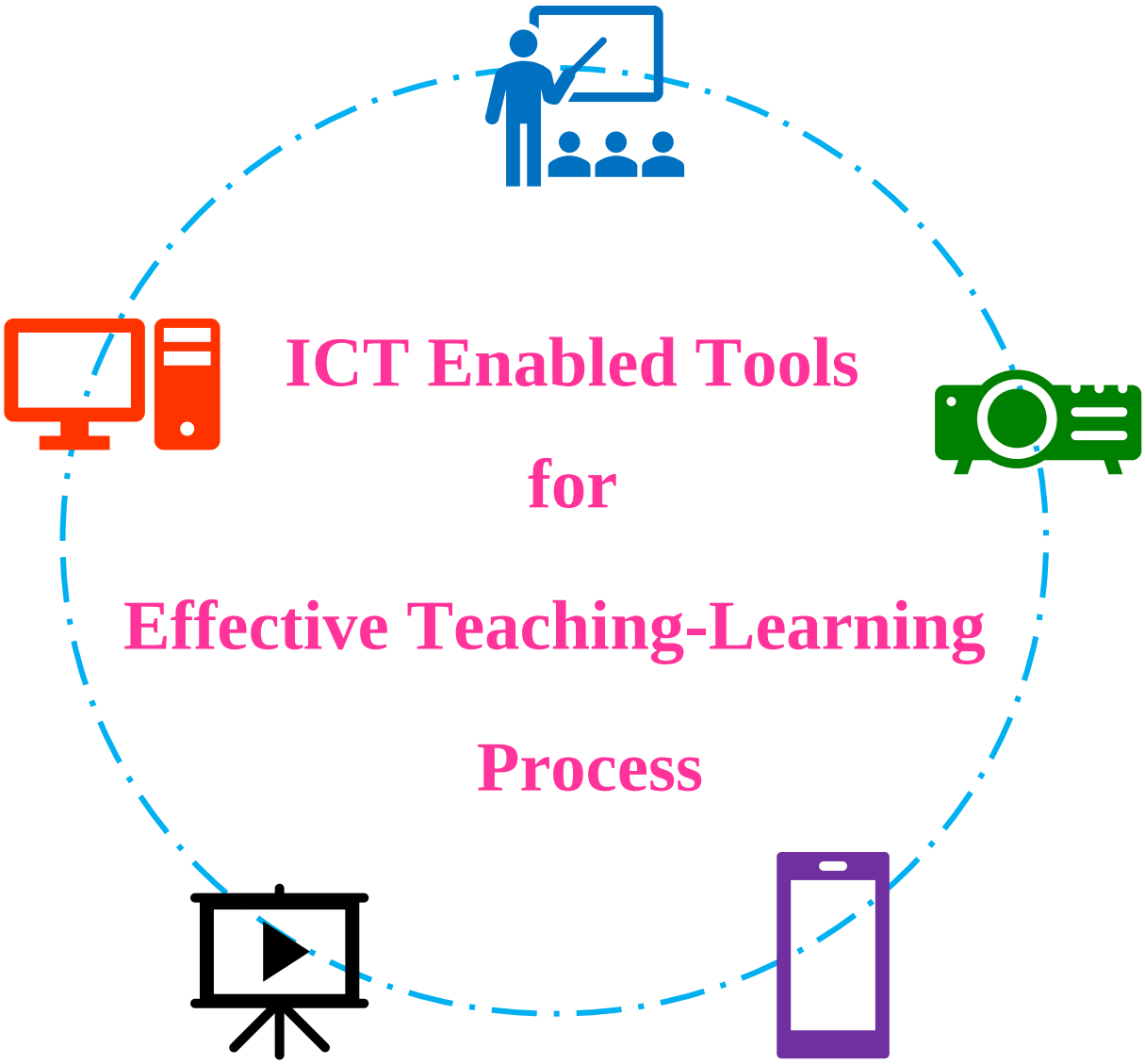

ICT Enabled Tools
for
Effective Teaching-Learning
Process

Index

ICT Enabled Tools for Effective Teaching and Learning Process

Department of Physics

Academic Year 2023-24

Class	Topic Name	ICT used	Link
Prof. R. N. Mulik			
M.Sc. II	Ceramic Materials (R. N. Mulik Video)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia/ V-Lab	https://youtu.be/oO-
	Composite Materials (R. N. Mulik Video)		https://youtu.be/VDPCC8H4
M.Sc. I	Nanostructured Materials (R. N. Mulik Video)		https://youtu.be/EGPGXZ8Y
	Polymer Materials (R. N. Mulik Video)		https://youtu.be/G0HoSDPen
B.Sc. III	Biomaterials (You-tube Video)		https://www.youtube.com/wa
	Nanotechnology (You-tube Video)		https://www.youtube.com/wa
	Piezoelectric Materials		Power Point Presentation
	Google Meet		https://meet.google.com/rbj-
	Precessional Motion		Power Point Presentation
	Materials Properties		https://en.wikipedia.org/wiki/

	(Wikipedia)		
	Resistivity by Four Probe Method (Virtual Lab)		https://vlab.amrita.edu/?sub=
Prof. S. D. Chavan			
Ph.D. (Course Work)	Research Design	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia/ V-Lab	Power Point Presentation
M.Sc. II	Chemical Methods of Thin Film Synthesis		Power Point Presentation
M.Sc. I	Logic Simplification (YouTube Video)		https://www.youtube.com/
B.Sc. III	Particle Accelerator (Prof. S. D. Chavan Video)		https://youtu.be/qsXXisiBo
	Nuclear Physics		Power Point Presentation
B.Sc. II	FET and BJT (Prof. S. D. Chavan Video)		https://youtu.be/E0Luuy16
	Field Effect transistor (Prof. S. D. Chavan Video)		https://youtu.be/oyX1aL5b
B.Sc. I	Moment of inertia of a Torsion Pendulum (V-Lab Experiment Demonstration)		https://vlab.amrita.edu/?su
Dr. E. K. Kore			
M.Sc. II	Charge Carriers in Semiconductors		https://youtu.be/5IcgpaQy-

	Google Classroom (Code: rfno6uu)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia/ V-Lab	https://classroom.google.com/c/
M.Sc. I	Quantum Mechanics		https://youtu.be/Usu9xZfabP
	Uncertainty Principle		https://www.youtube.com/watc
	Google Classroom (Code: 7tdvbak)		https://classroom.google.com/c/
B.Sc. III	Google Classroom (Code: dulrifc)		https://classroom.google.com/c/
	Coulomb's Law (YouTube Video)		https://youtu.be/2GQTfpDE9
	Gauss law (YouTube Video)		https://youtu.be/owMznEZP
	Bravais lattices (YouTube Video)		https://youtu.be/s2iY1pMcyR
	Effective mass (YouTube Video)		https://youtu.be/f_naRpURS
	Difference between AC & DC (YouTube Video)		https://youtu.be/Wm75Xgbq
	Maxwell's Equations		https://www.youtube.com/watc
	Google Classroom (Code: wmdcjzk)		https://classroom.google.com

B. Sc. II	Ozone Layer (E. K. Kore Video)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia/	https://www.youtube.com/wa
	Layers of Atmosphere (YouTube Video)		https://youtu.be/5sg9sCOXFI
	Tephigram		https://www.youtube.com/watc
	Google Classroom (Code: yrhikk2)		https://classroom.google.com/c/
	Class Notes (Google Drive)		https://drive.google.com/file/
	Class Notes (Google Drive)		https://drive.google.com/file/
Dr. S. G. Pawar			
M.Sc. II	Solar Cell		https://www.youtube.com/watch?
	Supercapacitors		Power Point Presentation
	Fuel Cell		Power Point Presentation
M.Sc. I	Energy Science and Energy Technology		Power Point Presentation
	Wind and Biomass Energy		Power Point Presentation
	Solar Energy		Power Point Presentation

B. Sc. III	Moving Coordinate System	V-Lab	Power Point Presentation
	Coupled Oscillations		Power Point Presentation
	Motion of Rigid Body		Power Point Presentation
B. Sc. II	Voltage Sweep Generator (YouTube Video)		https://www.youtube.com/watch?
	UJT as a Relaxation Oscillator (YouTube Video)		https:/ /www.youtube.com/watch?
B. Sc. I	Optics and Laser		Power Point Presentation
	Diffraction		Power Point Presentation
Dr. C. V. Chanmal			
M.Sc. II	Google Classroom (Code: fozjfox)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/	https://classroom.google.com/c/N
	MCQ Test (Google Form)		https://forms.gle/pxTx6Pe8wQb5
	Vacuum Technology		https://www.youtube.com/w
M.Sc. I	Introduction to Thermodynamics		https://www.youtube.com/

	Canonical Ensemble	Wikipedia/ V-Lab	https://www.youtube.com/
B.Sc. III	Google Classroom (Code: lbksjob)		https://classroom.google.com/c/N
	MCQ Test		https://forms.gle/gJEV8DMxah3
B. Sc. II	Google Classroom		https://classroom.google.com/c/N
	MCQ Test		https://forms.gle/wUdaJTg8BKZ
B.Sc. I	Google Classroom (Code: lcx22f6)		https://classroom.google.com/c/N
	MCQ Test Google Form		https://forms.gle/NogBRMVijBF
	MCQ Test Google Form		https://forms.gle/RYoq7SjbLd4s

Few Slides of Presentation

General Physics

B.Sc. II Sem - III

2. PRECESSIONAL MOTION

Prof. Dr. R. N. Mulik
Head Department of Physics
DBF Dayanand College of Arts and Science, Solapur

1

CONTENT

2

➢ Introduction

- Working of gyrocompass for navigation of ships and aeroplanes, directional stability of firing bullet etc., the principle of precessional motion is employed.
- To study the precessional motion, plane vectors is essential.
- The physical quantities like velocity, acceleration, force etc. can be represented by vectors called as linear vectors.
- Rotational dynamics, are represented by plane vectors.
- A plane vector is a two dimensional with one dimension as a plane of rotation and the other is its line of action. Eg. Angular velocity, angular momentum, torque etc.

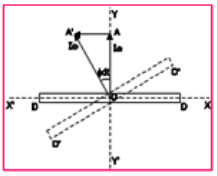
3

2.1 Precession

- The plane of rotation is called precession.
- The precession is caused by a couple or torque acting on a plane perpendicular to the rotation (or spin) of the body.

❖ **For precession a torque is necessary :**

- Consider a disc DD revolving with a constant angular velocity ω.
- Let the plane of the disc is perpendicular to the plane of paper and axis along YY'
- I - be the moment of inertia
- Iω - angular momentum
- After precession the disc takes position D'D' making an angle Ødt with its original position.



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DBF DAYANAND COLLEGE OF ARTS AND SCIENCE, SOLAPUR DEPARTMENT OF PHYSICS

Materials Science

(Paper - XIV)

B.Sc. III Sem - V

1. MATERIALS AND THEIR PROPERTIES

Prof. Dr. R. N. Mulik
Head of Department
Department of Physics,
D. B. F. Dayanand College of Arts & Science, Solapur.

1

DBF DAYANAND COLLEGE OF ARTS AND SCIENCE, SOLAPUR DEPARTMENT OF PHYSICS

Contents

2

Unit I

Chemical Methods of Thin Film Synthesis

Prof. S. D. Chavan
Department of Physics
DBF Dayanand College of Arts and Science, Solapur

Chemical vapor deposition: Common CVD reactions, Methods of film preparation, laser CVD, Photochemical CVD, Plasma enhanced CVD. Chemical bath deposition: ionic and solubility products, preparation of binary semiconductors, Electrodeposition: Deposition mechanism and preparation of compound thin film Spray pyrolysis: Deposition mechanism and preparation of compound thin Films. Ion-assisted deposition (IAD), Laser ablation, Longmuir Blochet film, Sol-gel film deposition.

B. Sc. III Physics Paper XII

Nuclear Physics

Prof. S. D. Chavan
Department of Physics
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Methods of film preparation

❑ Classified by operating conditions:

- Atmospheric pressure CVD (APCVD) – CVD at atmospheric pressure.
- Low-pressure CVD (LPCVD) – CVD at sub-atmospheric pressures. Reduced pressures tend to reduce unwanted gas-phase reactions and improve film uniformity across the wafer.
- Ultrahigh vacuum CVD (UHVCVD) – CVD at very low pressure, typically below 10−6 Pa (≈10−8 torr).
- Sub-atmospheric CVD (SACVD) – CVD at sub-atmospheric pressures. Uses tetraethyl orthosilicate (TEOS) and Ozone to fill high aspect ratio Si structures with silicon dioxide (SiO_2).[3]

- Most modern CVD is either LPCVD or UHVCVD.
- Classified by physical characteristics of vapor:
- Aerosol assisted CVD (AACVD) – CVD in which the precursors are transported to the substrate by means of a liquid/gas aerosol, which can be generated ultrasonically. This technique is suitable for use with non-volatile precursors.
- Direct liquid injection CVD (DLICVD) – CVD in which the precursors are in liquid form (liquid or solid dissolved in a convenient solvent). Liquid solutions are injected in a vaporization chamber towards injectors (typically car injectors). The precursor vapors are then transported to the substrate as in classical CVD. This technique is suitable for use on liquid or solid precursors. High growth rates can be reached using this technique.

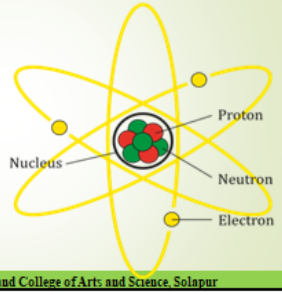
Total Marks -100 marks

UA-80 marks

CA-20 marks

Atom

- Nucleus- Proton and neutron- Physics of nucleus is Nuclear physics
- Electron -Physics of an electron is Electronics



1.Nuclear Structure and Properties

1.1 Composition of nucleus
1.2 Nuclear radius
1.3 Nuclear spin
1.4 Nuclear magnetic moment
1.5 Electric quadrupole moment
1.6 Mass defect
1.7 Binding energy
1.8 Packing fraction
1.9 Liquid drop model of nucleus
1.10 Semi-empirical mass formula

Ph. D. Course Work Physics
Research Methodology
RESEARCH DESIGN

Prof. S. D. Chavan
Department of Physics
DBF Dayanand College of Arts and Science, Solapur

1

Contents

- Research Design
  - Meaning of Research Design
  - Need of Research Design
  - Features of a Research Design
  - Different Research Designs
- Plagiarism

2

Meaning of Research Design

- A research design is the **arrangement of conditions for collection and analysis of data** in a manner that aims to combine relevance to the research purpose with economy in procedure.
- Decisions regarding what, where, when, how much, by what means concerning an **enquiry or a research** study constitutes a research design.

3

The **designing decisions** happen to be in respect of

(i) What is the study about?
(ii) Why is the study being made?
(iii) Where will the study be carried out?
(iv) What type of data is required?
(v) Where can the required data be found?
(vi) What periods of time will the study include?
(vii) What will be the sample design?
(viii) What techniques of data collection will be used?
(ix) How will the data be analysed?
(x) In what style will the report be prepared?

4

M.Sc. II (PAH Solapur University, Solapur)
Paper OET 3.2
Energy Harvesting Devices

2. Supercapacitors

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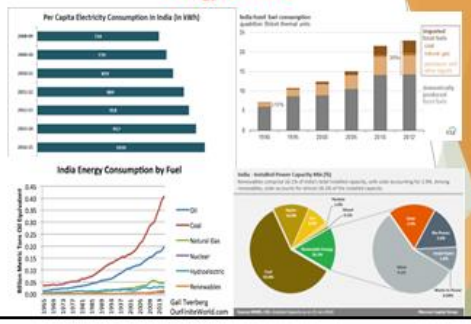
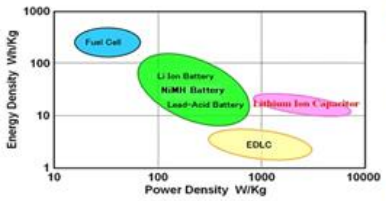
Syllabus

Comparison of battery and super capacitors, Super capacitor characterization, Types of super capacitors, double layer and pseudo capacitance, hybrid super capacitors, Recent status of carbon, RuO_2 and polyaniline based super capacitors, different methods for preparation of cathodic and anodic electrode materials, Fabrication of super capacitors with examples, Applications of supercapacitors

Energy Scenario



RAGAONE PLOT:



M.Sc. II (PAH Solapur University, Solapur)
OET 3.2
Energy Harvesting Devices

3. Fuel Cells

Comparison between fuel cells and batteries, fuel cell characterizations, Types of fuel cells: Metal oxide, proton exchange membrane, Phosphoric acid, Solid oxide fuel cells, working of fuel cells, Materials for fuel cells, applications of fuel cells

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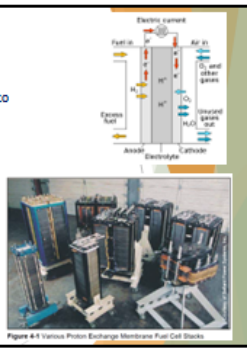
Introduction

- A fuel cell is an electrochemical cell that converts the chemical energy of a fuel (often hydrogen) and an oxidizing agent (often oxygen) into electricity through a pair of redox reactions.
- First Developed by Sir William Grove in 1839.
- Proton exchange membrane fuel cells were first used by NASA in the 1960's as part of the Gemini space program, and were used on seven missions. Those fuel cells used pure oxygen and hydrogen as the reactant gases and were small-scale, expensive and not commercially viable.



Historical events - Fuel Cells

- ✓Discovered in 1838 by German Scientist Christian Friedrich Schonbein
- ✓1st fuel cell demonstrated by sir William Robert Grove in February 1839
- ✓**United technologies corporation's (UTC)power subsidiary was the first company to manufacture and commercialise a large, stationary fuel-cell system -** use as a co-generation power plant in hospitals, universities and large office buildings
- ✓UTC power continues to market as PureCell 200 (a 200 kW system)

Advantages of Fuel Cells

- Fuel cell systems operate without pollution when run on pure hydrogen, the only by-products being pure water and heat. When run on hydrogen-rich reformate gas mixtures, some harmful emissions result although they are less than those emitted by an internal combustion engine using conventional fossil fuels.
- Fuel cell systems operate at higher thermodynamic efficiency than heat engines.
- Fuel cells are modular in construction with consistent efficiency regardless of size.
- Fuel cells exhibit good load-following characteristics. Fuel cells, like batteries, are solid state devices that react chemically and instantly to changes in load.
- When used as an electrical energy generating device, fuel cells require fewer energy transformations than those associated with a heat engine.

When used as a mechanical energy generating device, fuel cells require an equal number of conversions, although the specific transformations are different.

Every energy transformation has an associate energy loss so that the fewer transformations there are, the better the efficiency. Thus fuel cells are more ideally suited to applications that require electrical energy as the end product, rather than mechanical energy.

Unit III: Wind and Biomass Energy

Part-I Wind Power
1. Sources of wind energy
2. Global wind patterns
3. Modern wind turbines
4. Kinetic energy of wind
5. Principles of a horizontal axis wind turbine
6. Wind turbine blade design
7. Dependence of the power coefficient Cp on the tip-speed ratio λ
8. Design of a modern horizontal axis wind turbine
9. Two basic control of operation
10. Wind characteristics
11. Power output of a wind turbine
12. Wind farms
13. Environmental impact and public acceptance
14. Economics of wind power, Outlook and Conclusion

Part-II Biomass
1. Photosynthesis and energy cells
2. Biomass potential and cost
3. Biomass energy production
4. Environmental impact of biomass
5. Economics and potential of biomass, Outlook
6. Biogas plants and Types of Biogas plant

Part-I Wind Power

Introduction

- Winds are horizontal movement of AIR from an area of HIGH pressure to an area of low pressure.
- Wind energy is a kinetic energy associated with movement of large masses of air.
- It is clean, cheap and eco-friendly renewable source.
- Wind energy is utilized as mechanical energy with the help of a wind turbine.
- Moderate to high-speed winds, typically from 5m/s to about 25m/s are considered favorable for most wind turbines.
- The electric power generation through wind was first proposed in Denmark in 1890

1. Source of wind energy

- The Original Source of wind Energy is in radiation from the sun which is absorbed by land and Sea, turns into heat around the air. Material absorbs radiation differently so temperature gradient arise causing convection and pressure changes, which result in winds.
- Example: in offshore night-time wind often found on coasts, caused by the sea retaining the heat from the Sun better than the land
- On a global scale, the higher intensity of solar radiation at the equator that causes warm air to rise up from the equator and cooler air to flow in from the north and south.
- The direction of a wind traditionally taken to be where it comes from, so in the Northern hemisphere the warm air rising up from the equator would give rise to a northerly wind at ground level.
- The amount of power residue in the winds is about 1-2% of the incident solar power of 1.37 kW/m^2 is converted into winds

- The radius of the Earth is approximately 6000 km so the cross-sectional area receiving solar radiation is about 10^{14} m^2 and the power in the wind is ~10^{17} W. This is some 100 times the total global power usage.
- Winds are variable both in time and in location, with some parts of the world exposed to frequent high winds and some to almost no wind.
- Places where high and low winds occur are, in particular, determined by the effect of the rotation of the Earth.
- Over distances of tens of kilometers, the Earth's rotation has no significant effect on the direction of a wind; however, over hundreds of kilometers the effect is very noticeable.

2. Global wind patterns

- The higher intensity of solar radiation at the equator would set up a north-south convective flow of air if the Earth were not rotating.
- However, the Earth's rotation causes a point on the Earth to have a velocity towards the east that is highest at the equator, decreasing towards the poles.
- Therefore a wind moving north or south to an observer on the equator will initially have a component of velocity towards the east to an observer in space.
- As the wind moves away from the equator its distance to the Earth's axis decreases so its component of velocity towards the east increases.
- Air initially moving north will therefore reach a northern latitude at a point that is east of its origin.
- For the observer on Earth the wind appears to be accelerating towards the east and the apparent force is called the Coriolis force.

Fig. 3.1. Notice that there are three regions, called cells, in each hemisphere.

- The wind speed would, in principle, reach large values by high latitudes, but by latitude 30 degree the flow becomes unstable. As a result the north or south motion of the wind is dissipated and such winds are thereby restricted to within the 30 degree latitudes.
- In the Northern hemisphere the sinking air near the 30 degree latitude gives rise to the northeast trade winds and the westerly wind belt that is the prevailing wind over Europe.
- In practice the effects of surface friction and large-scale eddy motions have a big influence, as do seasonal variations, and only the cell nearest the equator, the Hadley cell, is clearly seen. The mid-latitude Ferrel cell is quite weak and the 'polar' cell is hardly observed. The winds are weak in the region between cells. However there are many areas where the winds are strong and reliable and it is in these locations the energy in the wind can be best exploited.
- Windmills were developed in the USA for pumping water, where they became very common. They were eventually displaced with the development of a national electricity grid in the 1930s.

M.Sc. I (PAH Solapur University, Solapur)
Sem II
Paper OET 2.2
Conventional and Non-conventional Energy

1. Energy Science and Energy Technology

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Unit I: Energy Science and Energy Technology

A brief history of energy technology, Various sciences and energy science, Energy, man and environment, Thermodynamics and energy analysis, Classification of conventional and non conventional energy sources, Global energy trends, Hydro energy-merits and demerits, Primary hydro energy resources, Types of hydroelectric plants, Energy and power equations, Hydraulic turbines, Fossil Fuels, Conversion and applications, Types of coal, properties of coal, Coal production and processing.

What is energy?

Energy is the cause behind the motion of particles or objects.

Energy is the capability to produce motion; force, work, change in shape, change in form, etc.

Energy exists in many forms:

Chemical energy, nuclear energy, solar energy, mechanical energy, electrical energy, internal energy in a body, bio energy in vegetables and animal bodies, thermal energy, etc.

Energy chain comprising of several energy links:

Each link represents an energy transformation and the energy chain has several energy links between raw energy and usable energy. Eg. Coal is extracted from nature. Coal energy chain by thermal power plant route is:

Fig. Energy Chain (Coal to electrical energy)

Concept of energy:

Concept of energy is derived from classical mechanics while explaining work. Work is performed when a particle or and rigid object moves.

Work is energy in transit. Energy is cause of work. Energy is capability of performing work.

Primary energy, intermediate energy and secondary energy:

Primary energy or raw energy: are resources available in nature.

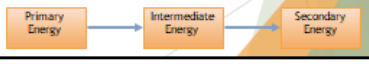
Eg. Coal, petroleum, solar, wind, geothermal, etc.

Intermediate energy: is obtained from primary energy resources by one or more processes. Eg. Steam, chemicals

Secondary energy or usable energy: is finally supplied to the consumer for utilisation.

Eg. Fuels, electricity, etc.

Thus the energy chain is



M.Sc. I (PAH Solapur University, Solapur)
Sem II
Paper OET 2.2
Conventional and Non-conventional Energy

2. Solar Energy

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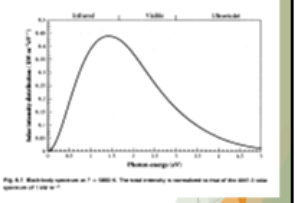
The solar spectrum, Semiconductors, p-n junction, Solar photocells, Efficiency of solar cells, Commercial solar cells, Developing technologies, Solar panels, Economics of photovoltaics (PV), Environmental impact of photovoltaics, Outlook for photovoltaics,
Solar thermal power plants, Solar thermal collectors, Flat plate collectors, Parabolic collectors, paraboloidal dish collector.

Introduction

- The average solar power incident on the Earth is ~ 1000 W m^{-2} (~ 100 mW per cm^2) or about 100000TW. This power is far larger than the current world power consumption of ~ 15TW.
- Currently, ~ 11% of the world's power is supplied by biomass, while 85% is derived from fossil fuels. Both are the consequence of photosynthesis, in which plants use solar energy to convert water and carbon dioxide into carbohydrates. While biomass is not necessarily a net producer of CO_2, the burning of fossil fuels definitely is. However, biomass is not a good converter of solar energy as the efficiency of biomass production is low (~ 0.2 – 2%).
- A more efficient conversion (~ 15%) of solar energy directly to electrical power is provided by photovoltaic (PV) cells. Currently (2004) these provide a peak power of ~ 2.5GW that is predicted to rise to ~ 1000 GW by 2030.
- The current price of PV cells is too high to be competitive with fossil or nuclear power, for electricity supply to a national grid, but is expected to decrease as new systems are developed. However, PV cells are already very competitive for applications in areas far from a grid.

The Solar Spectrum

The smooth spectrum shown in Fig. 6.1 is that of a black body at 5800 K. This spectral shape is close to that incident from the Sun on the Earth's atmosphere. The effect of passing through the thickness of the atmosphere is to reduce the total intensity from 1.36 kW m^{-2} for sunlight incident on the atmosphere, called AM0, to 1.0 kW m^{-2} for that passing through a typical thickness of the Earth's atmosphere taken to be 1.5 times its height, called AM1.5. AM1.5 corresponds to sunlight incident at an angle of 48° to the vertical.



The effect of absorption by water vapour, carbon dioxide, and methane is nearly all in the infrared region, corresponding to photon energies below ~ 1.7eV. The energy of the photons in the visible part of the solar spectrum ranges from ~ 3eV (0.4μm) to ~ 1.7eV (0.7μm)

B.Sc. III (PAH Solapur University, Solapur)
Paper XI
Classical Mechanics

3. Moving Coordinate System

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Moving Coordinate Systems

Two coordinate systems

- Fixed (inertial)
- Moving (Inertial or Non inertial)
  - Inertial: Non Accelerated / Moving with constant speed
  - Non inertial: Accelerated
  - Translational or Rotational

Rotational motion is always an accelerated motion: Since direction of linear velocity changes at every position.

3.1 MOVING ORIGIN OF COORDINATES

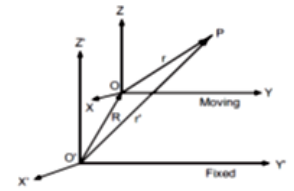

Fig. 3.1 : Coordinate systems (fixed and moving)

Let us consider two coordinate systems O' (x', y', z') fixed in space and other O (x, y, z) moving with a translational velocity with respect to fixed system. Let $\vec{R}$ be the position vector of O with respect to O' at an instant of time t.

B.Sc. III (PAH Solapur University, Solapur)
Paper XI
Classical Mechanics

5. Coupled Oscillations

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5. Coupled Oscillations: (7)

5.1 Frequencies of coupled oscillatory system

5.2 Normal modes and normal coordinates

5.3 Energy of coupled oscillations

5.4 Energy transfer in coupled oscillatory system

5.5 Problems

Introduction

A to and fro motion of a body about its mean or equilibrium position is known as an oscillatory motion. And if oscillatory motion repeats after a regular interval of time then it is called as simple harmonic motion.

Consider two oscillating systems and if motion of one system influence that of the other, then the two systems are said to be coupled to each other, and the oscillations are called coupled oscillations. The extent to which motion of one body influences that of other is called 'coupling' of the system. The coupled system may be mechanical or electrical.

5.1 FREQUENCIES OF COUPLED OSCILLATORY SYSTEM

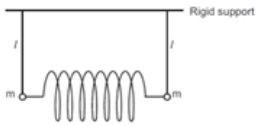

Fig. 5.1 : Coupled oscillatory systems

Consider a system of two identical pendulums coupled by means of a spring. If the masses of bobs of simple pendulum and lengths of strings are exactly equal then the two simple pendulums are said to be identical.

Suppose one pendulum oscillates first with other pendulum at rest. The energy from first pendulum gets transferred to the second and it alters between the two periodically. When first pendulum has maximum amplitude, the second has zero amplitude and vice-versa. We shall restrict to the systems in which the coupling is weak.

B.Sc. III (PAH Solapur University, Solapur)
Paper XI
Classical Mechanics

6. Motion of Rigid Body

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Motion of rigid body: (7)

6.1 Motion of rigid body in space

6.2 Euler's theorem

6.3 Angular momentum and energy

6.4 Euler's equations of motion

6.1 MOTION OF RIGID BODY IN SPACE

A rigid body is a one in which the distance between any two of its constituent particles is a constant.

A rigid body can have translational motion and rotational motion in space. Therefore a rigid body in motion can be completely specified if its position and orientation are given.

This can be achieved by specifying the coordinates of any three non-collinear points in the body. It is because if any one point of the body is fixed, the body may rotate about any axis passing through that point.

If two points of the body are considered then the body can rotate about an axis passing through these two points. Then the coordinates of the third point outside the axis, can locate the rigid body completely in space.

A point in space is specified by three coordinates. Therefore, to specify a rigid body in space (i.e. 3 non-collinear points of the body), we would need nine (09) coordinates.

These nine coordinates are not all independent of each other i.e. there are not nine degrees of freedom to the body. There are three (03) equations of constraints.

The vectors $\vec{r_i}$ and $\vec{r_j}$ represent the position vectors of three (03) points in the rigid body.

$$|r_1 - r_2| = \text{constant}$$

$$|r_1 - r_3| = \text{constant}$$

and $$|r_2 - r_3| = \text{constant}$$

These are holonomic constraints and r_1, r_2, r_3 are position vectors of points.

This reduces the number of degrees of freedom to six (06).

$$09 - 3 = 06 \qquad (3N - k = j)$$

Thus only six coordinates are independent of each other.

A general motion of a rigid body in space has six (06) degrees of freedom.

B.Sc. I (PAH Solapur University, Solapur)

Physics Paper II

Optics and Laser

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GEOMETRICAL OPTICS AND ABERRATIONS

Optics is a branch of physics which deals with the nature and properties of light. It is classified as follows :

1.Geometrical optics : It deals with image formation by mirror, lenses, prism and assumes rectilinear propagation of light.

2.Physical optics : It deals with nature of light and assumes Huygen's wave theory of light.

3.Quantum optics : It deals with study of interaction of light with atomic and nuclear particles.

Assumptions of Geometrical optics :

Following are the assumptions of geometrical optics :

(a) Light travels in a straight line in homogeneous medium (i.e. rectilinear propagation).

(b) Light rays are independent (i.e. even on intersection of two rays, each ray continues to travel in its own direction).

(c) Obey laws of reflection.

(d) Obey laws of refraction.

Fermat's principle of least time :

The optical path of a ray of light passing from one point to another by any number of reflections or refractions is the path of minimum time.

Fermat's principle of extremum path :

The optical path of a ray of light passing from one point to another, by any number of reflections or refractions is the path of extremum time (i.e. time may be maximum or minimum).

B.Sc. I (PAH Solapur University, Solapur)

Physics Paper II

Optics and Laser

4. Diffraction (8)

Introduction, Types of diffraction, Plane diffraction grating and its elementary theory, its application to determine wavelength, Comparison between prism and grating spectra

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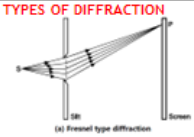
4.1 INTRODUCTION

The rectilinear propagation of light i.e. light travels in straight line in homogeneous medium can be explained on the basis of Newton's corpuscular theory. Using this property of light, we can explain formation of images by lenses and mirrors only.

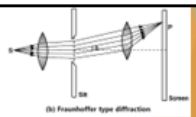
It is observed that the edges of the shadows of thin or sharp-edged opaque obstacle or objects like narrow slit, thin wire and razor blade are not sharp as expected on rectilinear propagation of light. This can be explained by assuming wave nature of light. This happens because of bending of light over the edges and corners of an obstacle and spread into geometrical shadow region. The bending of the beam round the edges of an obstacle is called diffraction.

It should be noted that for the effect of diffraction to be observable, the thickness of the edges of the obstacle must be small enough to be comparable with the wavelength (λ) of light.

4.2 TYPES OF DIFFRACTION



(a) Fresnel type diffraction



(b) Fraunhoffer type diffraction

Fresnel diffraction :

i) The source of light and the screen are effectively at finite distances from the obstacle.
ii) The lenses are not required in this type of diffraction.
iii) The incident as well as diffracted wavefronts are spherical or cylindrical.
iv) The phase of all points in the plane of the obstacle is not the same as the phase of secondary wavelets.
v) Each secondary wavelet produces its own effect at every point like P as maximum or minimum.
vi) The analysis of Fresnel diffraction is complicated.

Fraunhoffer diffraction :

i) The source of light and the screen are effectively at infinite distances from the obstacle.
ii) The two convex lenses are required in this type of diffraction. One convex lens is to make the light from source parallel and the other to focus the light after diffraction on to the screen.
iii) The diffraction is thus produced by the interference between parallel rays.
iv) The incident and diffracted (secondary) wavefronts are plane.
v) The phase of the wavefront at obstacle and the phase of diffracted wavefront is the same.
vi) The analysis of Fraunhoffer diffraction is simple.

4.3 PLANE DIFFRACTION GRATING

Plane diffraction grating consists of a large number of narrow parallel slits of equal width separated by opaque spaces of equal widths in a plane. Such a grating is called as transmission grating.

The grating is prepared by ruling large number of equidistant parallel lines on an optically plane thin glass plate with the help of fine diamond pointer. The space in between any two lines is transparent to light and the ruled portion is opaque to the light. Such surfaces act as transmission grating. This is known as original or Hilger grating.

To prepare number of replica of original grating, a transparent colloidal solution such as cellulose acetate is poured on the original grating and it is allowed to harden. Then this film formed is peeled off which bears impressions of the original grating. It is then mounted between two optically plane glass plates. This is called students grating and it works as original grating.

ICT Enabled Tools for Effective Teaching and Learning Process

Department of Chemistry

Academic Year 2023-24

Class	Topic Name	ICT used	Link
Prof. V. P. Ubale			
B.Sc. III	Introduction to Spectroscopy	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://www.youtube.com/watch
	Application of Spectroscopic Methods		https://www.youtube.com/watch?
	Perkin, Claisen and Thorpe Reactions		https://www.youtube.com/watc
B.Sc. II	Introduction to stereochemistry		https://www.youtube.com/watch?v
	Name Reactions & Their Mechanism		https://www.youtube.com/watch?v
	Ethers and Epoxides		https://www.youtube.com/watch?v
B.Sc. I	Quantitative Methods in Chemistry		https://www.youtube.com/watch?v
	A brief history of the beginnings of quantitation in Chemistry, defining chemical stoichiometry		https://www.youtube.com/watch?v
Mr. K. J. Mahajan			
M. Sc. II	Notes of All Curriculum and Classes (Google Drive)		https:// drive.google.com/file/

	Raman Spectroscopy	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
	Raman Spectroscopy (You Tube Video)		https://www.youtube.com/w
M. Sc. II	Electroanalytical Techniques		Power Point Presentation
	Polarography (You Tube Video)		https://www.youtube.com/w
B. Sc. III	Conductometry		Power Point Presentation
	Conductometry (You Tube Video)		https://www.youtube.com/w
B. Sc. II	The Solid State		Power Point Presentation
	Bragg's Law (You Tube Video)		https://www.youtube.com/w
B. Sc. I	Gaseous State		Power Point Presentation
	Liquefaction In Gases (You Tube Video)		https://www.youtube.com/w
Prof. S. Y. Jadhav			
M.Sc. II	Google Classroom (Code: n6z22eb)	Internet/	https://classroom.google.com/c/N
	^{13}C NMR Spectroscopy (You Tube Video)		https://www.youtube.com/watch?
M.Sc. I	Introduction to IR Spectroscopy (Prof. S. Y. Jadhav Video)		https://www.youtube.com/
	Addition Reactions to Alkenes and Alkynes		https://www.youtube.com/watch?

	(YouTube Video)	LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	
B.Sc. III	^{1}H NMR SPECTROSCOPY (YouTube Video)		https://www.youtube.com/watch?
	Stobbe condensation reaction (YouTube Video)		https://www.youtube.com/watch?
B.Sc. II	UV-Vis Spectroscopy & its applications (e-book)		https://link.springer.com/book/10.
	Aldehyde and Ketones (Wikipedia)		https://en.wikipedia.org/wiki/Car
B.Sc. I	Aromaticity (YouTube Video)		https://www.youtube.com/watch?
	Cycloalkane (e-book)		chrome-extension://efaidn
Dr. R. G. Gawali			
M.Sc. II	Pharmacodynamics	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
			https://youtu.be/XlEGpphUtZk?si
	Mass Spectrometry		Power Point Presentation
			https://link.springer.com/book/10.
M.Sc. I	Nucleophilic Substitution		Power Point Presentation
B.Sc. III	Organic Synthesis via Enolates		Power Point Presentation
B.Sc. II	Water Pollution		Power Point Presentation
B. Sc. I	Hybridization		https://youtu.be/J8GLj_armbA?si

	(You Tube Video)		
Mr. S. V. Rajmane			
M.Sc. I	Bio-Inorganic Chemistry	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
B.Sc. III	Energetics of Nuclear Reactions		Power Point Presentation
	Semiconductor		Power Point Presentation
	Crystal Field theory (Mr. S. V. Rajmane Video)		https://www.youtube.com/w
	Superconductors		Power Point Presentation
B.Sc. II	Comparison of 3d elements with 4d and 5d elements		Power Point Presentation
	Acids and Bases		Power Point Presentation
B.Sc. I	VSEPR Theory (Mr. S. V. Rajmane Video)		https://www.youtube.com/w
Prof. S. P. Deshmukh			
Ph. D	Mossbauer Spectroscopy-I (Prof. S. P. Deshmukh YouTube)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/	https://www.youtube.com/watch?
	Mossbauer Spectroscopy-II (Prof. S. P. Deshmukh YouTube)		https://www.youtube.com/watch?
M. Sc. II	ICP Spectroscopy (Prof. S. P. Deshmukh YouTube)		https://www.youtube.com/watch?
	Electron Spin Resonance Spectroscopy		https://www.youtube.com/watch?

M. Sc. I	(Prof. S. P. Deshmukh YouTube)	Wikipedia	
	Hyperfine Interaction-I (Prof. S. P. Deshmukh YouTube)		https://www.youtube.com/watch?
	Google Classroom (Code:zreez4a)		https://classroom.google.com/c/N
	Data Interpretation & Paper Writing-I		https://drive.google.com/file/d/10
	Data Interpretation & Paper Writing-II		https://classroom.google.com/u/0/
	Origin		https://classroom.google.com/u/0/
B. Sc. III	Atomic Absorption Spectroscopy (Prof. S. P. Deshmukh YouTube)		https://www.youtube.com/watch?
B. Sc. II	Hard and Soft Bases (Prof. S. P. Deshmukh YouTube)		https://www.youtube.com/watch?
	Study of d-Block Elements-I (Prof. S. P. Deshmukh YouTube)		https://www.youtube.com/watch?
	Study of d-Block Elements-II (Prof. S. P. Deshmukh YouTube)		https://www.youtube.com/watch?
B. Sc. I	UV-VIS Spectroscopy		Power Point Presentation
Prof. S. R. Pujari			

M. Sc. II	Google classroom (66cfcyq)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://classroom.google.com/u/1/
	Statistical Mechanics		Power Point Presentation
	Quantum Mechanics		Power Point Presentation
M. Sc. I	Schrodinger wave equation		Power Point Presentation
	Google classroom (sxjkksg)		https://classroom.google.com/u/1/
B. Sc. III	Electroplating (Prof. S. R. Pujari Video)		https://www.youtube.com/watch?
	Analytical and Industrial Physical Chemistry		https://www.youtube.com/watch?
B. Sc. II	Conductometry (Prof. S. R. Pujari Video)		https://www.youtube.com/watch?
	Environmental Studies		Power Point Presentation
	Thermodynamics		Power Point Presentation
Mr. S. S. Kumbhare			
M.Sc. I	Polymer Materials (Mr. S. S. Kumbhare YouTube Video)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://www.youtube.com/wat
B.Sc. III	Carboxylic Acid Derivatives (Mr. S. S. Kumbhare YouTube Video)		https://www.youtube.com/watch?
B. Sc. II	Ethers and Epoxides (Mr. S. S. Kumbhare		https://www.youtube.com/watch?

	YouTube Video)		
Mr. V. R. Shekdar			
M.Sc. II	Reduction by Lindlar Catalyst (Wikipedia)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://en.wikipedia.org/wi
M.Sc. I	Hoffmann Elimination (V.R. Shekdar Video)		https://www.youtube.com/
B. Sc. III	Chemical Thermodynamics (V.R. Shekdar Video)		https://www.youtube.com/wa
B.Sc. I	Bond Formation (YouTube Video)		https://www.youtube.com/wa
	Bond cleavage (Wikipedia)		https://en.wikipedia.org/wiki/
Mrs. P. A. Kabra			
B. Sc. II	Absorption Spectroscopy	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
	Carbohydrates Metabolism		Power Point Presentation
	Carbohydrates		Power Point Presentation
	Lipid Metabolism		Power Point Presentation
	The Nucleic Acids		Power Point Presentation
	Vitamins		Power Point Presentation
	Elisa		https://www.slideshare.net/

Few Slides of Presentation

D.B.F. DAYANAND COLLEGE OF ARTS AND SCIENCE, SOLAPUR.

DEPARTMENT OF CHEMISTRY

Mr. K. J. MAHAJAN

Specialization: *PHYSICAL CHEMISTRY*

(SEMESTER - I)

CHEMISTRY PAPER: I

(PHYSICAL CHEMISTRY)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM (CBCS)

Syllabus: CHEMISTRY

Name of the Course: B.Sc. I (Sem. –I & II)

(Syllabus to be implemented from w. e. f. June 2019)

GASEOUS STATE

INTRODUCTION:

All matter exists in three states: gas, liquid and solid. A gas consists of molecules separated wide apart in empty space. The gas molecules are free to move. Gas has no surface. It can completely fill any space available to it.

The behaviour of gases is often quite simple and many physical properties are found to be identical for all gases. As such some simple rule would state the behaviour of all gases. The identity in behaviour of different gases is evident from the fact that all gases generally obey some simple and common relations, which are called the ***gas laws.*** These well known laws may be as such Boyle's law, Charles' law, Graham's law, Dalton's law and Avogadro's law.

Ideal (perfect gas)and Non-Ideal (Real gas) Gases:

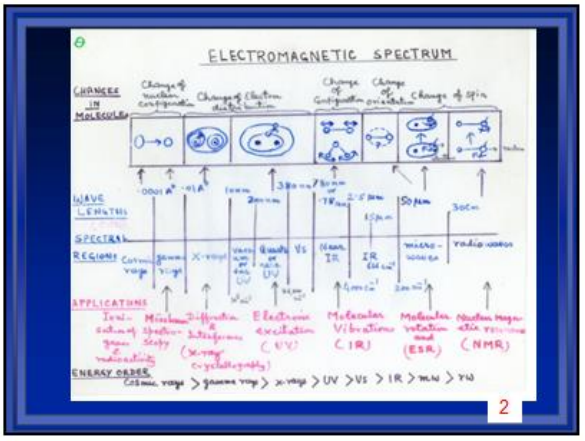
A gas which obeys the Boyle's law, Charle's law, Graham's law of diffusion, Avogadro's law **at all temperatures and pressures** is called an ***ideal gas or perfect gas*** while non-ideal or real gases is one that obeys the gas laws only **at low pressures and at relatively high temperatures.** Thus, ideal and non-ideal gases can be differentiated in number of respects as follows.

^{1}H NMR SPECTROSCOPY

Dr. Shravan Y. Jadhav
M.Sc, (SET), Ph.D.

Professor
Department of Chemistry
DBF Dayanand College of Arts & Science,
Solapur

1



2

^{1}H NMR SPECTROSCOPY

1. F.Bloch, W.W. Hansen and M.E.Packard
Phys. Rev., **69**, 37 (1946).
2. E.M. Purcell, H.C. Torrey and R.V. Pound,
Phys. Rev., **69**, 127 (1946)

Bloch and Purcell, Nobel Prize 1952

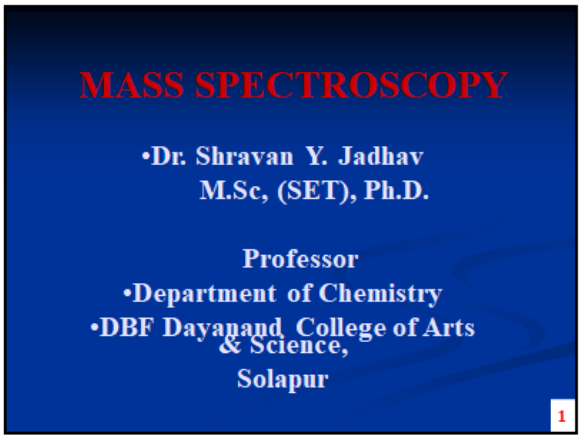
3

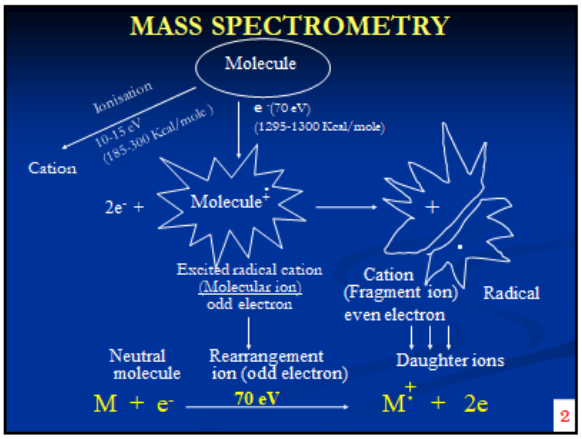
Packard et al., 1951, First NMR spectrum of ethanol CH_3CH_2OH- three peaks

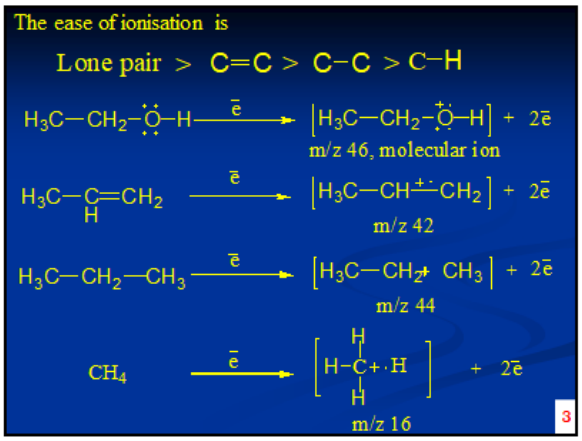
J.T. Arnold, S.S. Dharmati and M.E.Packard,

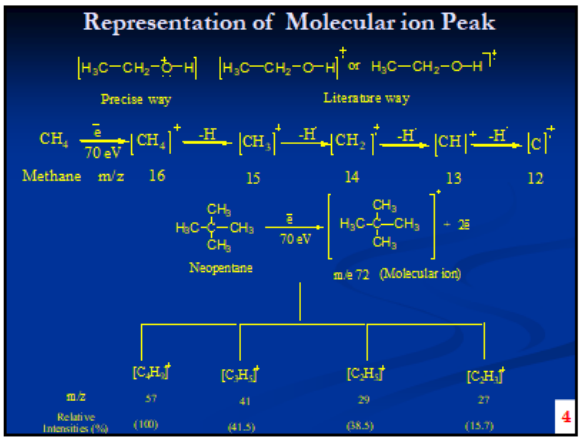
J. Chem. Phys., 19, 507 (1951)

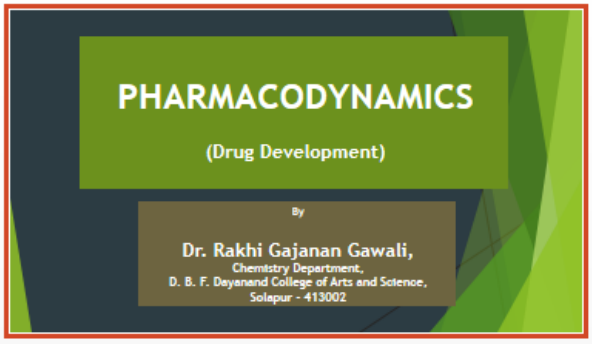
4


MASS SPECTROSCOPY
•Dr. Shravan Y. Jadhav
M.Sc, (SET), Ph.D.
Professor
•Department of Chemistry
•DBF Dayanand College of Arts & Science,
Solapur
1

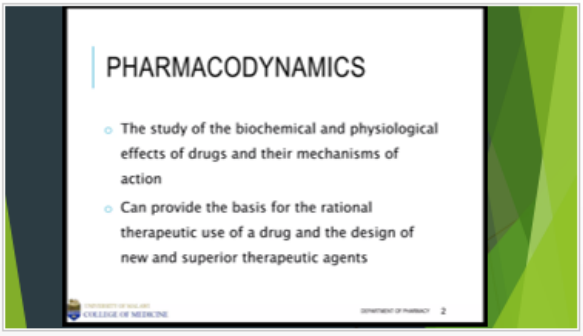

MASS SPECTROMETRY
Molecule
Ionisation
10-15 eV
(185-300 Kcal/mole)
e⁻ (70 eV)
(1295-1300 Kcal/mole)
Cation
2e⁻ +
Molecule⁺
Excited radical cation
(Molecular ion)
odd electron
Cation
(Fragment ion)
even electron
Radical
Neutral molecule
Rearrangement ion (odd electron)
Daughter ions
M + e⁻ 70 eV M⁺ + 2e
2


The ease of ionisation is
Lone pair > C=C > C–C > C–H
H3C–CH2–Ö–H + 2ē
m/z 46, molecular ion
H3C–C(H)=CH2 + 2ē
m/z 42
H3C–CH2–CH3 + 2ē
m/z 44
CH4 + 2ē
m/z 16
3

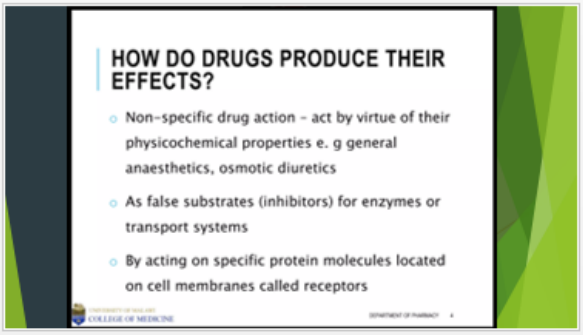

Representation of Molecular ion Peak
Precise way
Literature way
Methane m/z 16 15 14 13 12
70 eV
Neopentane
m/e 72 (Molecular ion)
m/z
Relative Intensities (%)
4


PHARMACODYNAMICS
(Drug Development)
By
Dr. Rakhi Gajanan Gawali,
Chemistry Department,
D. B. F. Dayanand College of Arts and Science,
Solapur - 413002

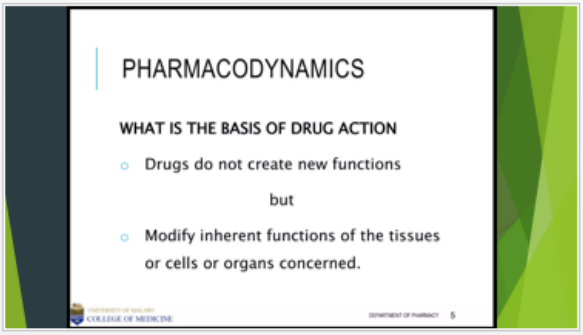
1


PHARMACODYNAMICS
The study of the biochemical and physiological effects of drugs and their mechanisms of action
Can provide the basis for the rational therapeutic use of a drug and the design of new and superior therapeutic agents

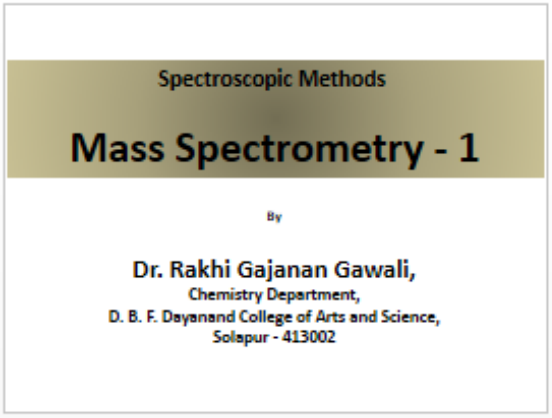
2


HOW DO DRUGS PRODUCE THEIR EFFECTS?
Non-specific drug action – act by virtue of their physicochemical properties e. g general anaesthetics, osmotic diuretics
As false substrates (inhibitors) for enzymes or transport systems
By acting on specific protein molecules located on cell membranes called receptors

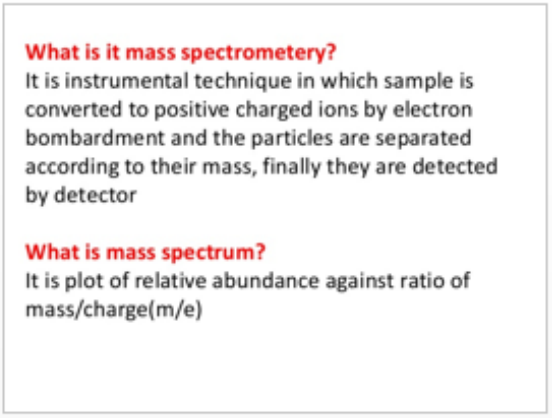
4


PHARMACODYNAMICS
WHAT IS THE BASIS OF DRUG ACTION
Drugs do not create new functions
but
Modify inherent functions of the tissues or cells or organs concerned.

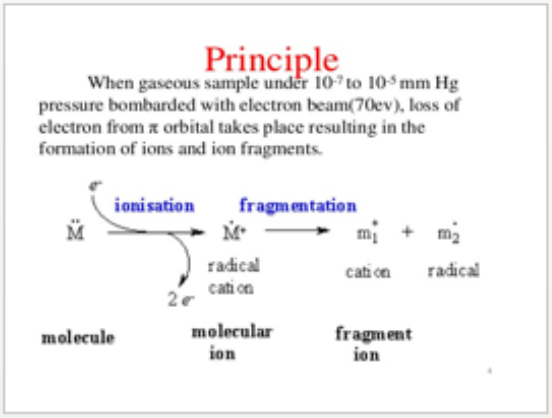
5

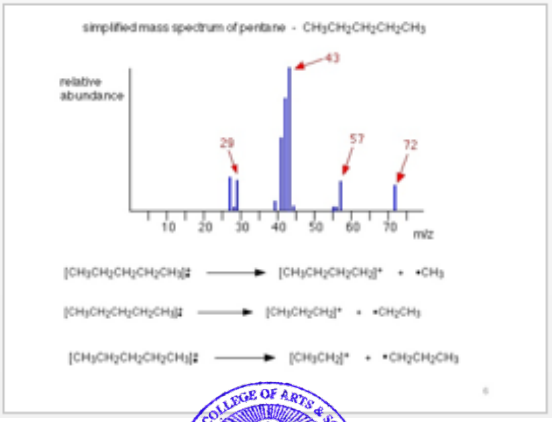

Spectroscopic Methods
Mass Spectrometry - 1
By
Dr. Rakhi Gajanan Gawali,
Chemistry Department,
D. B. F. Dayanand College of Arts and Science,
Solapur - 413002

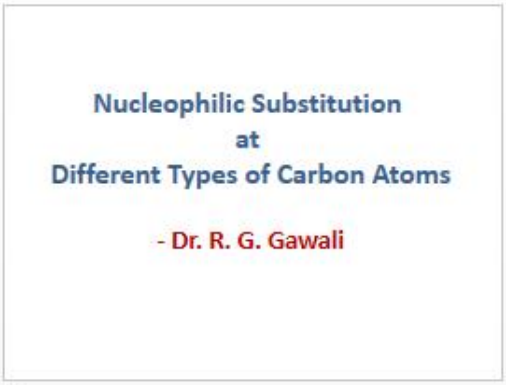
1


What is it mass spectrometery?
It is instrumental technique in which sample is converted to positive charged ions by electron bombardment and the particles are separated according to their mass, finally they are detected by detector
What is mass spectrum?
It is plot of relative abundance against ratio of mass/charge(m/e)

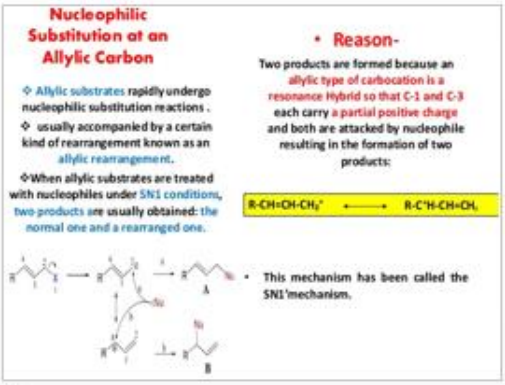
2


Principle
When gaseous sample under 10-7 to 10-5 mm Hg pressure bombarded with electron beam(70ev), loss of electron from π orbital takes place resulting in the formation of ions and ion fragments.
ionisation
fragmentation
radical cation
cation
radical
molecule
molecular ion
fragment ion

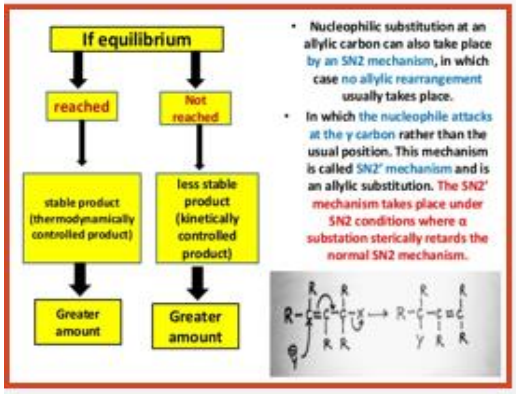

simplified mass spectrum of pentane - CH3CH2CH2CH2CH3
relative abundance
43
29
57
72
m/z


Nucleophilic Substitution
at
Different Types of Carbon Atoms
- Dr. R. G. Gawali

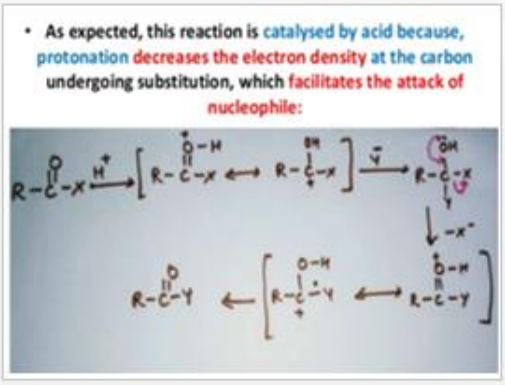
1


Nucleophilic Substitution at an Allylic Carbon
Allylic substrates rapidly undergo nucleophilic substitution reactions .
usually accompanied by a certain kind of rearrangement known as an allylic rearrangement.
When allylic substrates are treated with nucleophiles under SN1 conditions, two products are usually obtained: the normal one and a rearranged one.
Reason-
Two products are formed because an allylic type of carbocation is a resonance Hybrid so that C-1 and C-3 each carry a partial positive charge and both are attacked by nucleophile resulting in the formation of two products:
R-CH=CH-CH2+ ⟷ R-C+H-CH=CH2
This mechanism has been called the SN1 mechanism.

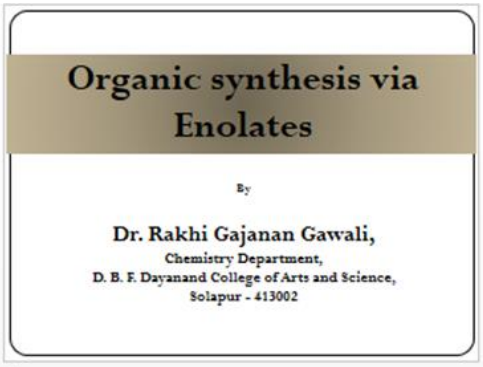
2


If equilibrium
reached
Not reached
stable product (thermodynamically controlled product)
less stable product (kinetically controlled product)
Greater amount
Greater amount
Nucleophilic substitution at an allylic carbon can also take place by an SN2 mechanism, in which case no allylic rearrangement usually takes place.
In which the nucleophile attacks at the γ carbon rather than the usual position. This mechanism is called SN2' mechanism and is an allylic substitution. The SN2' mechanism takes place under SN2 conditions where α substation sterically retards the normal SN2 mechanism.

5


As expected, this reaction is catalysed by acid because, protonation decreases the electron density at the carbon undergoing substitution, which facilitates the attack of nucleophile:

6


Organic synthesis via Enolates
By
Dr. Rakhi Gajanan Gawali,
Chemistry Department,
D. B. F. Dayanand College of Arts and Science,
Solapur - 413002

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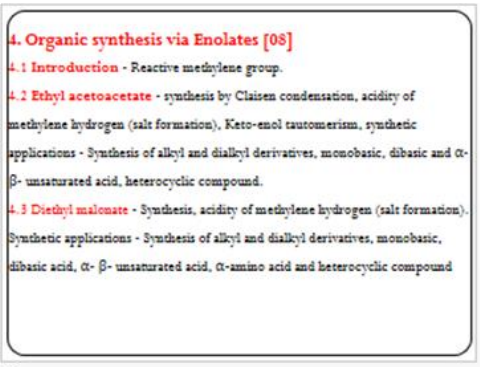
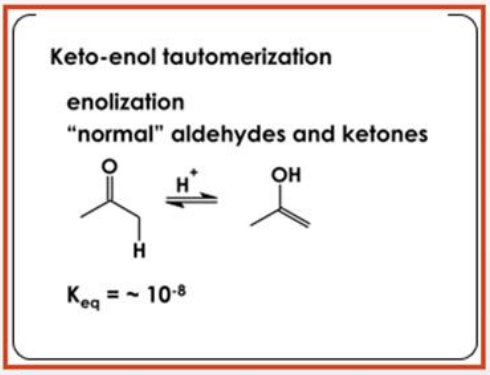
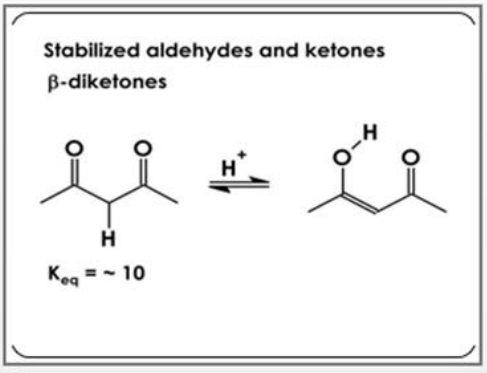

4. Organic synthesis via Enolates [08]
4.1 Introduction - Reactive methylene group.
4.2 Ethyl acetoacetate - synthesis by Claisen condensation, acidity of methylene hydrogen (salt formation), Keto-enol tautomerism, synthetic applications - Synthesis of alkyl and dialkyl derivatives, monobasic, dibasic and α-β- unsaturated acid, heterocyclic compound.
4.3 Diethyl malonate - Synthesis, acidity of methylene hydrogen (salt formation), Synthetic applications - Synthesis of alkyl and dialkyl derivatives, monobasic, dibasic acid, α- β- unsaturated acid, α-amino acid and heterocyclic compound

2


Keto-enol tautomerization
enolization
"normal" aldehydes and ketones
H+
OH
H
Keq = ~ 10-8

4


Stabilized aldehydes and ketones
β-diketones
H+
H
Keq = ~ 10

5

D.B.F. Dayanand College of Arts and Science, Solapur
Department of Chemistry

B.Sc.-II, Sem.-III
Paper-VI: Inorganic Chemistry

Topic: Comparison of 3d elements with 4d and 5d elements

Mr. S. V. Rajmane
M.Sc.; NET

Academic Year: 2023-2024

In the periodic table form 3d to 4d and 4d to 5d transition series, there is addition of new shell at each stage.

Therefore the size of d orbital's increases from 3d < 4d < 5d. In the third series before the filling of 5d orbital, 4f orbital is completely filled i.e. there is insertion of 4f orbital inner to the 5d orbital.

Due to addition of 4f orbital in inner side the nuclear force increases which show contraction in size. Thus the size of atoms in 5d series is near about same as that of 4d series atoms.

Due to same size, the properties of 4d and 5d transition elements are same, but they show different characteristics than 3d transition series elements.

- **Electronic configuration**

In 3d transition series only two elements i.e. Cr and Cu shows irregular electronic configuration which is related to the stability of half filled and completely filled electronic configuration respectively.

But in 4d and 5d transition series large number of elements shows irregular electronic configurations like Nb, Mo, Ru, Rh, Pd, Ag, W, Au etc.

Some of them like Mo, Au, Ag, and W etc. are related to the stability of half filled and complete filled electronic configuration, but there is no any region for irregularity in other elements.

- **Reactivity**

As compare to 4d and 5d transition series elements, the elements of 3d transition series have smaller size, hence greater polarizing power. Thus they have greater ability to accept the electrons from neighboring atoms. Hence 3d transition elements are more reactive than 4d and 5d transition elements.

- **Stability of oxidation state**

All the transition elements show variable oxidation states, but their stability must be different. In the 3d transition series lower oxidation states are stable, while in 4d and 5d transition series higher oxidation states are stable.

The compounds of 3d transition series elements with higher oxidation state like $KMnO_4$ (Mn^{+7}), $K_2Cr_2O_7$ (Cr^{+6}) etc. acts as oxidising agents, while the compounds of 4d and 5d transition series elements like TeO_2 (+4), ReO_2 (Re^{+4}) etc. acts as reducing agents.

- **Magnetic behavior**

Majority of the transition elements are paramagnetic in nature but their magnetic momentum is different. In 3d transition series due to smaller size and greater nuclear force the orbital magnetic momentum is quenched hence the magnetic behavior is related to only the spin of electrons. Therefore it is calculated by using spin only formula.

$$\mu = \sqrt{n(n+1)}\ BM$$

where, n = total number of unpaired electrons

While in the 4d and 5d transition series due to larger size both orbital and electron magnetic momentum is effective. Hence the momentum is calculated by using combined spin formula.

$$\mu = \sqrt{4S(S+1)+L(L+1)}$$

Where, S = summation of spin of electrons
L = summation of spin of orbital's i.e. azimuthal quantum number

Thus, the magnetic momentum of 4d and 5d transition series elements is greater than 3d transitions elements. Hence elements like Ta, W, Os etc. may be used for manufacturing of electromagnets.

- **Stability of complexes (Brief account only)**

During the formation of complexes the elements of 3d transition series shows either 4 or 6 co-ordination number with tetrahedral, square planner or octahedral geometry, while 4d and 5d transition series elements shows higher coordination number with octahedral or cubical geometries.

According to HSAB concept, 3d transition series elements are hard acids while 4d and 5d transition series elements are soft acids. Therefore 3d transition series elements form stable complexes with N, O, F donor atoms, while 4d and 5d transition series elements form stable complexes with S, P, Cl, Br etc. donor atoms. If the combination is reverse, the complexes are unstable.

D.B.F. Dayanand College of Arts and Science, Solapur
Department of Chemistry

Acids and Bases

Mr. S. V. Rajmane

Modern concepts for Acids and Bases :

(i) Arrhenius concept (1884) : According to Arrhenius concept, an acid is a substance which gives hydrogen ions (H^+) in aqueous solution and a base is a substance which gives hydroxyl ions (OH^-) in aqueous solution.

e.g.

$HCl_{(g)} + water \rightleftharpoons H^+_{(aq)} + Cl^-_{(aq)}$

Acid

$NaOH + water \rightleftharpoons Na^+_{(aq)} + OH^-_{(aq)}$

base

The strength of an acid or a base depends upon its capacity of ionization to give H^+ or OH^- ions respectively.

Syllabus:

Total Lecture:07 **Marks:~8**

3.1 Lewis Concept :
- A. Definition,
- B. classification
- C. merits and
- D. demerits.

3.2 Hard and soft acids and bases (HSAB) :
- A. Classification of acids and bases as hard and soft.
- B. Pearson's HSAB concept.
- C. Acid-Base strength and hardness-softness.
- D. Applications and limitations of HSAB principle.

(ii) Bronsted and Lowry concept (1923) : According to Bronsted - Lowry concept, an acid is a substance which can donate a proton (H^+) and a base is a substance which can accept a proton (H^+).

e.g. $CH_3COOH + H_2O \rightleftharpoons H_3O^+ + CH_3COO^-$

$acid_1 \quad base_2 \quad acid_2 \quad base_1$

$NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$

$base_1 \quad acid_2 \quad acid_1 \quad base_2$

Such pair of substances which can be formed from one another by the gain or loss of a proton are known as conjugate acid-base pairs. The acid-base reactions were thus regarded as proton-transfer reactions.

Introduction:

- The word acid has been derived from Latin word ***acidus meaning sour.***
- *The word **alkali** has been derived from the Arabic word **al-quili, meaning the ashes of a plant.***
- *Lavoisier (1787) said that acids are binary compounds **possessing oxygen** e.g. CO2, SO2, NO2, etc. which actually acted as acids in water solution.*
- *Humphry Davy (1810) verified that hydrochloric acid is a compound of hydrogen and chlorine, and it does not possess oxygen. Therefore he said, "**acidity is not connected with the presence of any one element**".*
- *Liebig (1838) regards acids as compounds containing **hydrogen which could be replaced by metals.***

(iii) Cady-Eday Concept (Solvent System Concept) (1928) : According to this concept, an acid is a substance which produces cation of the solvent either by dissolving or by reacting with the solvent and a base is a substance which produces anion of the solvent either by dissolving or by reacting with the solvent.

e.g. $SO_2 + SO_2 \rightleftharpoons SO^{2+} + SO_3^{2-}$

substance solvent cation anion

(acid) (base) (acid) (base)

$H_2O + H_2O \rightleftharpoons H_3O^+ + OH^-$

acid base acid base

$CH_3COOH + CH_3COOH \rightleftharpoons CH_3COOH_2^+ + CH_3COO^-$

acid base acid base

(iv) LUX-Flood Concept (1939) : According to this concept, an acid is an oxide-ion acceptor while a base is an oxide ion donor.

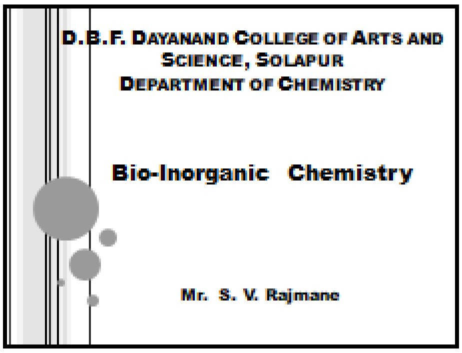
e.g.

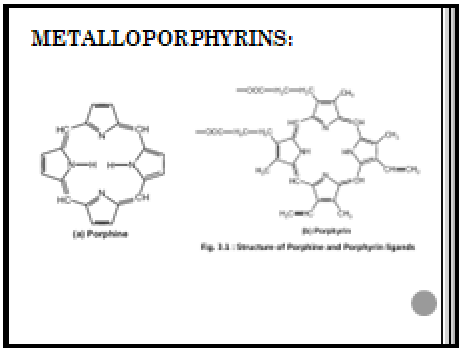
$CaO + SiO_2 \longrightarrow CaSiO_3$

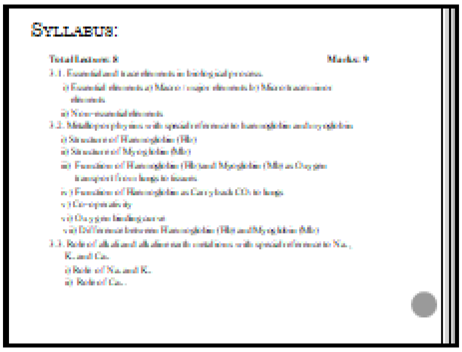
base acid salt

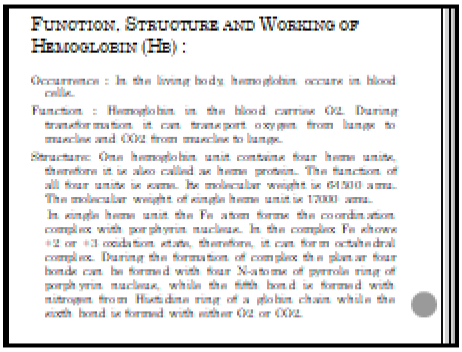
$PbO + SO_2 \longrightarrow PbSO_3$

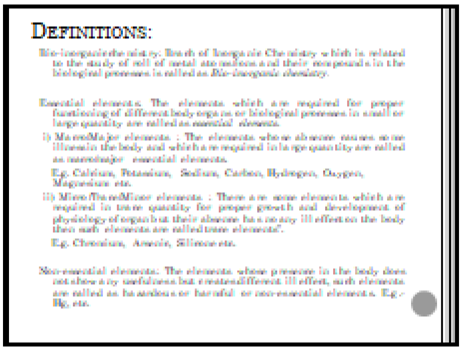
base acid salt

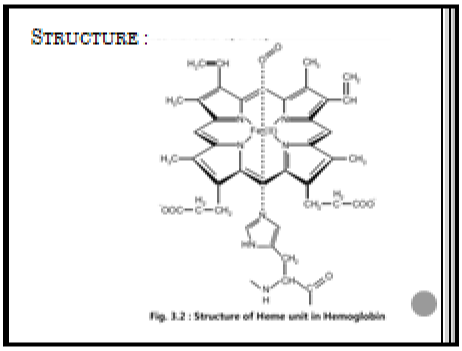

D.B.F. DAYANAND COLLEGE OF ARTS AND SCIENCE, SOLAPUR
DEPARTMENT OF CHEMISTRY
Bio-Inorganic Chemistry
Mr. S. V. Rajmane


METALLOPORPHYRINS:
(a) Porphine
(b) Porphyrin
Fig. 3.1 : Structure of Porphine and Porphyrin ligands


SYLLABUS:


FUNCTION, STRUCTURE AND WORKING OF HEMOGLOBIN (HB) :
Occurrence : In the living body hemoglobin occurs in blood cells.
Function : Hemoglobin in the blood carries O2. During transformation it can transport oxygen from lungs to muscles and CO2 from muscles to lungs.
Structure: One hemoglobin unit contains four heme units, therefore it is also called as heme protein. The function of all four units is same. Its molecular weight is 64500 amu. The molecular weight of single heme unit is 17000 amu.
In single heme unit the Fe atom forms the coordination complex with porphyrin nucleus. In the complex Fe shows +2 or +3 oxidation state, therefore, it can form octahedral complex. During the formation of complex the planar four bonds can be formed with four N-atoms of pyrrole ring of porphyrin nucleus, while the fifth bond is formed with nitrogen from Histidine ring of a globin chain while the sixth bond is formed with either O2 or CO2.


DEFINITIONS:
E.g. Calcium, Potassium, Sodium, Carbon, Hydrogen, Oxygen, Magnesium etc.


STRUCTURE :
Fig. 3.2 : Structure of Heme unit in Hemoglobin

D.B.F. Dayanand College of Arts and Science, Solapur
Department of Chemistry

B.Sc.-III, Sem.-V
Paper-X: Inorganic Chemistry

Topic: Superconductors

Mr. S. V. Rajmane
M.Sc.; NET

Academic Year: 2023-2024

Ceramic Superconductor

- The first non-metallic superconductor was found in 1964.
- This was a metal oxide with a **perovskite crystal structure** and found to be quite different type of superconductor from the alloys.
- In March 1987, one of the most significant ceramic superconductor was reported by **Wu, Chu and co-workers.**
- This is a mixed oxide type material based on the Y–Ba–Cu–O system, formulated as **YBa2Cu3O7–x** which became superconducting at **93 K**.
- This temperature appeared to be quite significant for practical reasons. This temperature allowed liquid nitrogen to be used as coolant rather than the more expensive liquid helium which was used earlier.
- Such materials are also called as **warm superconductors** or **high temperature superconductors** as they work at higher temperatures than the temperature of liquid nitrogen (B.P. – 77 K).

Introduction:

- In 1911, the phenomenon of superconductivity was discovered by the Dutch scientist **Kamerlingh Onnes** when he was studying electrical properties of materials near absolute zero.
- A superconductor has **zero or almost zero electrical resistance**. It can therefore carry an electric current **without losing energy**.
- It was proved that **mercury** is a superconductor **below 4.2 K** (the critical temperature (Tc) at which the super-conducting state is formed).
- Following the discovery, physicists and chemists made slow but steady progress in the discovery of superconductors with higher values of Tc.
- After 75 years, **in 1986**, high temperature superconductors were discovered. **George Bednorz and Alex Mueller** reported a new type of (mixed oxide) superconductor of lanthanum, barium and copper **(La2–x BaxCuO4– y)** which exhibited superconductivity at **35 K**. For this significant work, Bednorz and Mueller were awarded the Nobel Prize for Physics in 1987.

Preparation:

- There are different methods to prepare mixed oxide superconductors.
- For massive form chemical fusion or sintering is used.
- For film type, the methods used are:
  (i) Chemical Deposition Method.
  (ii) Chemical Vapour Deposition Method.
  (iii) Electrical Deposition Method.

Meissner effect.

- Meissner and Ochsenfeld found that some low temperature superconductors, exhibit the exclusion of magnetic field below Tc, i.e. they do not allow a magnetic field to penetrate their bulk. This is known as **Meissner effect**.
- Thus, superconductors are essentially diamagnetic. Meissner effect gives rise to **'Levitation'**. Levitation occurs when objects float on air.
- Here repulsion is encountered between a permanent magnet and a superconductor.

Chemical Fusion:

- The synthesis of high-temperature superconductors needs a variety of qualitative considerations.
- These materials may be prepared by fusing the mixture of metal oxides say oxides of yttrium, barium and copper to 1073-1173 K (800–900 °C), in an open alumina crucible or in a sealed gold tube.

D.B.F. Dayanand College of Arts and Science, Solapur
Department of Chemistry

B.Sc.-III, Sem.-V
Paper-X: Inorganic Chemistry

Topic: Semi Conductor

Mr. Rajmane S. V.
M.Sc.; NET

Academic Year: 2023-2024

Electronic Materials

- The goal of electronic materials is to generate and control the flow of an electrical current.
- Electronic materials include:
  1. Conductors: have low resistance which allows electrical current flow
  2. Insulators: have high resistance which suppresses electrical current flow
  3. Semiconductors: can allow or suppress electrical current flow

Introduction to Semiconductor Materials

Louis C. Frenzel

Conductors

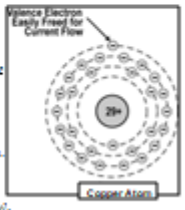
- Good conductors have low resistance so electrons flow through them with ease.
- Most common conductors include:
  - Copper, silver, gold, aluminum, & nickel
- Alloys are also good conductors:
  - Brass & steel
- Good conductors can also be liquid:
  - Salt Water

Student Learning Outcomes

- Upon completion of having this presentation, you should be able to:
  - Define conductor, insulator and semiconductor, and state the resistance or conductance of each.
  - Name at least three semiconductor materials and state the most widely used.
  - Name the basic structure of material and explain how it is formed with atoms.
  - Define doping and name the two types of semiconductor material formed with doping.
  - Name the current carriers in N and P-type material
  - Explain how current flows in semiconductor material.

Conductor Atomic Structure

- The atomic structure of good conductors usually includes only one electron in their outer shell.
  - It is called a Valence electron.
  - It is easily stripped from the atom, producing current flow.



D.B.F. Dayanand College of Arts and Science, Solapur
Department of Chemistry
B.Sc.-III, Sem.-V
Paper-X: Inorganic Chemistry

Topic: Energetics of Nuclear Reactions

Mr. S. V. Rajmane
M.Sc.; NET

Academic Year: 2023-2024

USE OF URANIUM, THORIUM AND PLUTONIUM IN ATOMIC ENERGY

(I) Natural uranium contains very high proportion of non-fissionable but fertile U-238 (99.27%) and very low proportion of fissionable (fissile) material U-235 (0.7%). Natural uranium on bombardment of neutron gives rise to following transmutation :

Thus U-239 captures fast neutrons and leads to the formation of fissionable Pu-239 as shown by first reaction, on the other hand U-235 absorbs slow or thermal neutrons and undergoes fission.

(II) The most fascinating use of thorium is as a source of nuclear fuel for atomic power. On bombardment with neutrons, Th-232 gets converted to U-233 and it undergoes nuclear fission, similar to U-235.

(III) Plutonium is a transuranium element. It does not occur in earth's crust. It is absolutely man-made element. Its different isotopes are known with mass number 232 to 244. Its isotope of major importance is Pu-239 having half life period of 24130 years. Its all isotopes are fissionable.

Energetics of Nuclear Reactions

The energy evolved in nuclear reactions corresponds to the conversion of a certain quantity of mass into energy which may be accounted on the grounds of Einstein's principle : $E = mc^2$.

where,

E = the total energy released.

m = mass defect.

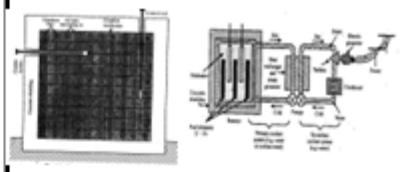
c = the velocity of light, $2.998 \times 10^8\ ms^{-1}$

Consequently any nuclear change must be balanced in terms of both energy and mass. The relationship may be expressed as :

$$Mass_1 + Energy_1 = Mass_2 + Energy_2$$

Nuclear Reactor :

(I) Boiling Water Nuclear Reactor :



The overall energy absorbed or released in nuclear reaction is called the nuclear (reaction) energy and is generally designated by symbol 'Q'. The quantity Q may be either positive or negative, where positive Q signifies release of energy that stems from exoergic reaction whereas a negative Q denotes the absorption of energy which signifies the process to be endoergic. In expressing a complete equation for a nuclear process, it is therefore, essential to represent not only the total masses involved but also the overall energy change caused.

For example :

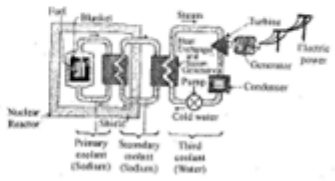
1. Endoergic reaction :

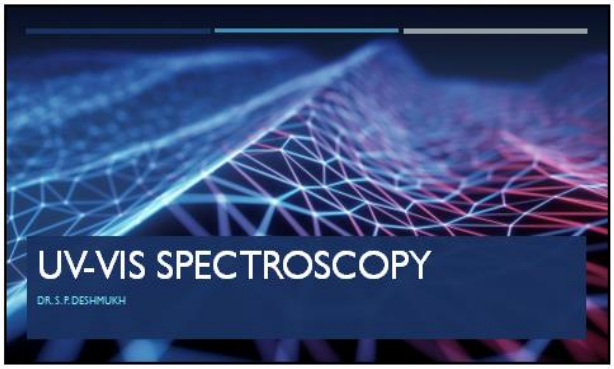
$^{14}N_7 + {}^4He_2 \longrightarrow {}^{17}O_8 + {}^1H_1 - 1.16\ MeV$

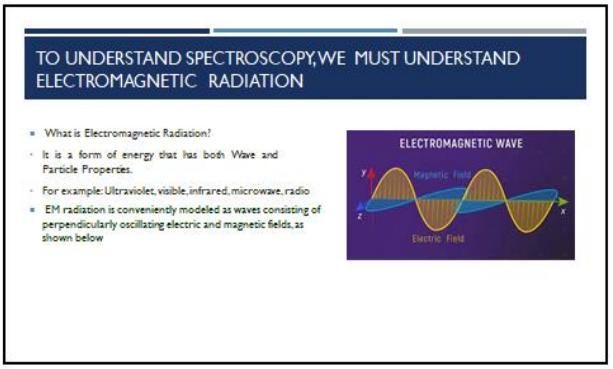
2. Exoergic reaction :

$^7Li_3 + {}^1H_1 \longrightarrow 2\ {}^4He_2 + 17.25\ MeV$

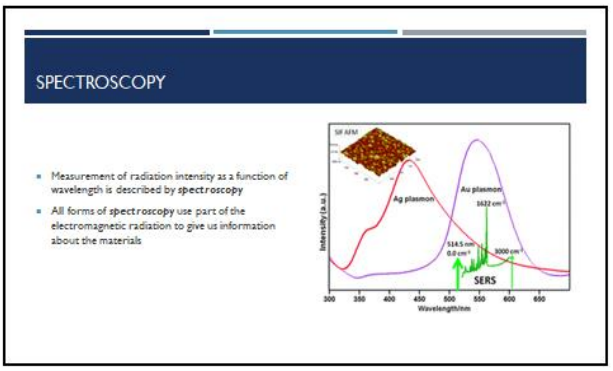
• Fast Breeder Nuclear Reactor :




UV-VIS SPECTROSCOPY
DR. S. P. DESHMUKH


TO UNDERSTAND SPECTROSCOPY, WE MUST UNDERSTAND ELECTROMAGNETIC RADIATION
What is Electromagnetic Radiation?
It is a form of energy that has both Wave and Particle Properties.
For example: Ultraviolet, visible, infrared, microwave, radio
EM radiation is conveniently modeled as waves consisting of perpendicularly oscillating electric and magnetic fields, as shown below
ELECTROMAGNETIC WAVE
Magnetic Field
Electric Field


DEFINITION
Period (p) – the time required for one cycle to pass a fixed point in space.
Frequency (ν) – the number of cycles which pass a fixed point in space per second.
Amplitude (A) – The maximum length of the electric vector in the wave (Maximum height of a wave).
Wavelength (λ) – The distance between two identical adjacent points in a wave (usually maxima or minima)
Wavenumber (ν̄) - The number of waves per cm in units of cm⁻¹.


SPECTROSCOPY
Measurement of radiation intensity as a function of wavelength is described by spectroscopy
All forms of spectroscopy use part of the electromagnetic radiation to give us information about the materials
SF AFM
Ag plasmon
Au plasmon
1622 cm⁻¹
514.5 nm
0.0 cm⁻¹
3000 cm⁻¹
SERS
Intensity (a.u.)
300
350
400
450
500
550
600
650
Wavelength/nm

Spectroscopy

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1

Introduction

- A molecule is a collection of positively charged atomic nuclei surrounded by a cloud of negatively charged electrons.
- Its stability results from a balance among the attractive and repulsive forces of the nuclei and electrons.
- A molecule is characterized by the total energy resulting from these interacting forces. As is the case with atoms, the allowed energy states of a molecule are quantized.

2

Introduction

- Molecular spectra result from either the absorption or the emission of electromagnetic radiation as molecules undergo changes from one energy state to another.
- The mechanisms involved are similar to those observed for atoms but are more complicated. The additional complexities are due to interactions of the various nuclei with each other and with the electrons.
- In order to analyze molecular spectra it is necessary to consider simultaneously the effects of all the contributions from the different types of molecular motions and energies.

3

Introduction

- There are two primary sets of interactions that contribute to observed molecular spectra.
- The first involves the internal motions of the nuclear framework of the molecule and the attractive and repulsive forces among the nuclei and electrons.
- The other involves the interactions of nuclear magnetic and electrostatic moments with the electrons and with each other.

4

Wave-particle duality

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1

2

Wave- Particle Duality of Matter and Energy

1. Matter behaves as if it moves like a wave!!
2. Only small, fast objects (e.g. e^-, p^+, n^0) have a measurable λ

$m_e = 9.11 \times 10^{-31}$ kg; $m_p = m_n = 1.67 \times 10^{-27}$ kg

1. Louis DeBroglie (1924) combined

$E = mc^2$ and $E = hc / \lambda$ to yield

$\lambda_{matter} = h/mv$ m = mass; v = velocity

4. DeBroglie λ too small to measure for heavy, slow objects

3

$$\lambda = h/mv$$

Table 7.1 The de Broglie Wavelengths of Several Objects

Substance	Mass (g)	Speed (m/s)	λ (m)
slow electron	9×10^{-28}	1.0	7×10^{-4}
fast electron	9×10^{-28}	5.9×10^{8}	1×10^{-10}
alpha particle	6.6×10^{-24}	1.5×10^{7}	7×10^{-15}
one-gram mass	1.0	0.01	7×10^{-29}
baseball	142	25.0	2×10^{-34}
Earth	6.0×10^{27}	3.0×10^{4}	4×10^{-63}

4

CHEMICAL KINETICS

Dr. S. R. Pujari
Professor,
Department of Chemistry,
D. B. F. Dayanand College of Arts and Science, Solapur
srpujari@dayanandsolapur.org

1

Decomposition of Ozone

* Decomposition of Ozone -

The most widely studied reaction. this is the difficult reaction to study because of wall reactions and homogeneous reactions.

First order - heterogeneous
second order - homogeneous

Chapmann - studied decomposition of O_3 in presence of excess O_2 and found that the reaction was second order in O_3.

2

John - Rate $\propto \frac{1}{[O]}$ and he proposed following mechanism

i) $O_3 \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} O_2 + O$

ii) $O + O_3 \xrightarrow{k_2} 2O_2$

The decomposition of a molecule is as simple in O_3 must be its second

3

order except at extremely high pressures.

Benson and Axworthy - modified the Jahn's mechanism as

i) $O_3 + M \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} O_2 + O + M$

ii) $O + O_3 \xrightarrow{k_2} 2O_2$

$\Rightarrow$ Applying SSA to $[O]$ gives

$\frac{d[O]}{dt} = 0 = k_1[O_3][M] - k_{-1}[O_2][O][M] - k_2[O][O_3]$

4


Data Interpretation & Paper Writing

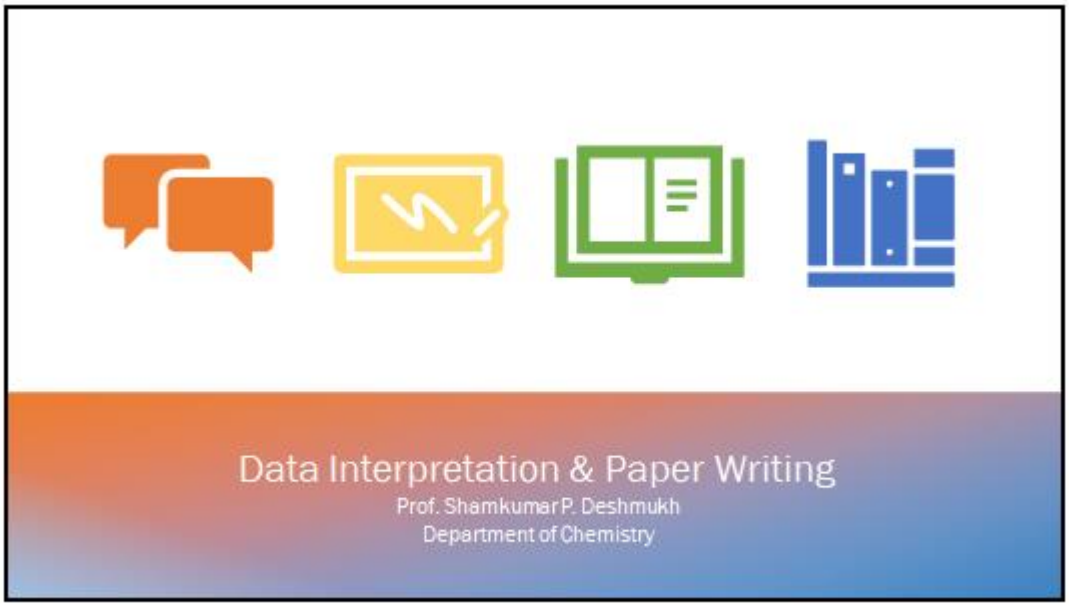

Data Interpretation & Paper Writing


Layout of a Research Paper
Title
Abstract
Keywords
Introduction
Materials and Methods
Result and discussion
Conclusion
Referring style


Step 1 Engage!


Step 2 Siege!


Step2 Siege!
"Writing is thinking"
"To write well is to think clearly"


Data Interpretation & Paper Writing
Prof. Shamkumar P. Deshmukh
Department of Chemistry


Data Interpretation & Paper Writing
Observation and Collection of data
Layout of a Research Paper
Use of e-tools for Research
Reference Management Software
Software for paper formatting
Software for detection of Plagiarism
Drawing software
Data plotting software's

Wave-particle duality

Dr. S. R. Pujari,
Associate Professor,
Department of Chemistry,
DBF Dayanand College of Arts and Science, Solapur
E-mail: pujari_aarush@yahoo.co.in

1

2

Wave- Particle Duality of Matter and Energy

1. Matter behaves as if it moves like a wave!!
2. Only small, fast objects (e.g. e^-, p^+, n^0) have a measurable λ

$m_e = 9.11 \times 10^{-31}$ kg; $m_p = m_n = 1.67 \times 10^{-27}$ kg

1. Louis DeBroglie (1924) combined

$E = mc^2$ and $E = hc / \lambda$ to yield

$\lambda_{matter} = h/mv$ m = mass; v = velocity

4. DeBroglie λ too small to measure for heavy, slow objects

3

$$\lambda = h/mv$$

Table 7.1 The de Broglie Wavelengths of Several Objects

Substance	Mass (g)	Speed (m/s)	λ (m)
slow electron	9×10^{-28}	1.0	7×10^{-4}
fast electron	9×10^{-28}	5.9×10^{6}	1×10^{-10}
alpha particle	6.6×10^{-24}	1.5×10^{7}	7×10^{-15}
one-gram mass	1.0	0.01	7×10^{-29}
baseball	142	25.0	2×10^{-34}
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CHEMICAL KINETICS

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4

ICT Enabled Tools for Effective Teaching and Learning Process

Department of Zoology

Academic Year 2023-24

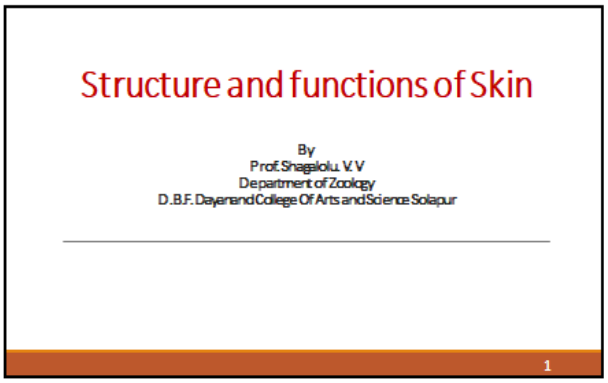
Class	Topic Name	ICT used	Link
Prof. L. B. Dama			
B. Sc. III	General Embryology (YouTube Video)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://www.youtube.com/watch
	Introduction and Basic concepts in chromatography-1 (YouTube Video)		https://www.youtube.com/watch
	Introduction and Basic concepts in chromatography-2 (YouTube Video)		https://www.youtube.com/watch?v
	Introduction to Prawn Culture (YouTube Video)		https://www.youtube.com/watch?v
B. Sc. II	Pila (Wikipedia)		https://en.wikipedia.org/wiki/Pila.
B. Sc. I	Platyhelminthes phylum characteristics (YouTube Video)		https://www.youtube.com/watch?v
Prof. V. V. Shagalolu			
M. Sc. II	Air Pollution (YouTube Video)	Internet/ LCD	https://www.youtube.com/watc

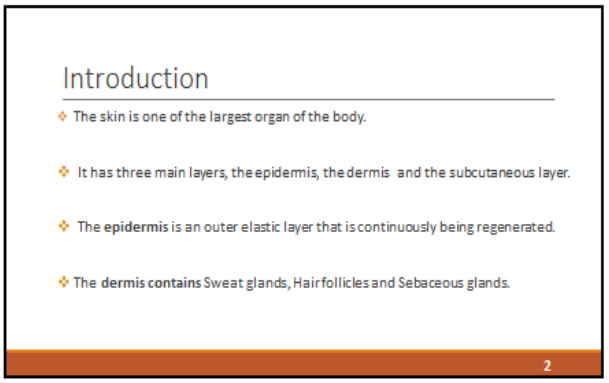
M. Sc. I	Darwin's finches (Wikipedia)	Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://en.wikipedia.org/wiki/Da
B. Sc. III	Vitamins and Coenzymes (YouTube Video)		https://www.youtube.com/watch
B. Sc. II	Malaria (Prof. V. V. Shagalolu Video)		https://www.youtube.com/wa
B. Sc. I	Structure and functions of Skin		Power Point Presentation
	Starfish (Wikipedia)		https://en.wikipedia.org/wiki/Starfi
Prof. L. C. Mushan			
Ph. D course work	Hypothesis and Testing of Hypothesis	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/	Power Point Presentation
M.Sc. II	Eukaryotic RNA polymerases and basal transcription factors		https://youtu.be/Yrwvrrvraq4?si
	Gene Regulation and the Order of the Operon		https://youtu.be/h_1QLdtF8d0?s
M.Sc. I	ntro Cell Biology: Cellular organization, division and processes		https://youtu.be/bvDgAfQlM54?
	Checkpoints: The DNA damage and DNA replication checkpoints.		https://youtu.be/ZD_gHEFTohk

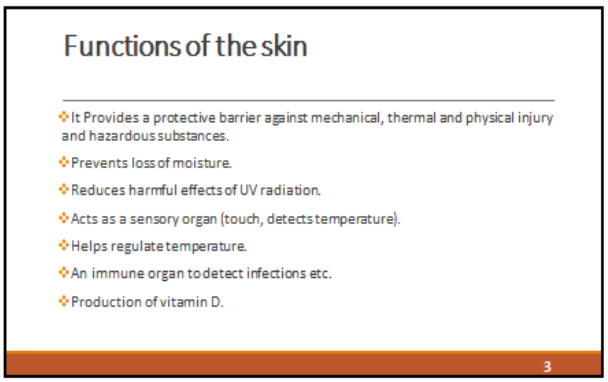
B.Sc. III	Structure of DNA & Replication	Wikipedia	Power Point Presentation
	DNA replication-Part I		https://youtu.be/rEed9iU0WtM?
	DNA Replication-Part II		https://youtu.be/O1v4CI00kOg?
B.Sc. II	Meiosis Part I		https://youtu.be/jZF4ajEtA6U?si
	Meiosis Part II		https://youtu.be/UeZYDU2
	Intro Cell Biology: Cellular organization, division, and processes		https://youtu.be/bvDgAfQlM5
B. Sc. I	Practical Examination Revision		Power Point Presentation
	Comparative Anatomy of the Heart		https://youtu.be/jqMj92Qf_4o?s
Prof. R. K. Dawale			
M.Sc. II	Insect Stored Grain Pest (YouTube Video)	Internet/ LCD Projector/ YouTube/ Google	https://www.youtube.com/w
M.Sc. I	Endocrine System (YouTube Video)		https://www.youtube.com/w
B.Sc. III	Pituitary Gland		Power Point Presentation
	Animal Behavior (YouTube Video)		https://www.youtube.com/w
B.Sc. II	Thyroid Gland-1 (Prof. R. K. Dawale, Videos)		https://www.youtube.com/w

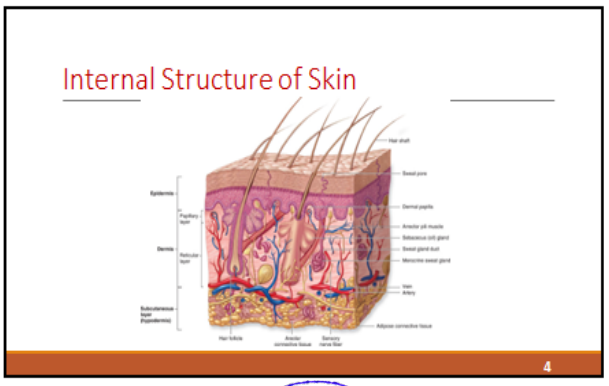
	Thyroid Gland-2 (Prof. R. K. Dawale, Videos)	Classroom/ Google meet/ Wikipedia	https://www.youtube.com/w
B.Sc. I	Classification of Kingdom Protista (YouTube Video)		https://www.youtube.com/w
	Arthropod (Wikipedia)		https://en.wikipedia.org/wiki/

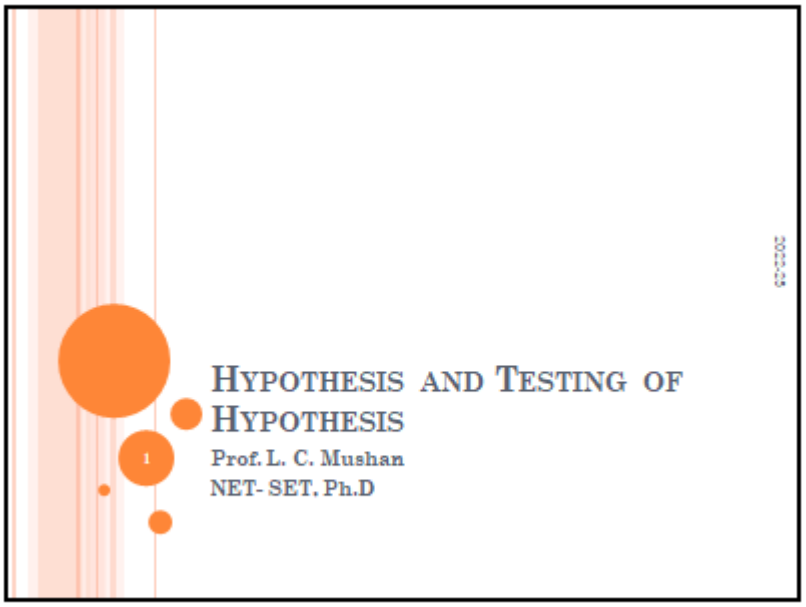
Few Slides of Presentation

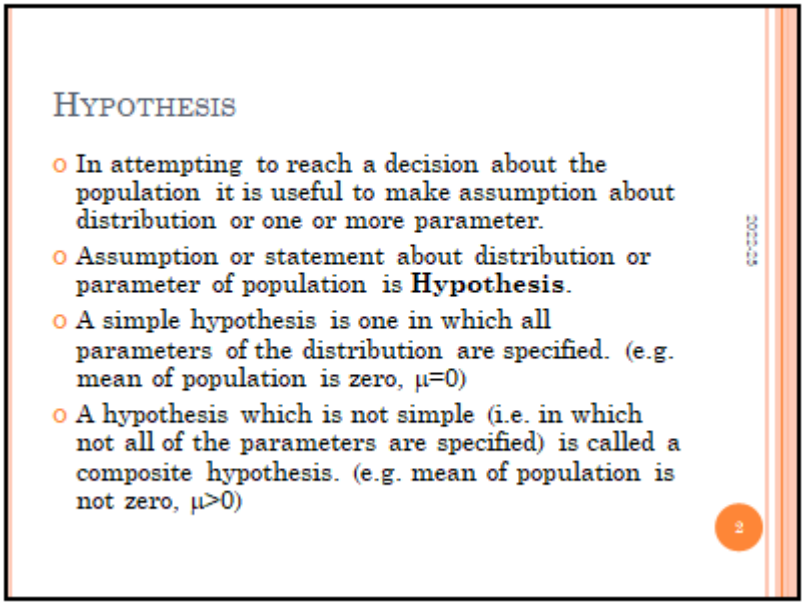


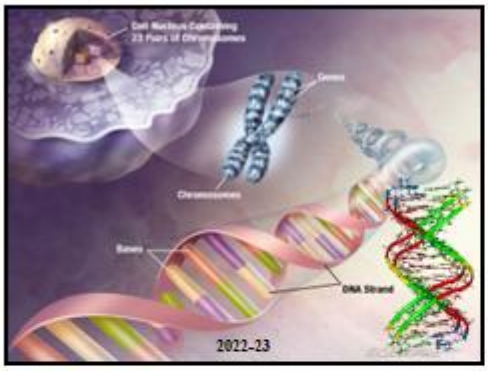


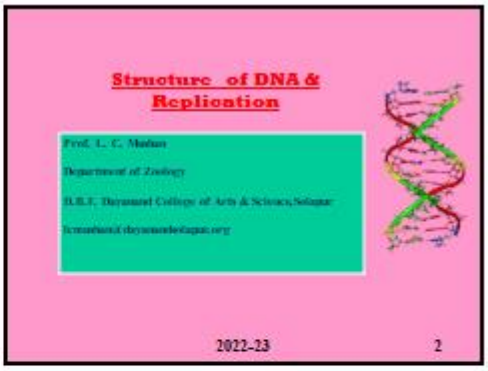


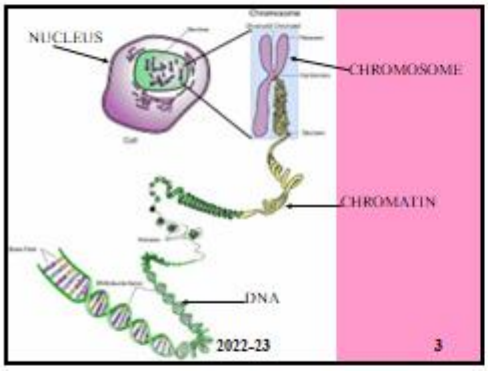


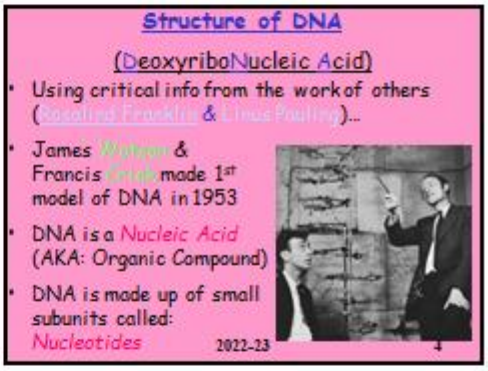

HYPOTHESIS AND TESTING OF HYPOTHESIS
Prof. L. C. Mushan
NET- SET, Ph.D
1

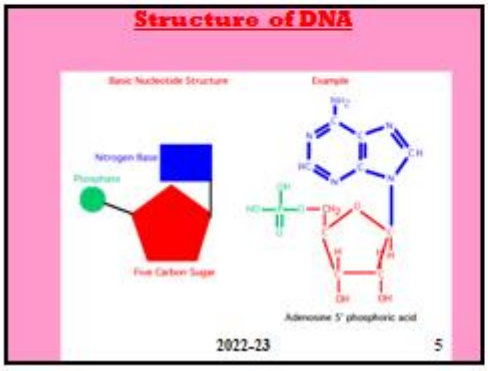

HYPOTHESIS
In attempting to reach a decision about the population it is useful to make assumption about distribution or one or more parameter.
Assumption or statement about distribution or parameter of population is Hypothesis.
A simple hypothesis is one in which all parameters of the distribution are specified. (e.g. mean of population is zero, μ=0)
A hypothesis which is not simple (i.e. in which not all of the parameters are specified) is called a composite hypothesis. (e.g. mean of population is not zero, μ>0)
2

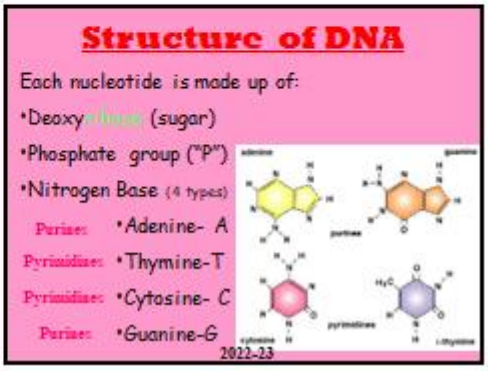

Genes
Chromosomes
Bases
DNA Strand
2022-23


Structure of DNA & Replication
2022-23
2


NUCLEUS
CHROMOSOME
CHROMATIN
DNA
2022-23
3


Structure of DNA
(DeoxyriboNucleic Acid)
Using critical info from the work of others (Rosalind Franklin & Linus Pauling)...
James Watson & Francis Crick made 1st model of DNA in 1953
DNA is a Nucleic Acid (AKA: Organic Compound)
DNA is made up of small subunits called: Nucleotides
2022-23
4


Structure of DNA
Basic Nucleotide Structure
Example
Nitrogen Base
Phosphate
Five Carbon Sugar
Adenosine 5' phosphoric acid
2022-23
5


Structure of DNA
Each nucleotide is made up of:
•Deoxyribose (sugar)
•Phosphate group ("P")
•Nitrogen Base (4 types)
Purines •Adenine- A
Pyrimidines •Thymine-T
Pyrimidines •Cytosine- C
Purines •Guanine-G
2022-23

D.B.F. Dayanand College of Arts and Science, Solapur

Practical Examination Revision :2022-23

Total Marks : 80

Subject : Zoology

B.Sc. I

Prof. L. C. Mushan

1

Q.3 Spotting

b) Identify, Sketch & label.(2M)

4

Q.1 Cytological preparation of Mitochondria (10 M)

Q.2 Effect of isotonic /hypotonic/hypertonic solution on blood cells : any one (10 M)

2

Q.3 Spotting

c) Identify & describe.(2M)

5

Q.3 Spotting (10M)

a) Identify & classify giving reasons.(2M)

3

Q.3 Spotting

d) Identify & give evolutionary significance.(2M)

6

Pituitary Gland

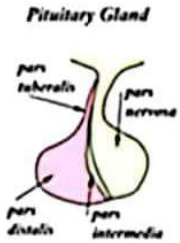
Prof. R.K.Dawale
Department of Zoology
D.B.F.Dayanand College Of Arts and Science Solapur

2022-23

Pituitary gland

- The pituitary gland is a part of endocrine system.
  Its main function is to secrete hormones in the blood stream.
- The pituitary gland is sometimes called the master gland because it controls other glands.

Pituitary gland anatomy and function



- The pituitary gland is small and oval-shaped. It's attached to the hypothalamus by a stalk-like structure.
- The hypothalamus is a small area of brain. It's very important in controlling the balance of bodily functions.
- It controls the release of hormones from the pituitary gland.
- The pituitary gland can be divided into two different parts: the anterior and posterior lobes.

Anterior lobe

Posterior lobe

- The posterior lobe of the pituitary gland also secretes hormones. These hormones are usually produced in our hypothalamus and stored in the posterior lobe until they're released.
- Hormones stored in the posterior lobe include:
- **Vasopressin.** This is also called antidiuretic hormone. It helps our body conserve water and prevent dehydration.
- **Oxytocin.** This hormone stimulates the release of breast milk. It also stimulates contractions of the uterus during labor.

Disorders of Pituitary Gland

- Two reasons for pituitary disorders
- **Hyperactivity**
- 1. Gigantism
- 2. Acromegaly
- 3. Cushing's disease
- **Hypoactivity**
- 1. Dwarfism
- 2. Acromicria
- 3. Simmond's disease

ICT Enabled Tools for Effective Teaching and Learning Process

Department of Economics

Academic Year 2023-24

Class	Topic Name	ICT used	Link
Dr. B. H. Damji			
B.A.III	State level webinar on Career Opportunities in Economics	LCD Projector/You-tube/ Google Classroom/ Google meet/ Wikipedia/ Zoom Meeting	https://meet.google.com/ghd-iedt-
	Elasticity of demand		https://youtu.be/R3az20KVVo0?
	Understanding Stock Market		https://www.nism.ac.in/2023/10/
	Union Budget 24-25		https://www.youtube.com/watch?v=
	Economic Thought		http://surl.li/owhvb
	Money Management and Financial Markets		https://meet.google.com/euz-
B.A.II	Union Budget 24-25		https://www.youtube.com/watch?v=x
	Economics of Banking And Finance Market		http://surl.li/owhxn
	State level webinar on Career Opportunities in Economics		https://meet.google.com/ghd-
	Money Management and Financial Markets		https://meet.google.com/euz-
	Census Tables		https://censusindia.gov.in/census
	Indian economy challenges		https://youtu.be/7fRjGEhp3zQ?si

B.A.I	Union Budget 24-25		https://www.youtube.com/watch?v=
	State level webinar on Career Opportunities in Economics		https://meet.google.com/ghd-
Mr. Birajdar V. B.			
MA-I	Union Budget 24-25	LCD Projector/You-tube/ Google Classroom/ Google meet/ Wikipedia/ Zoom Meeting	https://www.youtube.com/watch?v
	Money Management and Financial Markets		https://meet.google.com/euz-vcfx-
	State level webinar on Career Opportunities in Economics		https://meet.google.com/ghd-
	SEBI		https://www.sebi.gov.in/
MA-II	Union Budget 24-25	LCD Projector/ You- tube/ Google Classroom/ Google meet/ Wikipedia/ Zoom Meeting	https://www.youtube.com/watch?v=
	State level webinar on Career Opportunities in Economics		https://meet.google.com/ghd-
	G.S.T.		https://www.gst.gov.in/
Miss. S. P. Sakhare			
M.A.I	Demand	Internet/ LCD Projector/You-tube/ Google Classroom/ Googlemeet/ Wikipedia	https://youtu.be/SCmOK6uEVy
	Union Budget 24-25		https://www.youtube.com/watch?v=
	State level webinar on Career Opportunities in Economics		https://meet.google.com/ghd-iedt-
M.A.II	Advanced Banking		http://surl.li/oyflt
	E- Banking		http://surl.li/owhvs

Few Slides of Presentation

Class BA-III

D.B.F. Dayanand College Of Arts And Science, Solapur

Department of Economics

Topic: Elasticity Of Demand

Name of Teacher : Prof B. H. Damji

मागणीच्या लवचिकतेची व्याख्या:-

वस्तूची किंमत ,लोकांचे उत्पन्न , तसेच इतर वस्तूंची किमत बदलल्यानंतर एखाद्या वस्तूच्या मागणीत किती प्रमाणात बदल होतो? याला मागणीची लवचिकता असे म्हणतात. त्यानुसार एखाद्या वस्तूची मागणी जास्त प्रमाणात बदलत असल्यास जास्त लवचिक मागणी व कमी प्रमाणात बदल्यात असल्यास कमी लवचिक मागणी असे म्हणतात.

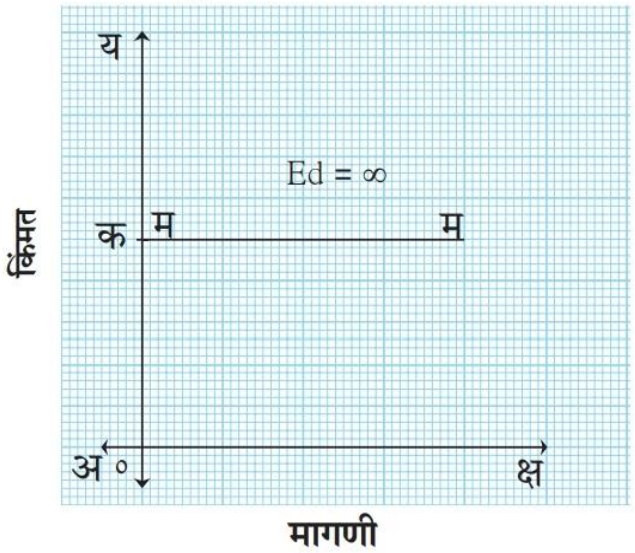
मागणीच्या लवचिकतेचे पुढील तीन प्रकार पडतात

1) उत्पन्न लवचिकता :-
लोकांचे उत्पन्न बदलल्यानंतर त्यांच्याकडून वस्तूच्या मागणीत किती प्रमाणात बदल होतो? त्याला मागणीतील उत्पन्न लवचिकता असे म्हणतात.

2) छेदक लवचिकता :-
अन्य किंवा दुसऱ्या वस्तूच्या किमतीत बदल झाल्यामुळे एखाद्या वस्तूच्या (पूरक व पर्यायी वस्तूच्या) मागणीत बदल घडून येत असल्यास त्याला छेदक लवचिकता म्हणतात.

3) मागणीतील किंमत लवचिकता :-
वस्तूच्या किमतीत बदल झाल्यामुळे वस्तूच्या मागणीत शेकडा किती प्रमाणात बदल होतो ? याला मागणीतील किंमत लवचिकता म्हणतात.

संपूर्ण लवचीक मागणी वक्र.



Class: - BA- II

D.B.F. Dayanand College Of Arts And Science, Solapur

Department of Economics

Topic: Nature Scope And Importance Of Demography

Name of Teacher : Prof B. H. Damji

लोकसंख्याशास्त्राच्या व्याख्या

- फ्रँक लोरीमर यांच्या मते "व्यापक अर्थाने लोकसंख्याशास्त्र म्हणजे लोकसंख्येचा अभ्यास होय".
- थॉम्पसन व लेवीस यांच्या मते, " लोकसंख्याशास्त्र हे लोकसंख्येचा आकार रचना आणि वितरण या पैलूंचे कालावधीत होणारे बदल आणि या बदलांची कारणे यांच्या अभ्यासाशी निगडित असते".
- डब्ल्यू सी बर्कले यांच्या मते, "लोकसंख्याशास्त्र हे व्यक्तीच्या वर्तणुकीची निगडित नसते तर ते केवळ लोकांच्या ते एकूणाशी किंवा त्याच्या भागाशी सुद्धा संबंधित असते मानवी लोकसंख्येच्या सांख्यिकीय चित्राला लोकसंख्याशास्त्र असे म्हणतात".
- ऑक्सफर्ड शब्दकोशानुसार "लोकसंख्याशास्त्र म्हणजे मानवी लोकसंख्येच्या वैशिष्ट्यांचा अभ्यास होय"

2

लोकसंख्याशास्त्राचे स्वरूप

- लोकसंख्याशास्त्र हे शास्त्र आहे.
- लोकसंख्याशास्त्र हे वास्तववादी शास्त्र आहे.
- लोकसंख्याशास्त्र हे आदर्शनिष्ठ शास्त्र आहे.
- लोकसंख्याशास्त्र हे सामाजिक शास्त्र आहे.
- सूक्ष्म लोकसंख्याशास्त्र आणि स्थूल लोकसंख्याशास्त्र.

3

लोकसंख्याशास्त्राची व्याप्ती

- **लोकसंख्याशास्त्राचा अभ्यास विषय**
- **लोकसंख्येचे वितरण**
- **जननक्षमता**
- **जननदर आणि मृत्युदर**

4

Class: - MA- II

D. B. F. Dayanand College Of Arts And Science , Solapur

Department Of Economics

Subject: Macro Economics

Name Of Teacher: Mr. V. B. Birajdar

केन्सचा उपभोगविषयक मानसशास्त्रीय सिद्धांत:-

जॉन मेनार्ड केन्स:- अर्थशास्त्राचे जनक म्हणून ज्याप्रमाणे ॲडम स्मिथ यांचे नाव घेतले जाते त्याचप्रमाणे19 व्या शतकातील एक आघाडीचा अर्थशास्त्रज्ञ म्हणून केन्स यांचे नाव घेतले जाते. केन्सने अर्थशास्त्रात खूप मोलाचे योगदान दिले आहे.

केन्सचा उपभोगविषयक मानसशास्त्रीय सिद्धांत:-

१) उपभोग खर्च:- टिकाऊ व नाशवंत उपभोग्य वस्तू व सेवांवर केलेल्या खर्चास उपभोग खर्च म्हणतात.

२) उपभोग फलन:- उत्पन्न व उपभोग यांच्यातील कार्यात्मक संबंधाला उपभोग फलन किंवा उपभोग प्रवृत्ती असे म्हणतात.

$C = f(y)$

१) सरासरी उपभोग प्रवृत्ती (APC)

सरासरी उपभोग प्रवृत्ती म्हणजे एका विशिष्ट उत्पन्न पातळीला किती उपभोग खर्च केला जातो ते दर्शविणारे गुणोत्तर होय. साध्या शब्दात उत्पन्न पातळी व उपभोग खर्च यांचे प्रमाण होय.

$$\text{सरासरी उपभोग प्रवृत्ती} = \frac{\text{उपभोग खर्च}}{\text{उत्पन्न पातळी}}$$

२) सीमांत उपभोग प्रवृत्ती (MPC) उत्पन्नात झालेला निव्वळ बदल व त्याला अनुसरून उपभोग खर्चात झालेला निव्वळ बदल या दोहोतील गुणोत्तारास सीमांत उपभोग प्रवृत्ती म्हणतात. सीमांत उपभोग प्रवृत्ती= उपभोग खर्चातील निव्वळ बदल / उत्पन्नातील निव्वळ बदल	केन्सच्या उपभोगविषयक मानसशास्त्रीय सिद्धांताच्या आधारे पुढील तिन निष्कर्ष निघतात:- १) उत्पन्न वाढीबरोबर उपभोग खर्चात कमी वेगाने वाढ होते. २) वाढत्या उत्पन्नाचे विभाजन उपभोग खर्चात व बचतीत केले जाते. ३) वाढत्या उत्पन्नाबरोबर उपभोग खर्च व बचतीत वाढ होते.

Class: - MA- I

D. B. F. Dayanand College Of Arts And Science , Solapur **Department Of Economics** **Subject: FIM** **Topic: IS-LM Model** **Name Of Teacher: Mr. V. B. Birajdar**	IS-LM प्रतिमान/ आधुनिक व्याजाचा सिद्धांत हिक्स आणि हॅन्सेन या आधुनिक अर्थशास्त्रज्ञांनी हा सिद्धांत मांडला आहे. IS वक्र हा वस्तूबाजाराशी संबंधित असून तो वस्तूबाजारातील संतुलन म्हणजे बचत आणि गुंतवणूक यातील संतुलन दाखवतो. I = गुंतवणूक, S=बचत

अ) बचत- S=f(y): बचत ही उत्पन्नावर अवलंबून असून उत्पन व बचत यांच्यात धनात्मक संबंध आहे.

ब) गुंतवणूक- I=f(r): गुंतवणूक ही व्याजदरावर अवलंबून असून गुंतवणूक व व्याजदर यांच्यात व्यस्त स्वरुपाचा संबंध आहे.

*** बचत-गुंतवणुक वक्र हा वस्तूबाजारातील संतुलन व्यक्त करतो.**

*** IS वक्र हा ऋणात्मक उताराचा असतो.**

*** व्याजदर घटल्यास उत्पन्न वाढते व वाढलेल्या उत्पन्नातून बचतीत वाढ होते. अशी वाढलेली बचत गुंतवणूकीत पुर्ण वापरली जावी यासाठी व्याजदर घसरावा लागतो.**

*** IS वक्राचा उतार हा गुंतवणूकीची लवचिकता व्यक्त करतो.**

LM **वक्र**:-

*** LM वक्र हा नाणेबाजाराशी संबंधित असून तो पैशाची मागणी आणि पैशाचा पुरवठा यातील संतुलन दर्शवतो.**

*** L= पैशाची मागणी**
*** M= पैशाचा पुरवठा**

Class: - MA- I

DBF Dayanand College of arts and sciences Solapur

Department of Economics

Micro Economics

Ms.Sakhare S.P. 1

अ) निगमन पद्धती

निगमन पद्धतीचे गुण:
१) वापरण्यास सोयीची पद्धत
२) निर्णय अचूक असतात
३)मानवी वर्तणुकीचा अभ्यास
४) निर्णय सर्व व्यापक व निष्पक्ष

2

निगमन पद्धतीचे दोष

१) चुकीचा निर्णय मिळण्याची संभाव्यता

२) दोषयुक्त निर्णय अचूक असण्याचा दुराग्रह

३) निर्णयांच्या सर्व व्यापकतेत बाधा

3

आगमन पद्धती:

१) प्रयोगात्मक आगमन पद्धती

२) सांख्यिकीय पद्धती

4

ICT Enabled Tools for Effective Teaching and Learning Process

Department of AIHC

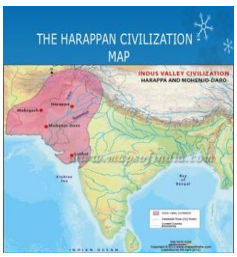
Academic Year 2023-2024

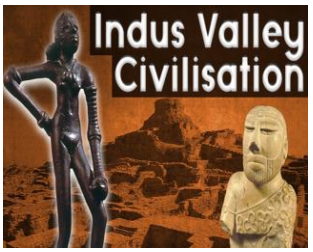
Class	Topic Name	ICT used	Link
Dr. R. N. Jadhav			
B.A. III	Google Classroom (Code:2ga6gzr)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	B.A III AIHC 2023-2024
	Incredible India		https://incredibleheritage.com/
	Indus Valley Civilization		https://incredibleheritage.com/2023/0
	Kopeshwar Temple,Khidrapur		https://mr.wikipedia.org/wiki
	Vitthal Temple,Pandharpur		https://mr.wikipedia.org/wiki
BA.II	Google Classroom (Code:2ga6gzr)		B.A II AIHC 2023-2024
	Incredible India		https://incredibleheritage.com/
	Indian Society		https://incredibleheritage.com/2023/0
B.A.I	Google Classroom (Code: gvoqve5)		B.A I AIHC 2023-2024
	Mourya Period-PPT		https://classroom.google.com/w/NTIz
	Bhartiya Puratatva Sanshodhan		https://incredibleheritage.com/2023/0

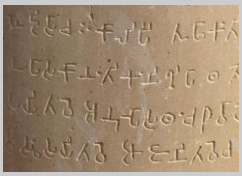
Few Slides of Presentation

DR.RAVIKIRAN JADHAV
Head Dept. Of Ancient Indian History and Culture
DBF Dayanand College of Arts and Science,Solapur
डॉ .रविकिरण जाधव
विभाग प्रमुख,प्राचीन भारतीय इतिहास आणि संस्कृती
दयानंद कला व शास्त्र महाविद्यालय ,
सोलापूर

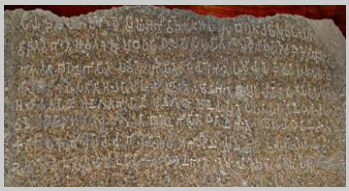
सिंधू संस्कृती (हडप्पा संस्कृती)







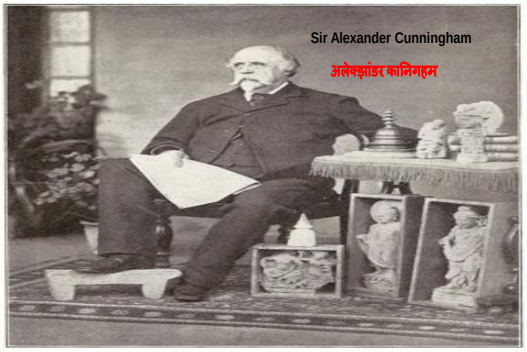
शिलालेख,
नाणी
आणि
ताम्रपट



Princep Ghat ,Kolkata

जेम्स प्रिन्सेप

James Princep



Sir John Marshall
सर जॉन मार्शल

Few Slides of Presentation

प्राचीन भारतीय
इतिहास आणि संस्कृती
(AIHC)
बी.ए. भाग १ सत्र २
प्रकरण १ मौर्य काळ
डॉ.रविकिरण जाधव

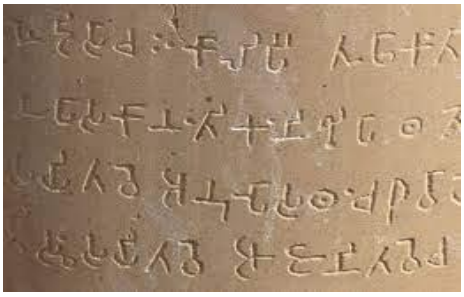
मौर्य काळ

मौर्य साम्राज्याची स्थापना साम्राज्याचा संस्थापक चंद्रगुप्त मौर्य याने चाणक्य या तक्षशिला येथील त्याच्या शिक्षकाच्या मदतीने केली. आख्यायिकांनुसार, चाणक्य मगध प्रांतात गेला. मगधामध्ये नंद घराण्यातील धनानंद हा जुलमी राजा राज्य करीत होता. त्याने चाणक्याला अपमानित केले. सूड घेण्याच्या निर्धाराने चाणक्याने ही जुलमी सत्ता मोडून काढण्याची प्रतिज्ञा केली.

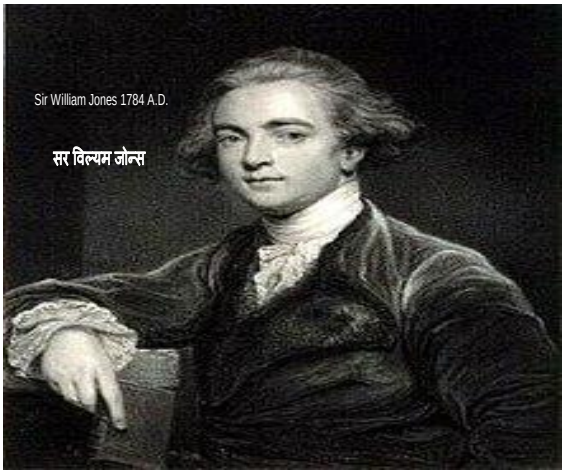
मगध
साम्राज्य

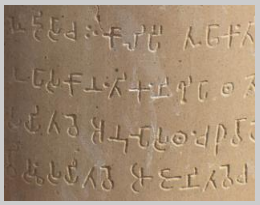
चंद्रगुप्त मौर्याचे साम्राज्य

अशोकाचे शिलालेख आणि स्तंभालेख

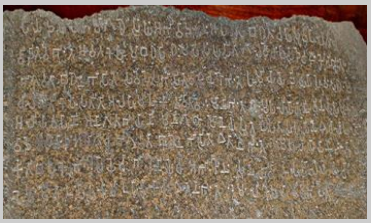


DR.RAVIKIRAN JADHAV
Head Dept. Of Ancient Indian History and Culture
DBF Dayanand College of Arts and Science,Solapur
डॉ .रविकिरण जाधव
विभाग प्रमुख,प्राचीन भारतीय इतिहास आणि संस्कृती
दयानंद कला व शास्त्र महाविद्यालय ,
सोलापूर





शिलालेख,
नाणी
आणि
ताम्रपट



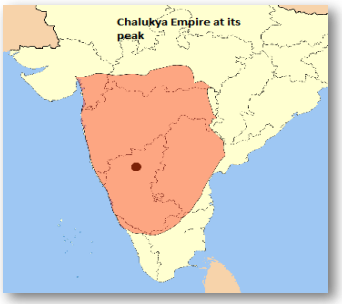
K.N.Dixit
के.एन.दिक्षित

Few Slides of Presentation

डॉ.रविकिरण जाधव
विभाग प्रमुख ,इतिहास विभाग आणि प्राचीन भारतीय इतिहास व संस्कृती
द.भै.फ.दयानंद महाविद्यालय ,सोलापूर

चालुक्य घराण्याचे प्राचीन भारतीय इतिहासातील योगदान

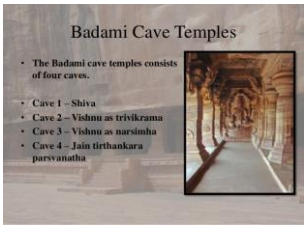
चालुक्य साम्राज्य



चालुक्य घराण्याचा पुर्व इतिहास

चालुक्य घराणे : दक्षिणेत विशेषतः कर्नाटक व महाराष्ट्र यांत पाचव्या शतकात उदयास आलेला एक प्रसिद्ध वंश. या वंशाची एक शाखा अधिक प्रसिद्ध पावली. ती म्हणजे बादामीचे चालुक्य व त्यांचे वंशज कल्याणीचे चालुक्य, याशिवाय त्यांच्या इतर लहान शाखा गुजरात, तेलंगण व इतरत्र पसरल्या होत्या. कोरीव लेखांत या घराण्याचे नाव चालिकी, साल्की, चलिक्य, चालुक्य, चलुकिक इ. विविध प्रकारांनी आढळते.

बदामी लेणी



नटराज

बदामी लेणी

त्रिविक्रम

वराह

बदामी लेणी

नरसिंह

ICT Enabled Tools for Effective Teaching and Learning Process

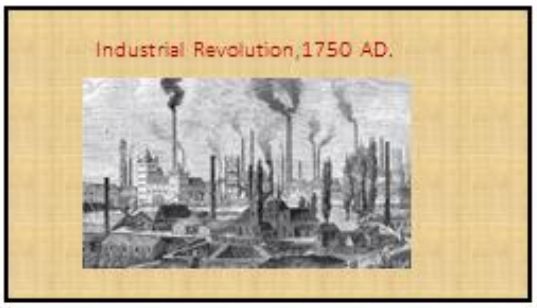
Department of History

Academic Year 2023-2024

Class	Topic Name	ICT used	Link
Mr. M. J. Sakhare			
M.A.II	Bakhar-Maratha History literary Source Mount Stuart Elphiston British East India Company (Wikipedia)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://mr.wikipedia.org/wiki
	Google Classmroo (Code :zczgxot)		M.A II History 2023-2024
M.A.I	Sources of Mughal History (You Tube Video)		https://youtu.be/ztWaqmsYjZo
	Google Classroom (Code:eetbgb7)		MA.I History 2023-2024
B.A. III	Google Classroom (Code: p7raxke)		B.A III HISTORY 2023-2024
	Sources of Mughal India		https://youtu.be/ztWaqmsYjZo
B.A.II	Industrial Revolution Google Classroom (Code:3tjseyr)		Power Point Presentation https://classroom.google.com/c/NjIzO
	French Revolution, 1789 AD.		https://classroom.google.com/c/NjIzO
	Rousso		https://classroom.google.com/c/NjIzO

B.A.I	Rajmata Jijabai (Marathi Wekipedia)		https://classroom.google.com/c/NjE4
	Shahajiraje Bhosale (Marathi Wekipedia)		https://classroom.google.com/c/NjE4
	Google Classroom (Code:qojhbhq)		https://classroom.google.com/c/NjE4
Mr. G. N. Satalolu			
M.A II	Google Classmroo (Code: zczgxot)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	M.A II History 2023-2024
M.A.I	Google Classroom (Code: eetbgb7)		MA.I History 2023-2024
Mr. R.R. Berungikar			
M.A II	Google Classmroo (Code :zczgxot)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	M.A II History 2023-2024
M.A.I	Google Classroom (Code:eetbgb7)		MA.I History 2023-2024
B.A. III	Google Classroom (Code: p7raxke)		B.A III HISTORY 2023-2024
B.A.II	Google Classroom (Code: 3tjseyr)		B.A II HISTORY 2023-2024

Few Slides of Presentation



History of Modern Europe (1750-1871 AD.)
Mr.Sakhare M.J.
Dept.of History
DBF Dayanand College of Arts & Science,Solapur

Napoleon Bonaparte I

Napoleon Banapart Reforms in Paris


Napoleon's Reforms

- He was Enlightened but **did limit some rights** as well.
- Reforms focused on four areas:
  - Economic reform
  - Social reform
  - Religious reform
  - Legal reform

Other improvements:
- Brought order to France after the instability of the Revolution
- Turned Paris into a beautiful city (parks, fountains, boulevards, etc...)

REGULATIONS OR REFORMS

Artistic Reforms
Beautification of France and Paris,
Restoration of Palaces, Avenues,
Paris: Pleasure City of Europe

Commercial Reforms
Colonial Empire for France……
Failed…. British Navel Supremacy

Reforms


Paris City in the 18th Centuary


Paris City in 21st Centuary


द.भै.फ.दयानंद कला व शास्त्र महाविद्यालय,सोलापूर

मुघल इतिहास (इ.स.1526-1707)
वर्ग: बीए.भाग: तीन
सत्र: पाचवे
सादरकर्ते: प्रा. साखरे.एम.जे.
(इतिहास विभाग)

प्रकरण.दुसरे-बाबर

बाबराचे पूर्वायुष्य

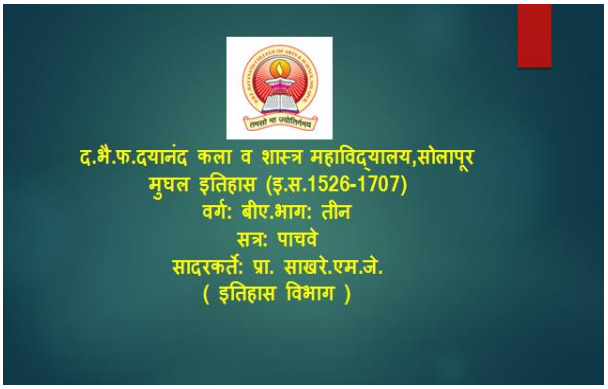
- जन्म : 14 फेब्रुवारी 1483
- ठिकाण : आर्दीजान (मध्य आशिया)
- वडील : उमरशेख मिर्झा
- आई : कुतलुगनिगार खानम
- मृत्यु : 26 डिसेंबर 1530
- कारकीर्द : इ.स.1483-1530

भारतावरील स्वारीची कारणे

- मध्य आशियातील अपयश
- बाबराचे भटकंती जीवन
- बाबराचे नातेवाईक
- भारतातील राजकीय परिस्थिती
- पंजाबचा राज्यपाल दौलतखान लोदी
- इब्राहीमखान लोदी

भारतावरील आक्रमणाचे परिणाम

- सुलतानशाहीचा अंत
- सुलतान इब्राहीमखानाचा मृत्यू
- मुघल सत्तेची स्थापना
- बाबर दिल्लीचा मुघल बादशहा झाला
- भारतीय संस्कृती व इस्लाम संस्कृती यांचा समन्वय
- नव्या प्रशासन व्यवस्थेचा उदय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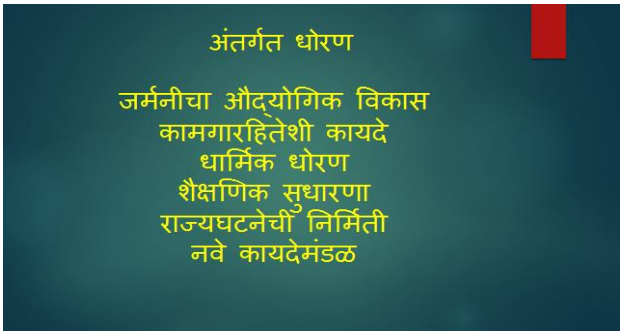
वर्ग: बीए.भाग: तीन
सत्र: पाचवे
सादरकर्ते: प्रा. साखरे.एम.जे.
(इतिहास विभाग)


बिस्मार्क


जीवनचरित्र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जर्मनीचा औद्योगिक विकास
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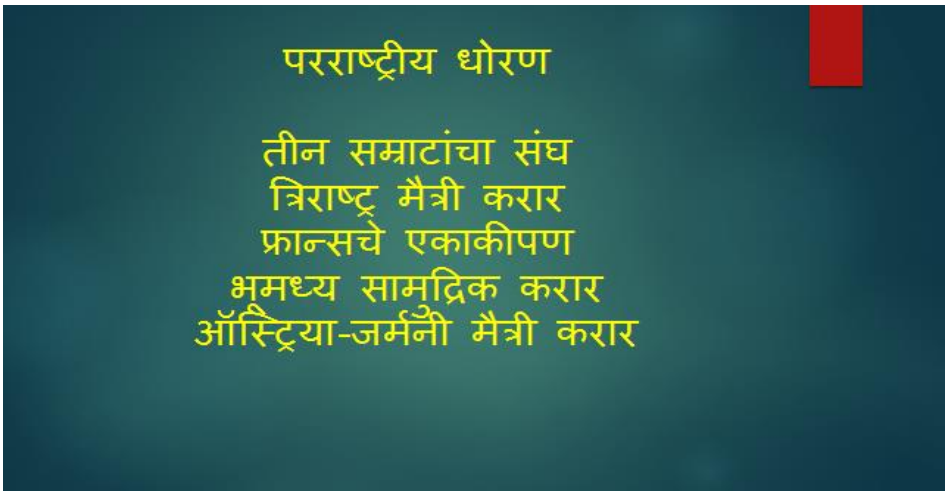
धार्मिक धोरण
शैक्षणिक सुधारणा
राज्यघटनेची निर्मिती
नवे कायदेमंडळ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तीन सम्राटांचा संघ
त्रिराष्ट्र मैत्री करार
फ्रान्सचे एकाकीपण
भूमध्य सामुद्रिक करार
ऑस्ट्रिया-जर्मनी मैत्री करार

ICT Enabled Tools for Effective Teaching and Learning Process

Department of Botany

Academic Year 2023-24

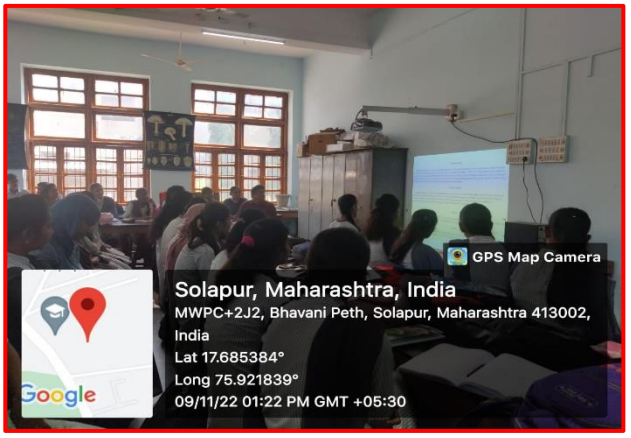
Class	Topic Name	ICT used	Link
Prof. M. N. Jagtap			
M. Sc. II	Aeropalynolgy	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
	Bonsai (Prof. M. N. Jagtap Video)		https://www.youtube.com/watc
	Flora of Andaman (Prof. M. N. Jagtap Video)		https://www.youtube.com/watc
M. Sc. I	Phytoremediation		Power Point Presentation
	Biodiversity (YouTube Video)		https://www.youtube.com/watc
B. Sc. III	Hybridization		Power Point Presentation
	Cellular Totipotancy & Organogenesis (YouTube Video)		https://www.youtube.com/watc
	Plant Tissue Culture - Micropropagation II (YouTube Video)		https://www.youtube.com/watc
	Module		https://dayanandsolapur.org/modules/modules-science.html
B. Sc. II	Anomalous secondary growth in Bignonia (Dicot.) and Dracaena stem.		Power Point Presentation

	Plant Tissue Culture (Wikipedia)		https://en.wikipedia.org/wiki/Pl
B. Sc. I	Cyanobacteria (Wikipedia)		https://en.wikipedia.org/wiki/Cy
	Cyanohyceae Study of Nostoc		Power Point Presentation
	Study of Yeast		Power Point Presentation
Prof. R. N. Katakdhond			
M.Sc. II	Study of Riccia	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
Dr. S. D. Randive			
M. Sc. II	Karyotype Analysis (Dr. S. D. Randive Video)		https://www.youtube.com/w
	Polyembryony (Dr. S. D. Randive Video)		https://www.youtube.com/w
	Plant Embryology: Megasporogenesis		Power Point Presentation
	In situ conservation		LCD Projector
M. Sc. I	Family Caesalpiniaceae (Dr. S. D. Randive Video)		https: //www.youtube.com/wa

	Family Solanaceae (Dr. S. D. Randive Video)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://www.youtube.com/w
	Family Convoulvulaceae Juss.		Power Point Presentation
B. Sc. III	Plant Tissue Culture (Dr. S. D. Randive Video)		https://www.youtube.com/w
	Sterilization Techniques (Dr. S. D. Randive Video)		https://www.youtube.com/w
	Aneuploidy		Power Point Presentation
B. Sc. II	Pollen Morphotypes (Dr. S. D. Randive Video)		https://www.youtube.com/w
	Pollen Fertility (Dr. S. D. Randive Video)		https://www.youtube.com/w
	Agents of Pollination		Power Point Presentation
	Plant growth regulators (Wikipedia)		https://en.wikipedia.org/
	Physiological role of GA		LCD Projector
B. Sc. I	Introduction to Microbiology (Dr. S. D. Randive Video)		https://www.youtube.com/w
	Phycology (YouTube Channel)		https://www.youtube.com/@
	Plant tissues (Wikipedia)		https://en.wikiversity.org/w
Miss. A. S. Kamble			
M. Sc. II	Gene Mapping	Internet/ LCD	Power Point Presentation
M. Sc. I	DNA Transcription in		Power Point Presentation

	Prokaryotes	Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	
B. Sc. III	RNA		Power Point Presentation
B. Sc. II	Photosynthesis and Photorespiration (YouTube Video)		https://www.youtube.com/w
B. Sc. I	Ecosystem		Power Point Presentation
	Ecosystem (YouTube Video)		https://www.youtube.com/w

Few Glimpses & Slides of Presentation



BIOSPHERE RESERVES

Professor Dr. Jagtap M.N
Head Department of Botany
D.B.F.DAYANAND COLLEGE OF ARTS AND SCIENCE SOLAPUR

1

BR

- Biosphere reserves are areas of terrestrial and coastal ecosystems
- Biosphere reserves are sites established by countries and recognized under UNESCO's Man and the Biosphere (MAB) Programme
- They promote
  - sustainable development based on local community efforts and sound science.
  - solutions to reconcile *conservation* of biological and cultural diversity and economic and social *development* through partnerships between people and nature.
- They serve as 'living laboratories'
  - for testing out and demonstrating integrated management of land, water and biodiversity and
  - demonstrate innovative approaches to sustainable development from local to international scales.

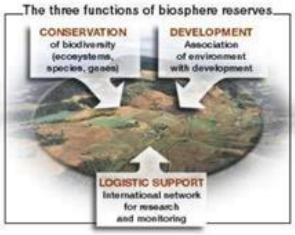
2

BR

- They are internationally recognized, nominated by national governments and remain under sovereign jurisdiction of the states where they are located, yet they share their experience and ideas nationally, regionally and internationally within the World Network of Biosphere Reserves (WNBR).
- The first biosphere reserve of the world was established in 1979, since then the network of biosphere reserves has increased to 580 in 114 countries across the world (MAB, 2012).
- BRs are thus special environments for both people and the nature and are living examples of how human beings and nature can co-exist while respecting each others' needs.
- **Direct Beneficiaries** of the Biosphere Reserves are the local people and the ecological resources and **indirect beneficiaries** are scientists, government decision makers and the world community.

3

Functions of biosphere reserves



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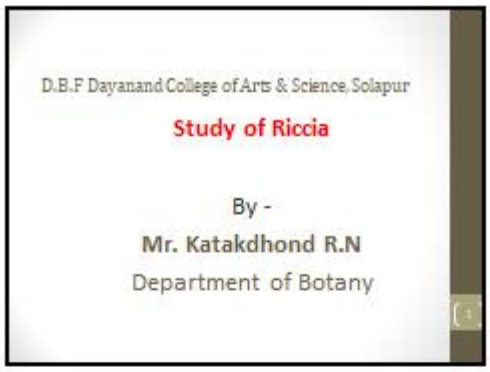
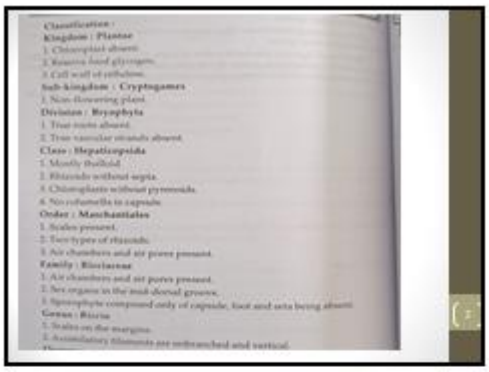
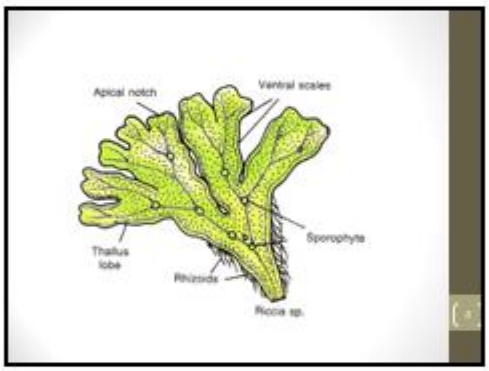
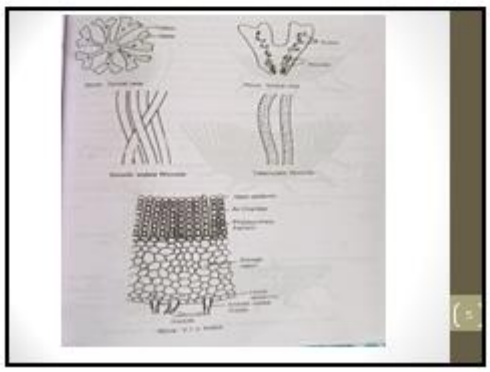
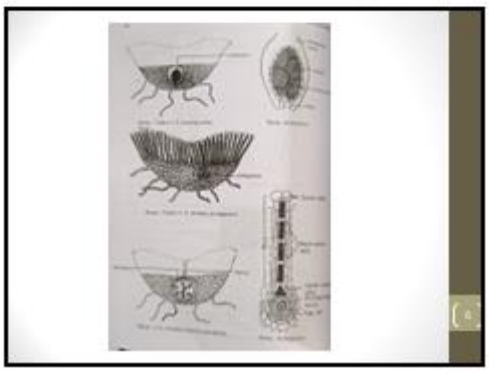

D.B.F Dayanand College of Arts & Science, Solapur
Study of Riccia
By -
Mr. Katakdhond R.N
Department of Botany




Apical notch
Ventral scales
Sporophyte
Thallus lobe
Rhizoids
Riccia sp.





B.SC. II SEM III
PAPER V
UNIT 04

4.2 Anomalous secondary growth in Bignonia (Dicot.) and Dracaena stem.

Professor Dr. JAGTAP M.N.

D.B.F.DAYANAND COLLEGE OF ARTS AND SCIENCE SOLAPUR

1

Types of Anomalous Secondary Growth

1-Abnormal behaviour of normal cambium:-

(A) The cambium forms vascular tissues only in the region of vascular bundle.
(B) The cambium forms usually large proportion vascular tissues only in the region of vascular bundle.
(C) The cambium forms irregular patches of parenchyma in xylem

2-Abnormal behaviour of abnormal cambium:-

(A)Formation of rings of vascular bundles embedded in parenchymatous tissue.
(B)Formation of rings of vascular bundles embedded in conjunctive tissues.

2

Anamalous secondary growth in *Bignonia* and *Dracaena* stem

3

Anamalous secondary growth in *Bignonia* stem

4

BOTANY
B.SC. I
PAPER I
Micribiology and Phycology
Unit : 04 .Cyanohyceae
Study of Nostoc

Professor Dr. JAGTAP M.N.

D.B.F.DAYANAND COLLEGE OF ARTS AND SCIENCE SOLAPUR

1

UNIT-04
CYANOPHYTA (Blue Green Algae)

Introduction

Cyanophyta,Myxophyceae,Cyanophyceae, Mixophycophyta are various names of blue green algae. The names Myxophyceae is due to presence of mucilaginous sheath in their forms, cyanophyta is for cyanin pigment(Allophycocyar, phycocyanin). In Cyanobactaria their nuclear material is not bounded by nuclear membrean. The membrane bound plastids are absent .Large vacuoles are also absent. The cell wall shows some chemical similarity to those of bacteria.

2

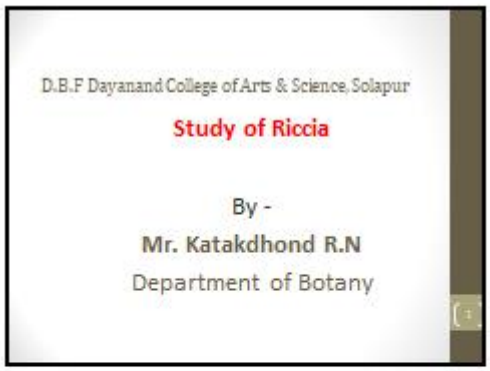
The cyanobactaria are included in volume 03 of Bergeys manual and according to classification they are oxygenic phototrophic bactaria. The members of this class occur in diverse habitat and included about 150 genera and 1400 species. The exact timing of their appearance is still not clear but it is approximately 2.7 billion years ago. They likely played major role in creating oxygen atmosphere on the earth.Cyanobacteria have been identified as one of the most promising group of organisms from which novel and biochemically active natural products are isolated. Cyanobacteria such as Spirulina, Anabaena, Nostoc and Oscillatoria produce a great variety of secondary metabolites. Cyanobacteria produce a wide variety of bioactive compounds.

3

General Characters of Cyanophyta

- Cyanobacteria occur in fresh water lakes, ponds, springs, rivers and wet lands. Also occur in marine water and hot water springs (even up to 85^0 C).
- They are gram negative photoautotrophic prokaryotes.
- Members have pigments like chlorophyll a, β-carotene, lutein, myxoxanthophyll and phycocyanin.
- They may be unicellular (*chroococcus, terapedia, gleocapsa*) colonial (*Nostoc, Aphanocapsa*) filamentous (*Oscillatoria*).
- The cells shows prokaryotic organization i.e. absence of true nucleus, chloroplast, mitochondria and endoplasmic reticulum.

4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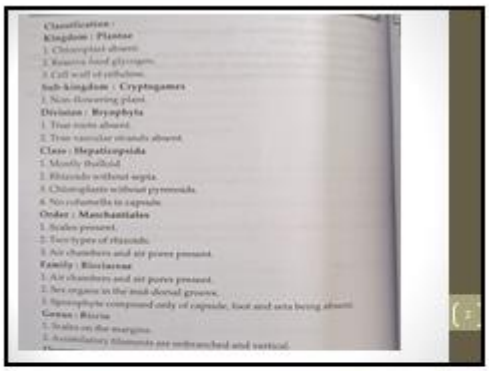
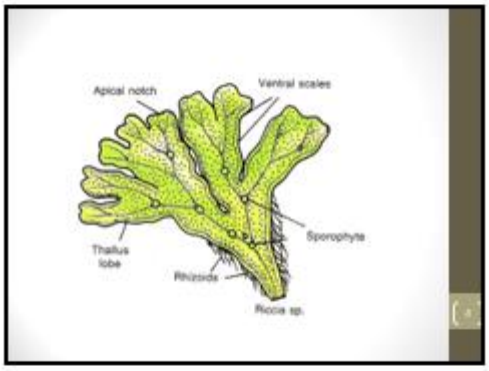
Study of Riccia
By -
Mr. Katakdhond R.N
Department of Botany

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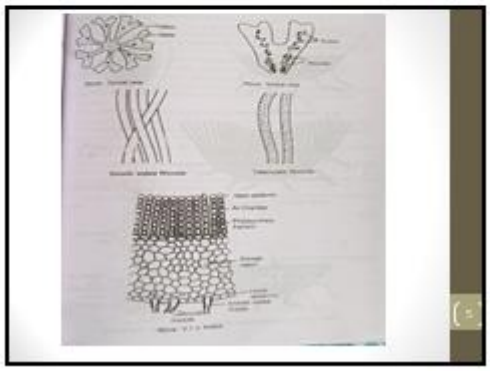
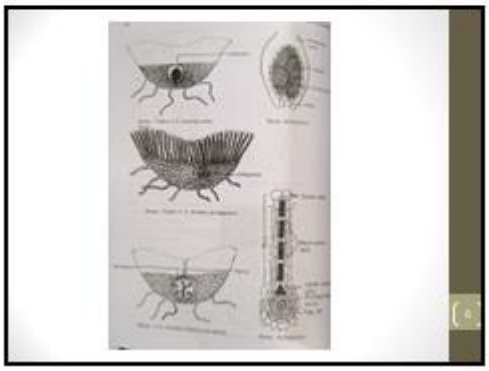
Ventral scales
Sporophyte
Thallus lobe
Rhizoids
Riccia sp.



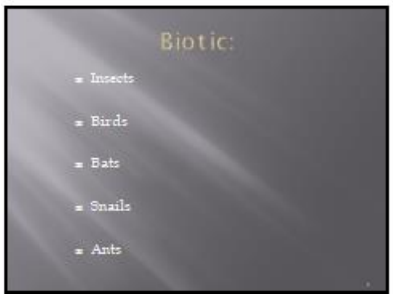


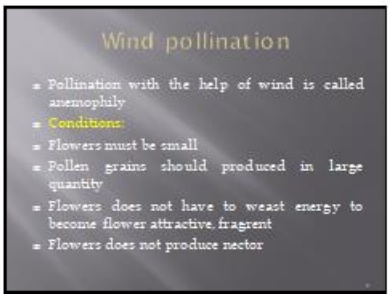

Agents of Pollination
Dr. Sonali Randive-Aherkar
D.B.F. Dyanand College of Arts & Science, Solapur
2022-23


AGENTS OF POLLINATION


There are two main groups of agents:
Abiotic
Biotic


Abiotic:
Wind:
Water:


Biotic:
Insects
Birds
Bats
Snails
Ants


Wind pollination
Pollination with the help of wind is called anemophily
Conditions:
Flowers must be small
Pollen grains should produced in large quantity
Flowers does not have to weast energy to become flower attractive, fragrent
Flowers does not produce nector

STUDY OF ANEUPLOIDY: DOWN'S, KLINEFELTER'S AND TURNER'S SYNDROMES

Aneuploidy

Dr. Sonali Randive-Abrelon
D.B.F. Dyanand College of Arts & Science, Solapur

2022-23

Content:

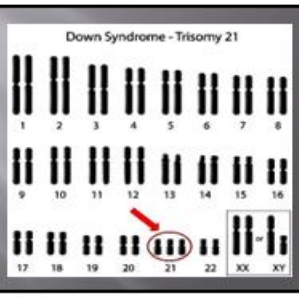
- Introduction
- Objectives
- Aneuploidy
- Down syndrome
- Klinefelter syndrome
- Turners syndrome

Introduction:

- Aneuploid cells have an abnormal number of chromosomes. Because each chromosome contains hundreds of genes, the addition or loss of even a single chromosome disrupts the existing equilibrium in cells, and in most cases, is not compatible with life.
- Aneuploidies disturb the delicate balance of gene products in cells
- Most of aneuploides are lethal.

Down syndrome

- It is a chromosomal abnormality characterized by the presence of an extra copy of genetic material on the 21st chromosome.
- either in whole (trisomy 21) or part (such as due to translocation).
- A typical human karyotype is designated as 46 with XX or 46 with XY, indicating 46 chromosomes with an XX arrangement for females and 46 chromosomes with an XY arrangement for males

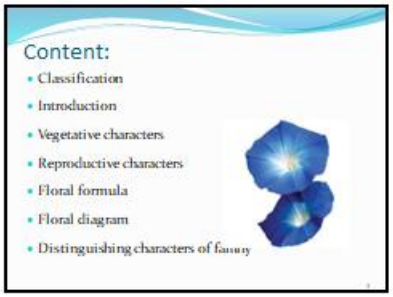


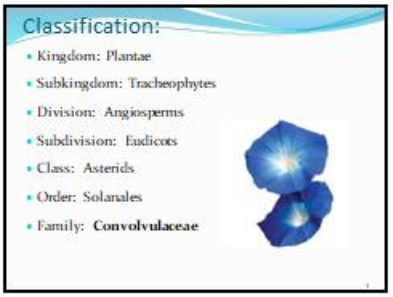
Klinefelter Syndrome

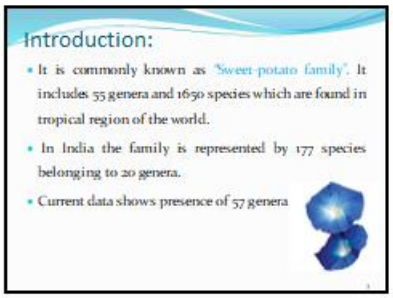
- Genes are bundled into chromosomes. One pair of chromosome is called the sex chromosomes, it determines whether you are male or female.
- Usually, females have two X chromosomes (XX). Males have one X and one Y (XY).
- But in rare cases, a male is born with an extra X chromosome (XXY). This is Klinefelter Syndrome. It's also called Klinefelter's or XXY.

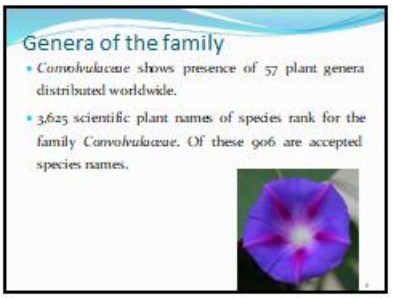

Family
Convoulvulaceae
Juss.
Dr. Sonali Randive-Aherkar
D.B.F. Dyanand College of Arts
& Science, Solapur
2022-23


Family Convoulvulaceae
Juss.


Content:
Classification
Introduction
Vegetative characters
Reproductive characters
Floral formula
Floral diagram
Distinguishing characters of family


Classification:
Kingdom: Plantae
Subkingdom: Tracheophytes
Division: Angiosperms
Subdivision: Eudicots
Class: Asterids
Order: Solanales
Family: Convolvulaceae


Introduction:
It is commonly known as 'Sweet-potato family'. It includes 55 genera and 1650 species which are found in tropical region of the world.
In India the family is represented by 177 species belonging to 20 genera.
Current data shows presence of 57 genera


Genera of the family
Convolvulaceae shows presence of 57 plant genera distributed worldwide.
3,625 scientific plant names of species rank for the family Convolvulaceae. Of these 906 are accepted species names.

Plant Embryology: Megasporogenesis

Dr. Sonali Randive-Aherkar
D.B.F. Dyanand College of Arts & Science, Solapur

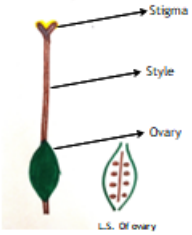
2022-23

CONTENT:

- What is megasporogenesis
- Typical structure of Gynoecium
- Typical structure of ovule
- Types of ovule
- Megasporogenesis

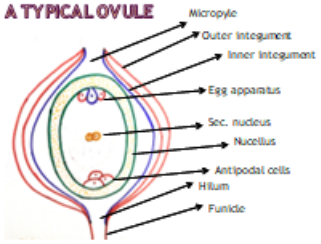
WHAT IS MEGASPOROGENESIS ?

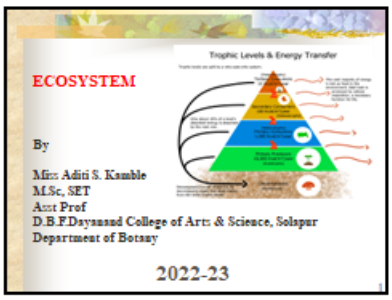
- Megasporogenesis is the process of formation of megaspores.
- These megaspores are developed in to female gametophyte.

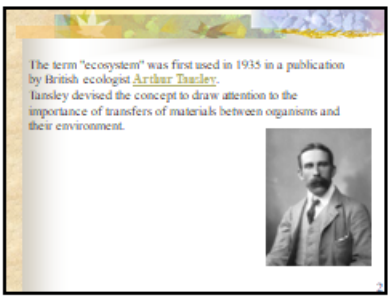


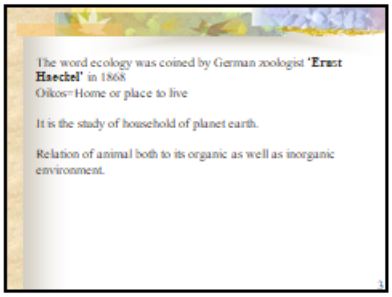
A TYPICAL GYNOECIUM:

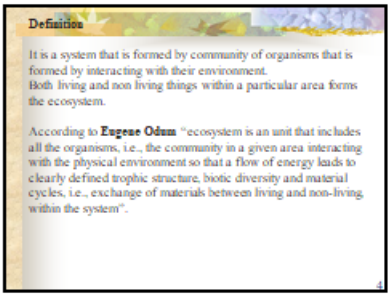
- Stigma: A apical portion on style which bears anthers.
- Style: An elongated tube link structure of stigma, it may be hollow, soild or transient depending upon the species. It helps to pass out the pollentube towards embryo sac at the time of fertilization.
- Ovary: It stores the ovules.

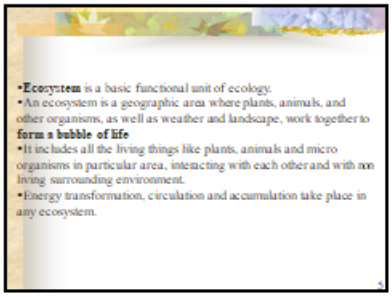


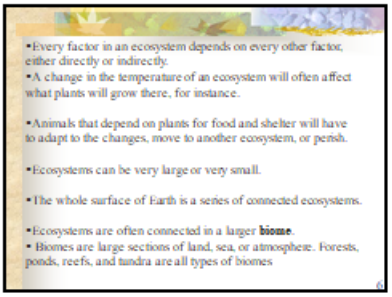

ECOSYSTEM
Trophic Levels & Energy Transfer
By
Miss Aditi S. Kamble
M.Sc, SET
Asst Prof
D.B.F.Dayanand College of Arts & Science, Solapur
Department of Botany
2022-23

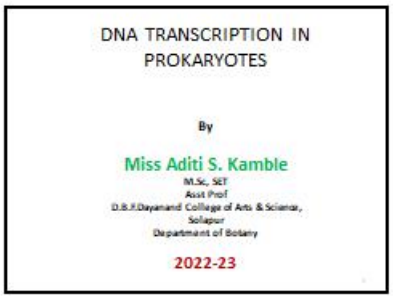

The term "ecosystem" was first used in 1935 in a publication by British ecologist Arthur Tansley.
Tansley devised the concept to draw attention to the importance of transfers of materials between organisms and their environment.


The word ecology was coined by German zoologist 'Ernst Haechel' in 1868
Oikos=Home or place to live
It is the study of household of planet earth.
Relation of animal both to its organic as well as inorganic environment.


Definition
It is a system that is formed by community of organisms that is formed by interacting with their environment.
Both living and non living things within a particular area forms the ecosystem.
According to Eugene Odum "ecosystem is an unit that includes all the organisms, i.e., the community in a given area interacting with the physical environment so that a flow of energy leads to clearly defined trophic structure, biotic diversity and material cycles, i.e., exchange of materials between living and non-living within the system".


•Ecosystem is a basic functional unit of ecology.
•An ecosystem is a geographic area where plants, animals, and other organisms, as well as weather and landscape, work together to form a bubble of life
•It includes all the living things like plants, animals and micro organisms in particular area, interacting with each other and with non living surrounding environment.
•Energy transformation, circulation and accumulation take place in any ecosystem.


•Every factor in an ecosystem depends on every other factor, either directly or indirectly.
•A change in the temperature of an ecosystem will often affect what plants will grow there, for instance.
•Animals that depend on plants for food and shelter will have to adapt to the changes, move to another ecosystem, or perish.
•Ecosystems can be very large or very small.
•The whole surface of Earth is a series of connected ecosystems.
•Ecosystems are often connected in a larger biome.
• Biomes are large sections of land, sea, or atmosphere. Forests, ponds, reefs, and tundra are all types of biomes


DNA TRANSCRIPTION IN PROKARYOTES
By
Miss Aditi S. Kamble
M.Sc, SET
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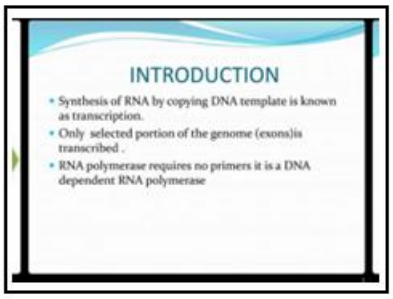
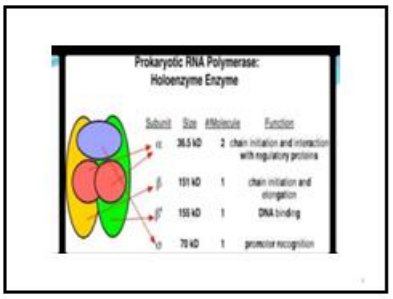
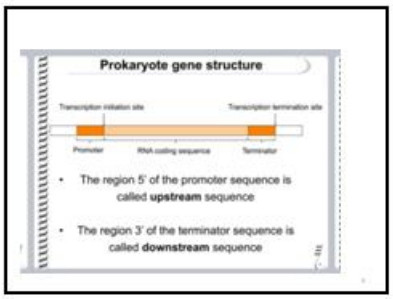
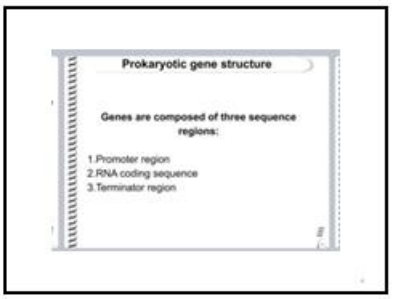
Department of Botany
2022-23

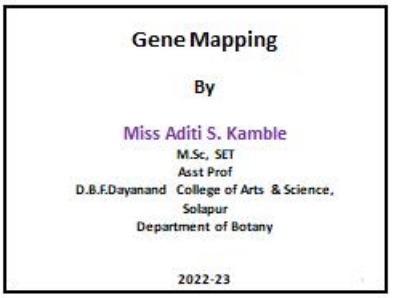

DNA
RNA
Protein
Transcription
Replication
Translation


INTRODUCTION
Synthesis of RNA by copying DNA template is known as transcription.
Only selected portion of the genome (exons)is transcribed .
RNA polymerase requires no primers it is a DNA dependent RNA polymerase


Prokaryotic RNA Polymerase:
Holoenzyme Enzyme
Subunit
Size
#Molecule
Function


Prokaryote gene structure
Promoter
RNA coding sequence
Terminator
The region 5' of the promoter sequence is called upstream sequence
The region 3' of the terminator sequence is called downstream sequence


Prokaryotic gene structure
Genes are composed of three sequence regions:
1.Promoter region
2.RNA coding sequence
3.Terminator region


Gene Mapping
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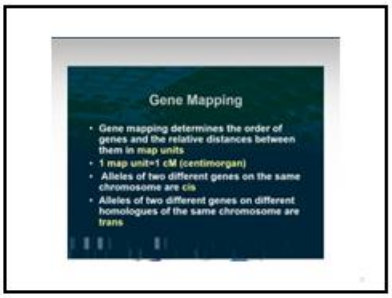
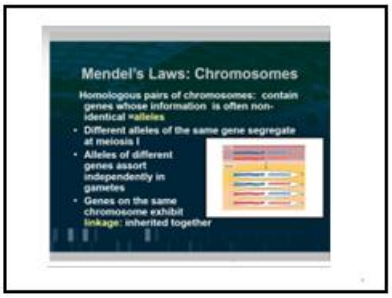
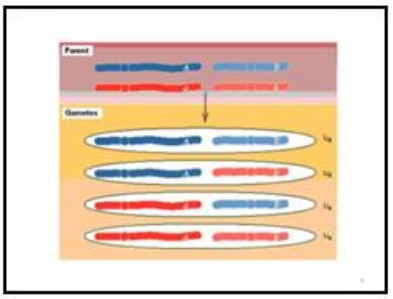
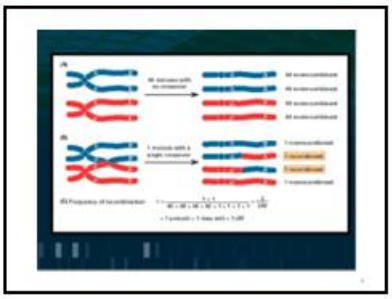
Solapur
Department of Botany
2022-23

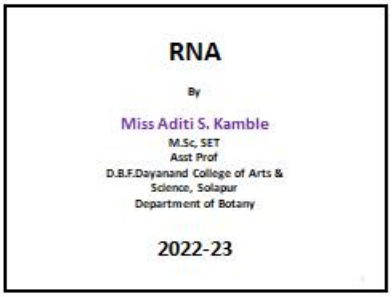

Gene Mapping
Gene mapping determines the order of genes and the relative distances between them in map units.
1 map unit=1 cM (centimorgan)
Alleles of two different genes on the same chromosome are cis
Alleles of two different genes on different homologues of the same chromosome are trans


Gene Mapping
Gene mapping methods use recombination frequencies between alleles in order to determine the relative distances between them
Recombination frequencies between genes are inversely proportional to their distance apart
Distance measurement: 1 map unit = 1 percent recombination


Mendel's Laws: Chromosomes
Homologous pairs of chromosomes: contain genes whose information is often non-identical *alleles
Different alleles of the same gene segregate at meiosis I
Alleles of different genes assort independently in gametes
Genes on the same chromosome exhibit linkage: inherited together


Parent
Gametes




RNA
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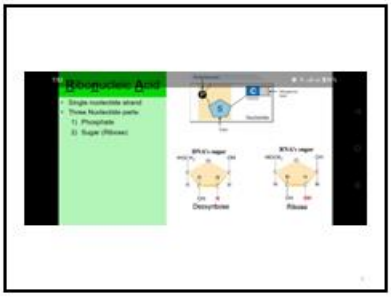
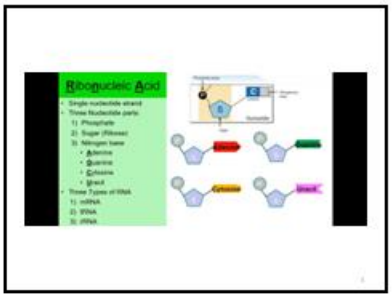
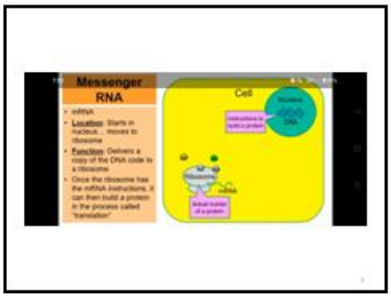
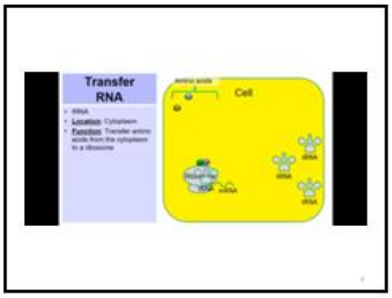
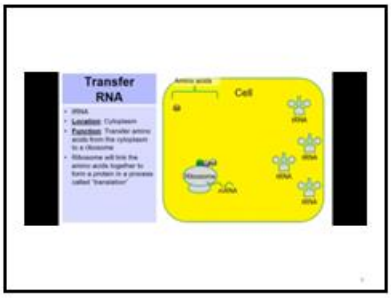
Department of Botany
2022-23


Ribonucleic Acid


Ribonucleic Acid


Messenger
RNA
Cell


Transfer
RNA
Cell


Transfer
RNA
Cell

ICT Enabled Tools for Effective Teaching and Learning Process

Department of Microbiology

Academic Year 2023-24

Class	Topic Name	ICT used	Link
Dr. S. N. Deshpande			
M.Sc.II	Google Classroom (lw7mjrs)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia/ V-Lab	https://classroom.google.c
	CAR T cell therapy for cancer treatment (YouTube Video)		https://www.youtube.com/w
M.Sc.I	Google Classroom (jlayqwk)		https://classroom.google.co
	The Immune System Kills Cancer Cells (YouTube Video)		https://www.youtube.com/w
B.Sc.III	Cryptococcosis		Power Point Presentation
	Rabies (YouTube Video)		https://www.youtube.com/w
B.Sc.II	Immunity (Dr. S. N. Deshpande Video)		https://www.youtube.com/w
	Clinical Specimens for Diagnosis		Power Point Presentation
B.Sc.I	Cultivation Technique for Microorganism		Power Point Presentation
	Gram Staining (YouTube Video)		https: //www.youtube.com/w

Prof. N. R. Damle			
M.Sc. II	Google Classroom (3scczzh)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia/ V-Lab	https://classroom.google.co
	Fermented food and milk products (Google Drive)		https://docs.google.com/pr
M.Sc. I	Google Classroom (h2xqrmn)		https://classroom.google.co
	Medical Mycology (Google Drive)		https://docs.google.com/pr
B. Sc. III	Cellulose Degradation (Google Drive)		https://docs.google.com/pres
	Eutrophication (Google Drive)		https://docs.google.com/pres
	Oil Recovery		Power Point Presentation
	Bioluminescence		Power Point Presentation
B.Sc. II	Protein Synthesis (YouTube Video)		https://www.youtube.com/wa
B.Sc. I	IMViC Test (Prof. N. R. Damle Video)		https://www.youtube.com/
	Sewage Microbiology		Power Point Presentation
	Enzymes		Power Point Presentation
Mr. S. H. Kamble			
M.Sc. II	Google Classroom (lpil7vh)	Internet/ LCD Projector/	https://classroom.google.co
M.Sc. I	Google Classroom		https://classroom.google.co

	(cta2dye)	YouTube/ Google Classroom/ Google meet/ Wikipedia/ V-Lab	
B.Sc. III	Mutations at Molecular Level (Mr. S. H. Kamble Video)		https://www.youtube.com/
	Effect of Mutation in Bacteria		Power Point Presentation
	Tools and Techniques of Genetic Engineering		Power Point Presentation
	Google Classroom (o4j4ckf)		https://classroom.google.co
B.Sc. II	Immobilization of enzymes (Mr. S. H. Kamble Video)		https://www.youtube.com/
	Google Classroom (wnwfypb)		https://classroom.google.co
	Bacterial Genetics		Power Point Presentation
B.Sc. I	Microscopy		Power Point Presentation
	Google Classroom (ome36wf)		https://classroom.google.co

Few Slides of Presentation

Cryptococcosis

Prof. S. N. Deshpande
Department of Microbiology
DBF Dayanand College of Arts and Science, Solapur

1

- **Cryptococcosis is a pulmonary or disseminated infection**
- **acquired by inhalation of soil contaminated with the encapsulated yeasts *Cryptococcus neoformans* or *C. gattii*.**
- **Symptoms are those of pneumonia, meningitis, or involvement of skin, bones, or viscera.**

2

Kingdom:	Fungi
Division:	Basidiomycota
Class:	Tremellomycetes
Order:	Tremellales
Family:	Cryptococcaceae
Genus:	*Cryptococcus*
Species:	***C. neoformans***
Binomial name	
Cryptococcus neoformans	

3

Characteristics

- Unicellular
- Round or ovoid budding ,size 4-20 micrometer
- replicates by budding
- makes hyphae during mating, and eventually creates basidiospores at the end of the hyphae before producing spores.
- produce a characteristic polysaccharide capsule.This allows for quick and easy identification of *C. neoformans*
- an opportunistic intracellular pathogen

4

CLINICAL SPECIMENS FOR DIAGNOSIS

Dr. S N. Deshpande.

DEPARTMENT OF MICROBIOLOGY

D.B.F.Dayanand college of Arts & Science,

SOLAPUR

1

CLINICAL SPECIMEN

- A portion or quantity of human material that is tested ,examined,or studied to determine the presence or absence of a particular disease or diseases.

2

Types of specimens

- Blood
- Sputum
- Throat swab
- Pus
- Stool
- Urine
- C.S.F.
- Biospy
- Skin ,nail hair , scrappings

3

METHODS OF COLLECTION OF BLOOD SAMPLES

- PURPOSE OF COLLECTION OF BLOOD:
- 1.HEMATOLOGICAL STUDIES.
- 2.BIOCHEMICAL STUDIES.
- 3.BACTERIOLOGICAL STUDIES.
- 4.IMMUNOLOGICAL STUDIES.
- 5.BLOOD TRANSFUSION SERVICES

4

Cultivation technique for Microorganism

Prof. S. N. Deshpande
Department of Microbiology
DBF Dayanand College of Arts and Science, Solapur

1

Types of media

Two types
1.Live

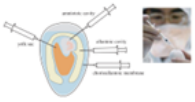
2.Non living

2

live media

Generally three live media methods employed for cultivation

1. animals
2. embryonated eggs
3. Tissue culture



3

Inoculation in Animals

- Laboratory animals play an essential role in studies of viral pathogenesis
- Live animals such as monkeys, mice, rabbits, guinea pigs, ferrets are widely used for cultivating virus
- Mice are the most widely employed animals in virology

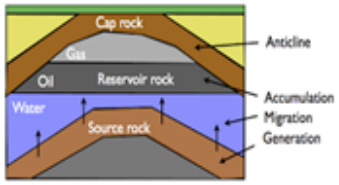
4

Oil recovery

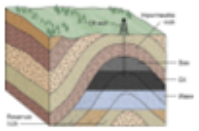
B.Sc III Paper XVI Environmental Microbiology
Prof N. R. Damle

- Countries like India are heavily dependent on fossil fuels(oil, natural gas &coal
- oil is recovered and refined to produce fuels (petroleum, diesel oil, & heating oils) feed stocks and lubricants for the petrochemical industry.
- According to J. Green earth's oil reserves are finite & will certainly become exhausted by the middle of this century
- So extraction of proven reserves should be made as efficient as possible

Origin of oil



- Conventional hydrocarbon reservoirs consist of three main parts: the source rock, the reservoir rock, and the cap rock (Figure below).
- The source rock is the rock that contains the kerogen that the oil and gas forms from.
- The reservoir rock is the porous, permeable rock layer or layers that hold the oil and gas.
- The cap rock seals the top and sides so that the hydrocarbons are trapped in the reservoir, while water often seals the bottom.[1]



- For a reservoir to exist, oil and gas from the source rock must migrate into the reservoir rock, which takes millions of years.
- This migration occurs because oil and gas are less dense than water.
- This difference in density causes the oil and gas to rise towards the surface so that they are above groundwater with the gas settling above the oil because of its lighter densities.

BIOLUMINESCENCE

Dr. N. R. Damle

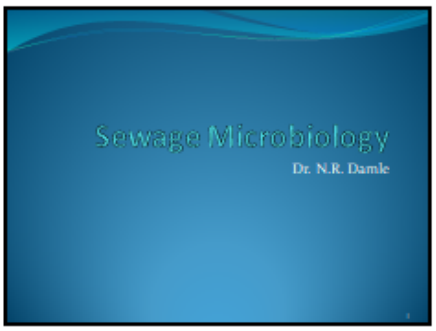
- Definition- it is defined as the process of emission of light by living organisms.
- Some bacteria have ability to emit light .
- This light emission property of some living bacteria is characteristic property.
- It is a type metabolic process.
- This is called bioluminescence.
- it is also sometimes known as phosphorescence.

- Light of the sea, light of the fish, flesh is always due to phosphoresence of living organisms including bacteria, molds, sponges, fishes, centipedes, millipedes insects etc.
- Most luminous bacteria are found in the genera *Photobacterium, Xenorhabdus and Vibrio.*
- These are the marine forms. May be free living or saprophytic.

- Luminescent bacteria are differentiated from other light emitting organisms by uniform intensity of light, shining day and night and stimulation.
- Some animals emit light only when they are stimulated.
- During light emission by bacteria very little heat is produced.
- So bioluminescence is called 'Cold light'.

- Increase in temp by in some light emitting bacteria is less than 0.001°C.
- The properties of light emitted by bacteria are similar to the other kinds of light.
- light emitted by bacteria may affect photographic film and it can induce chemical reactions.
- Light emission is confined to narrow range of wavelength.
- Bacteria emit light at 490nm & fungi at 530nm

- Bioluminescence is aerobic reaction and oxygen must be present for the emission of light.
- Luminescent bacteria contain luciferin compound.
- This particular compound is key compound which actually emits the light.
- In presence of oxygen it loses two hydrogen atoms to give **oxidized luciferin and water**



Sewage

- Sewage is a used water supply of a community.
- Types:
- Domestic waste water- human excrements and wash water
- Agricultural waste from intensive live stock farming, run off
- Waterborne wastes from industrial establishments.
- Industrial waste – Dairy, tannery, cannery distillery, textile, coal and coke, steel and rubber.
- Surface, ground and storm water that enter the sewage system

Composition of sewage

- Sewage consists of -
- 99.5 -99.9 % water
- 0.1 – 0.5 % organic & inorganic matter in suspended soluble forms.
- The chemical constituents in sewage vary from community to community an even from hour to hour.

- The organic compounds in sewage are classified as nitrogenous or non nitrogenous.
- The major nitrogenous compounds are urea, proteins, amines and amino acids and non-nitrogenous substances include carbohydrates, fats and soaps.
- Chemical compounds contributed by domestic wastes includes detergents, antiseptics, pesticides, besides human excrement.
- The increased use of household garbage-disposal units has increased the total organic load.
- The pH of sewage ranges from 6.8 to 8.5 . Temp. varies seasonally (5 to 25° C) which favours growth of mesophiles.

Microflora of Sewage

- Since the composition of sewage varies, the types and numbers of microorganisms also fluctuate.
- Various types of microorganisms including bacteria, fungi, protozoa, algae and viruses are present in sewage.
- These include aerobes, strict anaerobes and facultative anaerobes, both heterotrophs and autotrophs.
- Raw sewage may contain millions of bacteria milliliter.
- These are largely intestinal bacteria; but soil organisms are abundant.

- Common types of bacteria are coliforms, *streptococci, Clostridia, Micrococci, Proteus group, Pseudomonas species and Lactobacilli* etc.
- A number of pathogenic bacteria, viruses and protozoa are also found.
- The causative agents of dysentery (Amoebic and bacillary) cholera and typhoid fever have been found in sewage.
- Different types of enteric and other viruses such as polio, jaundice, coxsakie and adenoviruses may be excreted by the infected patients and thus occur in sewage.

Enzymes

Prof. N. R. Damle

Definition Of Enzymes :-

Enzymes are thermolabile biological catalysts produced by a living cell high molecular weight protein structures. They accelerate the rate of reaction and remain unaltered.

Importance

- Enzymes play an important role in Metabolism, Diagnosis, and Therapeutics.
- All biochemical reactions are enzyme catalyzed in the living organism.
- Level of enzyme in blood are of diagnostic importance e.g. it is a good indicator in disease such as myocardial infarction.
- Enzyme can be used therapeutically such as digestive enzymes.

Properties of enzymes :-

- 1)All enzymes are proteins or proteins combined with other chemical groups except ribozymes. Therefore they possess properties of proteins.
- 2)They are thermolabile and are precipitated by ethanol or high cone of organic salts such as ammonium sulphate.
- 3) Enzymes are large globular (M.W. 10,000 to 10,00,000) molecules with three dimensional structure.
- 4) Enzymes accelerate rate of reaction & remain unaltered (unaffected) in a given reaction.

- 5) Enzymes are required in small quantities for catalyzing the reactions in the cell. Enzyme can be reused. A single enzyme can act upon a large no of substrate molecules per minute.
- 6) Enzymes accelerate the rate of reaction without altering the chemical equilibrium of the reaction.
- 7) One of the most striking characteristics of enzymes is their high catalytic efficiency e.g. 28.35 grams of pure crystalline pepsin can digest nearly 2 tones of egg white in only few hours.

- 8)The specificity of enzymes is one of their most fundamental and important properties. Most enzymes are highly specific both in the nature of the substrate they utilize and also in the reaction they catalyze.
- 9) The enzymes are sensitive to various environmental conditions. Their activity may be reduced or destroyed by a variety of physical or chemical conditions.

Unit II: Effect of mutation in bacteria

Selection, detection and Isolation of mutants

Class- B.Sc.-III
Subject – Microbial Genetics

Mr. Kamble Sainath Hanmant
Assistant Professor
Department of Microbiology
D. B.F. Dayanand College of Arts and Science, Solapur

1

Direct Observation Technique:

- In some cases, a colony growing on an agar plate can easily be seen to be different from the normal parental type (wild-type).
- For example, if the parental strain is pigmented, the observation of non-pigmented colonies may indicate the presence of mutants.
- Indicators can also be incorporated into the medium to detect microorganisms with and without particular metabolic capabilities.
- For instance, pH indicators can be used in the medium to detect the production of acidic products.
- The indication of acid production by one microbial strain and not by another of the same microorganisms growing under identical conditions would show the presence of a mutant.

2

Enrichment Technique:

- Enrichment technique is employed especially in isolating mutants resistant to phages, antibiotics, or toxic chemicals.
- Phage-resistant mutants can be isolated simply by plating the mutagenized, phenotypically expressed microbial population on plates containing phage particles.
- Cells expressing the parental wild-type phenotype are killed; only phage-resistant mutants develop into colonies.
- Such colonies are isolated. Similarly, mutants resistant to an antibiotic or a toxic chemical can be isolated by plating the microbial population with the antibiotic or the chemical.

3

Replica-Plating Technique:

- Replica-plating technique is often used to isolate nutritional mutants (auxotrophs) as well as various other types of mutants, e.g., antibiotic-resistant mutants.
- Bacterial cultures are diluted, and the cells are spread on the surface of a semisolid nutrient agar medium in a Petri dish (called "master plate").
- The medium in the master plate is a complete medium i.e., containing all the nutritional components required by the bacterial population.
- After a sufficient incubation period, each bacterium produces a visible colony on the surface of the agar in the master plate.
- A piece of sterile velvet cloth is stretched over a cylindrical block of wood or metal that is slightly smaller in diameter than the Petri dishes used in the process.

4

Tools and Techniques of Genetic engineering

Class- B.Sc.-III
Subject – Microbial Genetics
Mr. Kamble Sainath Hanmant
Assistant Professor
Department of Microbiology
D. B.F. Dayanand College of Arts and Science, Solapur

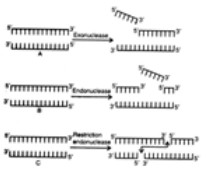
1

Introduction

- Genetic Engineering is the direct manipulation of the hereditary material.
- Genetic engineering, also called genetic modification or genetic manipulation, is the direct manipulation of an organism's genes using biotechnology.
- It is based on a set of molecular techniques collectively called recombinant DNA (rDNA) technology.
- The birth of Recombinant DNA technology is based on two sets of discoveries, the discovery of the Watson and crick DNA model together with the studies that ensued, and the identification of enzymes that can cleave, elongate, join or otherwise modify DNA Molecules.
- Using recombinant DNA technology to modify an organism's DNA to achieve desirable traits is called genetic engineering.
- Addition of foreign DNA in the form of recombinant DNA vectors that are generated by molecular cloning is the most common method of genetic engineering.
- An organism that receives the recombinant DNA is called a genetically modified organism (GMO). If the foreign DNA that is introduced comes from a different species, the host organism is called transgenic.

2

- **Exonucleases**
- These enzymes act upon genome and digest the base pairs on 5' or 3'ends of a single stranded DNA or at single strand nicks or gaps in double stranded DNA.
- **Endonucleases**
- They act upon genetic material and cleave the double stranded DNA at any point except the ends, but their action involves only one strand of the duplex.



3

- Restriction Endonucleases
- Before 1970 there was no method of cleaving DNA at discrete points. All the available methods for fragmenting DNA were non-specific.
- The restriction enzymes are called as Molecular scissors. These enzymes are present in bacteria and provide a type of defense mechanism called the restriction–modification system.
- Since this endonuclease cuts unmodified DNA into large discrete fragments, it was reasoned that it must recognize a target sequence.
- Restriction systems allow bacteria to monitor the origin of incoming DNA and to destroy it if it is recognized as foreign.
- Restriction endonucleases recognize specific sequences in the incoming DNA and cleave the DNA into fragments, either at specific sites or more randomly.
- When the incoming DNA is a bacteriophage genome, the effect is to reduce the efficiency of plating, i.e. to reduce the number of plaques formed in plating tests.

4

Bacterial Genetics

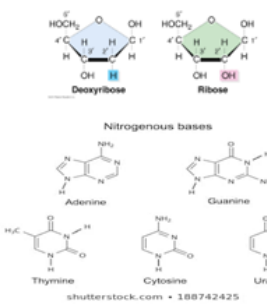
Class- B.Sc.-II
Paper- VI, Bacterial Genetics
Mr. Kamble Sainath Hanmant
Assistant Professor
Department of Microbiology
D. B.F. Dayanand College of Arts and Science, Solapur

1

Introduction

- DNA, or deoxyribonucleic acid, is the central information storage system of most animals and plants, and even some viruses.
- DNA is long polymer of deoxyribonucleotides.
- The length of DNA is usually defined as number of nucleotides (or a pair of nucleotide referred to as base pairs) present in it.
- A nucleotide has three components- a nitrogenous base, a pentose sugar (ribose in case of RNA and Deoxyribose for DNA) and Phosphate group.
- There are two types of nitrogenous bases-Purines(Adenine and Guanine) and Pyrimidines (Cytosine, Uracil and Thymine)
- Cytosine is common for both DNA and RNA and Thymine is present in DNA. Uracil is present in RNA at the place of thymine.

2



3

- A nitrogenous base is linked to pentose sugar through a N-glycosidic linkage to form a nucleoside.
- When a phosphate group is linked 5'-OH of a nucleoside through phosphoester linkage.
- Two nucleotides are linked through 3'-5' phosphodiester linkage to form a dinucleotide.
- More nucleotides can be joined in such a manner to form a polynucleotide chain.
- A polymer thus formed has at one end a free phosphate moiety at 5' end of ribose sugar, which is referred to as 5'–end of polynucleotide chain.
- Similarly at the other end of the polymer the ribose has a free 3'-OH group which is referred to as 3'end of the polynucleotide chain.
- The DNA molecule consists of two strands that wind around one another to form a shape known as a double helix.
- Each strand has a backbone made of alternating sugar (deoxyribose) and phosphate groups. Attached to each sugar is one of four bases--adenine (A), cytosine (C), guanine (G), and thymine (T).
- The double helix structure was first discovered by Francis Crick and James Watson with help of Rosalind Franklin and Maurice Wilkins.

4

Microscopy

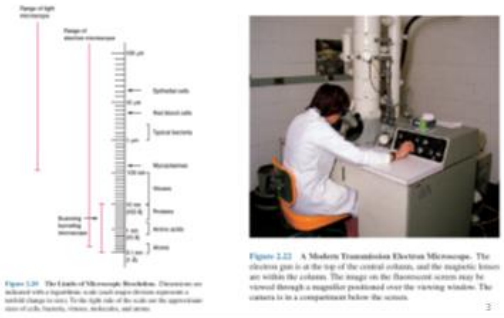
Class- B.Sc.-I
Subject – Microscopy
Mr. Kamble Sainath Hanmant
Assistant Professor
Department of Microbiology
D. B.F. Dayanand College of Arts and Science, Solapur

1

The Transmission Electron Microscope

- For centuries the light microscope has been the most important instrument for studying microorganisms.
- The electron microscope now has transformed microbiology and added immeasurably to our knowledge.
- The very best light microscope has a resolution limit of about **0.2 µm**. Because bacteria usually are around 1 µm in diameter, only their general shape and major morphological features are visible in the light microscope.
- The detailed internal structure of larger microorganisms also cannot be effectively studied by light microscopy.
- These limitations arise from the nature of visible light waves, not from any inadequacy of the light microscope itself.

2



3

- Recall that the resolution of a light microscope increases with a decrease in the wavelength of the light it uses for illumination
- Electron beams behave like radiation and can be focused much as light is in a light microscope.
- If electrons illuminate the specimen, the microscope's resolution is enormously increased because the wavelength of the radiation is around 0.005 nm, approximately 100,000 times shorter than that of visible light.
- The transmission electron microscope has a practical resolution roughly 1,000 times better than the light microscope; with many electron microscopes, points closer than 5 A^0 or 0.5 nm can be distinguished, and the useful magnification is well over 100,000X.
- A modern **transmission electron microscope (TEM)** is complex and sophisticated , but the basic principles behind its operation can be understood readily.

4

ICT Enabled Tools for Effective Teaching and Learning Process

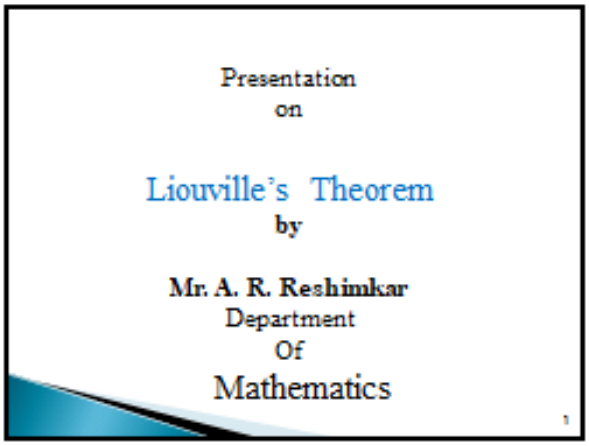
Department of Mathematics

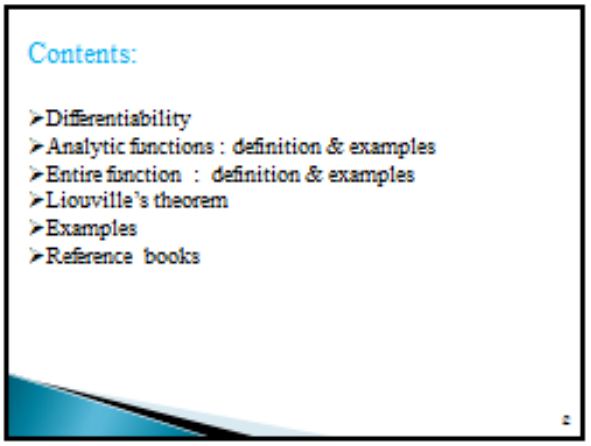
Academic Year 2023-24

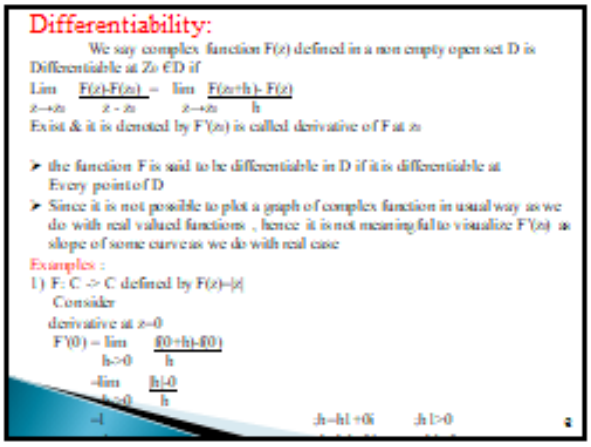
Class	Topic Name	ICT used	Link
Mr. A. R. Reshimkar			
B. Sc. III	Liouville's Theorem	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia/ V-Lab	Power Point Presentation
	Properties of Zn (Mr. A. R. Reshimkar Video)		https://youtu.be/uD4Q8qkpF
B.Sc. II	Normal Sub-group		Power Point Presentation
	Subgroups of S4 (Mr. A. R. Reshimkar Video)		https://youtu.be/Y6K2rPzwfr
M.Sc. II	Google Classroom (oj6fdet)		https://classroom.google.co
	Linear span using Geogebra (Mr. A. R. Reshimkar Video)		https://youtu.be/wdU58X2
	Normal Operators (Google Meet)		https://meet.google.com/rw
	Linear span of two vectors (Mr. A. R. Reshimkar Video)		https://youtu.be/LjPuzKmJ
M.Sc. I	Google Classroom (bxovjez)		https://classroom.google.co
	Separable field extension (Google Meet)		https://meet.google.com/m
	Dihedral Group D3 (Mr. A. R. Reshimkar Video)		https://www.youtube.com/

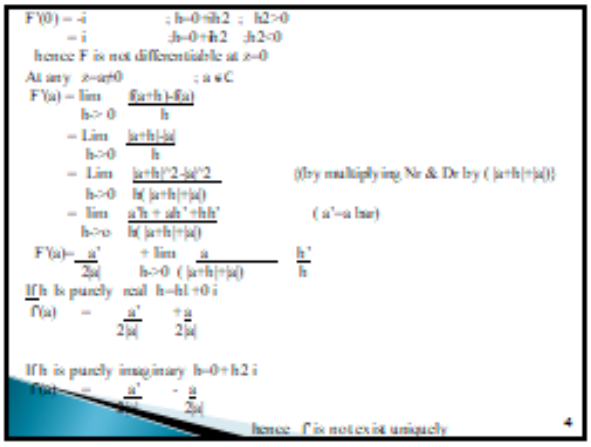
	Lagrange's theorem (Mr. A. R. Reshimkar Video)		https://youtu.be/VQu_R_F

Few Slides of Presentation









Normal Sub-groups

Presented by –
Mr.A.R.Reshimkar
D.B.F.Dayanand College of Arts and Science,Solapur

1

Groups

- 1. Introduction
- 2.Normal subgroups, quotien groups.
- 3. Homomorphism.

2

1.Introduction

- 1.1. Binary Operations
- 1.2.Definition of Groups
- 1.3.Examples of Groups
- 1.4.Subgroups

3

1.Introduction

1.1.Binary Operations

A *binary operation* on a set is a rule for combining two elements of the set. More precisely, if S iz a nonemty set, a binary operation on S iz a mapping f : S × S → S. Thus f associates with each ordered pair (x,y) of element of S an element f(x,y) of S. It is better notation to write x y for f(x,y), refering to as the binary operation.

4

ICT Enabled Tools for Effective Teaching and Learning Process

Department of English

Academic Year 2023-24

Class	Topic Name	ICT used	Link
Prof. N. N. Londhe			
B. A. III	Modern English Grammer	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
B. A. I	Nature of language		Power Point Presentation
Dr. R. A. Ranaware			
M.A. II	Practical Criticism of an Unseen Poem	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
B.A. I	Parts of speech (Part-1)		Power Point Presentation
B.Sc. I	Parts of speech (Part-2)		Power Point Presentation
B.A. II	Parts of speech (Part-3)		Power Point Presentation
B.Sc. III	Parts of speech (Part-4)		Power Point Presentation
Shri. S. S. More			
M. A. II	Vijay Tendulkar - UGC NET Exam (You- tube video)	Internet/ LCD	https:// www.youtube.com/w

M. A. I	Shakespeare's Hamlet (You- tube video)	Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://www.youtube.com/w
B. A. III	Literatures in English		Power Point Presentation
	Shakespeare's Macbeth (You- tube video)		https://www.youtube.com/w
	Animal Farm by George Orwell (You- tube video)		https://www.youtube.com/w
B. A. II	The Vendor of Sweets by- R. K. Narayan		Power Point Presentation
	That Long Silence by Shashi Deshpande (You- tube video)		https://www.youtube.com/w
	Bravely Fought the Queen by Mahesh Dattani		https://www.youtube.com/w
B. Sc. I	The Birth of Khadi by- Mahatma Gandhi (You- tube video)		Power Point Presentation

Few Slides of Presentation

Topic – I
Nature of language

Language – a special gift to mankind
Language is species – specific

Prof. N. N. Londhe

2022-23

Definitions of language

Edword Sapir : Language is a means of communication by means of speech sounds.

R. H. Robins: Language is a symbol ---- infinitely modifiable and extendable according changing needs of the society.

Characteristics of language

Language is human
Language is social
Language is non-instinctive
Language is arbitrary
Language is systematic
Language is symbolic
Language is sound
Language is conventional

Special properties of language

1. Duality of patterns

2. Creativity / Productivity

T.Y.B.A. English (Special)

Modern English Grammer

Prof. N. N. Londhe

2022-23

Subordination : Grammatical Inequality

Coordination : Grammatical Equality

Subordination

Two or more than two clauses involved
One is the main clause and other is subordinate clause
Exam. If you love me, I will love you
'I will love you' is the main clause
'If you love me' is the subordinate clause

The main clause is higher in rank because it is independent

The subordinate clause is lower in rank because it is dependent on the main clause

Coordination
Two or more than two clauses involved
Both are main clauses Exam.
You help me and I will help you
'You help me' is the main clause
'I will help you' is also main clause

Conclusion
In subordination, the combination of two or more clauses reduces one clause to subordinate level and so grammatical inequality. In coordination, the combination of two or more clauses maintains status of the clauses. So there is grammatical equality.

1

Practical Criticism of an Unseen Poem

DR. RANAWARE RAVINDRA ARUNRAO
ASSISTANT PROFESSOR
DEPARTMENT OF ENGLISH
DBF DAYANAND COLLEGE OF ARTS AND SCIENCE, SOLPAUR
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2

Who is I A Richards?

Ivor Armstrong Richards

A poet, dramatist, speculative philosopher, psychologist and semanticist,

The 20th century critics to bring to English criticism a scientific precision and objectivity.

He is often referred to as the 'critical consciousness' of the modern age.

3

I. A. Richards' contribution

- *Principles of Literary Criticism,*
- *Practical Criticism,*
- *Coleridge on Imagination,*
- *The Foundation of Aesthetics* (with C.K.Ogden and James Wood)
- *The Meaning of Meaning* (with Ogden).

4

What is Practical Criticism?

- The objective of *Practical Criticism* is to encourage students to concentrate on `the words on the page`, rather than rely on preconceived or received beliefs about a text.
- "The lesson of all criticism is that we have nothing to rely upon in making our choices but ourselves." The lesson of good poetry, when we have understood it, lies in the degree to which we can order ourselves.
- Through close analysis of poems and by responding to the emotion and meaning in them the students were to achieve what Richards called an 'organized response.'

PARTS OF SPEECH (PART-1)

Dr. Ravindra Arunrao Ranaware

Department of English
D. B. F. Dayanand College of Arts and Science, Solapur

1

- Sentences are made of words.
- The words according to their nature and function in a sentence have been divided into eight classes.
- That classes are called parts of speech.
- These eight parts of speech in traditional grammar describe words according to their function in a sentence.
- They are also known as word classes.
- They include nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and interjections.

2

- **Nouns**: a Noun may be defined as a word standing for the name of a person place or thing.

3

- **Types of nouns**:
- The nouns can be divided into two main classes: **concrete and abstract Nouns**.

4

- The words used for names of persons or things that we can touch and see or they exist physically or materially are called **concrete nouns**.
- Examples: tree, road, balloon, ice cream, book, mountain, river etc.
- Concrete nouns can be subdivided into **proper nouns, common nouns, collective nouns and material nouns.**

5

Proper Nouns

- A Proper Noun is a word used to indentify by name a particular person, place or thing.
- Proper nouns always begin with capital letter.
- These are names given to particular person, place or thing.
- Examples: Rama, Govinda, Chennai, Reshma, Savitri, Agra, Ganga, Park Chauk, kadak Roti, Shenga Chatani etc.

6

PARTS OF SPEECH (PART-2)

Dr. Ravindra Arunrao Ranaware

Department of English
D. B. F. Dayanand College of Arts and Science, Solapur
(Academic Year : 2022-2023)

1

Parts of Speech

- Sentences are made of words.
- The words according to their nature and function in a sentence have been divided into eight classes.
- These classes are called parts of speech.
- These eight parts of speech in traditional grammar describe words according to their function in a sentence.
- They are also known as word classes.
- They include nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and interjections.

2

Pronouns

- Pronoun is a word standing for / used instead of the name of a person place or thing. The Pronouns are words used instead of a noun. In English language the pronouns have hollowing kinds. They are: Personal Pronouns, Reflexive Pronouns, Emphatic Pronouns, Demonstrative Pronouns, Indefinite Pronouns, Interrogative Pronouns, Distributive Pronouns, Reciprocal Pronouns and Relative Pronouns.

3

Personal Pronouns

- Personal pronouns are the pronouns used in place of Nouns which are referred in the speech earlier by mane. The personal pronouns are in form of first, second and third persons.
- The first person stands for the speaker, second person stands for the person spoken to and the third person stands for the person spoken of in his/her absence.
- Examples: I, we, you, he, she, it, they, them, us, me

4

PARTS OF SPEECH (PART-3)

Dr. Ravindra Arunrao Ranaware

Department of English
D. B. F. Dayanand College of Arts and Science, Solapur
(Academic Year : 2022-2023)

1

Parts of Speech

- Sentences are made of words.
- The words according to their nature and function in a sentence have been divided into eight classes.
- These classes are called parts of speech.
- These eight parts of speech in traditional grammar describe words according to their function in a sentence.
- They are also known as word classes.
- They include nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and interjections.

2

Articles

- An Article is a word used to modify a noun. The articles are used to point out or refer to nouns in English language. They specify and sometimes distinguish the noun from the others. The articles are specially found in English language. In Indian languages there are no articles as such.
- In English there are three articles: a, an and the.

3

Types of Articles

- Articles in English language are of two types. Definite article and Indefinite articles.
- Indefinite articles are 'a' and 'an'. They are called indefinite because they do not give fix or determined reference of the noun they are used with.
- Both of these are used with only singular and countable nouns.

4

B.Sc. I
Semester I
Prose No. 01

The Birth of Khadi
by- Mahatma Gandhi

Mr. S. S. More

2022-23

- About the Author:
- Mahatma Gandhiji an architect of form of nonviolent civil disobedience movement
- Essays on the theme of truth, nonviolence and independence

- About the essay:
- The essay is about Gandhaji's intent on promoting khadi to the population of India who are suffering from poverty.
- He explains that by taking to the spinning wheel and making khadi fabric, we can equalise the social standing of the poor classes and begin a revolution.
- He makes the case for khadi at a gathering where he is asked to give an address to a large crowd. Instead of making a religious discourse, he instead talks about khadi.

- Mahatma Gandhiji was asked to give a religious discourse.
- Gandhiji thought that in his every public act there was a religious consciousness and a downright religious motive.
- Gandhiji talked about his experience with a missionary friend in Vellore.
- They asked Gandhiji to explain the connection between khadi and spirituality.

B.A. II
Semester IV

The Vendor of Sweets

by- R.K. Narayan

Mr. S. S. More

2022-23

- About the author :
- R. K. Narayan was born in Madras, South India, and educated there and at Maharaja's College in Mysore. His first novel Swami and Friends (1935) and its successor The Bachelor of Arts (1937) are both set in the enchanting fictional territory of Malgudi. Other 'Malgudi' novels are The Dark Room (1938), The English Teacher (1945), Mr. Sampath (1949), The Financial Expert (1952), The Man Eater of Malgudi (1961), The Vendor of Sweets (1967), The Painter of Signs (1977), A Tiger for Malgudi (1983), and Talkative Man (1986).

- **Settings:**
- Malgudi, Narayan's famous Indian township provides the backdrop for this novel with its interesting mixture of the traditional and colonial heritage. The love and marriage, their devotion to God ,and their celebration of the festivals make the Malgudians come alive. The simplicity of the vendor and the naivety of his customers is touching when they spend half an hour discussing politics., before asking for sweet meats and their price.

- **Themes:**
- There are two main themes in Vendor of Sweets: One is the father-son conflict which can be generalized as a conflict between the east and west or between good and evil. The other theme is man's quest for identity and self-renewal. The protagonist Jagan is a sweet-vendor by profession., follower of the Gita in thinking and talker of Gandhian principles but he indulges in double dealing in matters of money, and also cheats sales-tax authorities. He comes to realize that money is evil when his son, Mali, comes back to India with a Korean girl, Grace and asks for money for his business. Jagan finds new life or a new birth in his retirement, when he surrenders his business to his cousin. His fragile Gandhian self-respect collapses before his much-loved son's strange actions; and after Mali ends up disastrously in prison as a result of driving drunk around Malgudi, Jagan has no option but a Hindu-style renunciation of the world, bewilderment and retreat to a simpler life. But even here his ideal of Sanyasa is not serious as he still holds the purse string.

B.A. III
Semester VI

Literatures in English

Mr. S. S. More

2022-23

Twenty Six Men and a Girl
by- MaximGorky

- Author:- Alexei Maximovich Peshkov, popularly known as Maxim Gorky, was a Russian and Soviet writer and socialist political thinker.
- Title- The title in Russian translates literally as Twenty Six Men and One. Most translator, however, render the English title as Twenty Six Men and a Girl.
- Source- Maxim Gorky based the story in part on his own experiences as a member of the working class in such jobs as errand boy, shoemaker's helper, dishwasher, night watchman and baker.
- Setting-The action takes place in an unidentified locale in Czarist Russia of the late nineteenth century.
- Theme- the dismal plight of the working class

- The story is narrated by one of the bakers, whose only relief from misery is the visit of Tanya, a beautiful girl whom the bakers gradually begin worship. When they know that she is seduced by the soldier they rebuke her. Her initial surprise soon gives way to anger as she scolds the bakers for intruding her affairs and making her an object of their worship. Only when she permanently takes their leave do they realize their loss.

- Characters-
- Narrator- One of the twenty six men
- Tanya- sixteen year old girl who visits them in early morning
- Pavel- baker in the cellar sweet shop
- Co-workers of the Narrator and Pavel
- Makers of whitebread-
- Soldier- handsome, well-dressed man
- Lidka and Grushka- two girls who work in an embroidery shop
- Proprietor- owner of the bakeries and an embroidery shop

PARTS OF SPEECH (PART-4)

Dr. Ravindra Arunrao Ranaware

Department of English
D. B. F. Dayanand College of Arts and Science, Solapur
(Academic Year : 2022-2023)

1

Parts of Speech

- Sentences are made of words.
- The words according to their nature and function in a sentence have been divided into eight classes.
- These classes are called parts of speech.
- These eight parts of speech in traditional grammar describe words according to their function in a sentence.
- They are also known as word classes.
- They include nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and interjections.

2

Verbs

- A verb is a word or a combination of words which describes the action, a state of being or condition of the subject or talk about something that happens i.e. what the subject does, or what happens to it, or what it is.
- A verb is the part of a sentence that tells us what the subject performs. Verbs are the hearts of English sentences. They take many different forms depending on their subjects, the time they refer to and other ideas we want to express.
- It is one of the nine parts of speech in English grammar. Non-action verbs are also referred to as linking or stative verbs, such as *to be, to seem, to sound*. Verbs comprise the third largest group of words in English (about 10%) and appear in any sentence as a major mandatory element tying the subject and predicate together.

3

Types of Verbs

- Transitive and Intransitive Verbs:
- The verb in a sentence which is followed by an object is called a transitive verb. A transitive verb is a verb that requires an object to receive the action. For example: I will give you hundred rupees.
- If the verb carries two objects, it is called di-transitive verb. If it carries three objects, it is called tri-transitive verb. And if it carries more than three objects, it is called multi-transitive verb.
- The verb in a sentence which does not followed by an object is called intransitive verb. An intransitive verb does not take an object. Using an object immediately after an intransitive verb will create an incorrect sentence. However, there may be other information after the verb, such as one or more prepositional phrases or an *adverb*. E.g. He runs fast. Water is boiling.

4

Verbs and Moods

- The manner in which the verb is used is called its mood. There are three moods in English: Indicative mood, Imperative mood and Subjective mood.
- When the verb in a sentence is used to state a fact or to ask a question, then it is in Indicative mood. E.g. The student is studying English grammar. When does the train depart for Pune?
- When the verb in a sentence is used to command, advise or petition, then it is Imperative mood. E.g. Keep it up. Be careful and attentive in the class. God help me out in this worst times.
- When a verb in a sentence is used to express a wish, a desire, a purpose, a doubt and a condition contrary to fact. E.g. Long *live* the baby. I wish he *would* help us. We study that we *may pass* exam. I am hoping that he *may go* tomorrow. If it *were* difficult, I would not do it.

5

Auxiliary Verbs

- Auxiliary verbs are those verbs which are used in a sentence in the verb phrase to assist the main verb to form a specific meaning. An auxiliary verb is used with a main verb to help express the main verb's tense, mood, or voice. Auxiliary verbs are: *be, do, have, will, shall, would, should, can, could, may, might, must, ought*, etc.
- In English grammar, **auxiliary verbs** are generally needed to form **compound** tenses, **questions**, and **negations** as well as **passive** sentences. In all these constructions, they 'help' (support) main verbs.
- The auxiliary verbs can be described as **Primary Auxiliary Verbs** and **Modal Auxiliary Verbs** .

6

ICT Enabled Tools for Effective Teaching and Learning Process

Department of Hindi

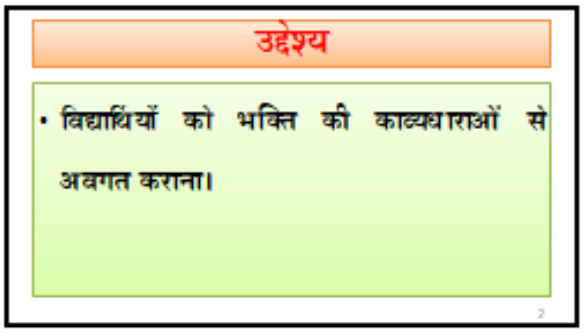
Academic Year 2023-24

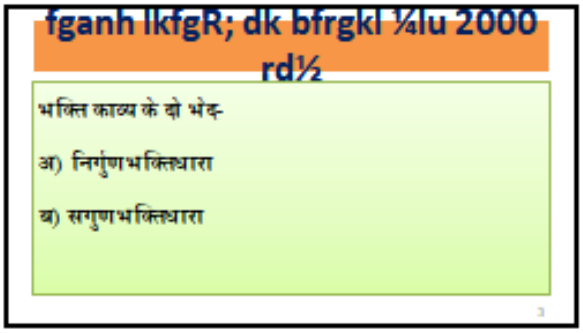
Class	Topic Name	ICT used	Link
Prof. G. D. Birajdar			
B. A. III	रस सिद्धांत (YouTube Video)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Ras Siddhant In Hindi | रस
	भक्ति की काव्यधाराएँ		Power Point Presentation
	Google Classroom (Code:kyl56dq)		https://classroom.google.com
B.A. II	कमलेश्वर का संपूर्ण परिचय		https://www.youtube.com/wa
B. A. I	Google Classroom (Code: cruafgg)		https://classroom.google.co
	कबीर के दोहे		https://www.youtube.com/
B. A. I	कष्टों से भागना कायरता है। - भगतसिंह का पत्र सुखदेव के नाम		https://www.youtube.com/
Mr. N. M. Harale			
B. A. III	हिंदी साहित्य:-भक्ति काल (YouTube Video)	Internet/ LCD Projector/	Hindi sahitya |bhakti kal,
	कबीर के पद (YouTube Video)		https://www.youtube.com/wa

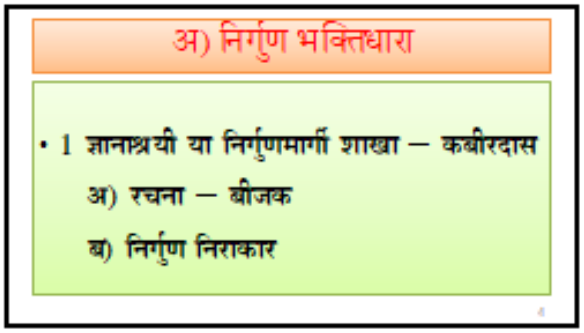
B.A. II	रहीम के नीतिपरक दोहे	YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
	नागमती का वियोग वर्णन-जायसी का परिचय (YouTube Video)		https://www.youtube.com
B. A. I Hindi Com.	Google Classroom (Code: e3yju3n)		https://classroom.google.co
	उसने कहा था-चंद्रधर शर्मा गुलेरी (YouTube Video)		Write A Winning Essay |
Mr. M. B. Koli			
B. A. III	महाकाव्य काव्य के प्रकार (YouTube Video)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	NTA UGC NET HINDI ||
	आलोचना (YouTube Video)		https://hi.wikipedia.org/wiki/
	साहित्यशास्त्र का परिचय (YouTube Video)		https://www.youtube.com/wa
B.A. II	Google Classroom (Code: yrmipdb)		https://classroom.google.com
B. A. I Opt. Hindi	साक्षात्कार लेखन (YouTube Video)		Power Point Presentation
	वृत्तांत लेखन हिंदी ..		https://www.youtube.com/

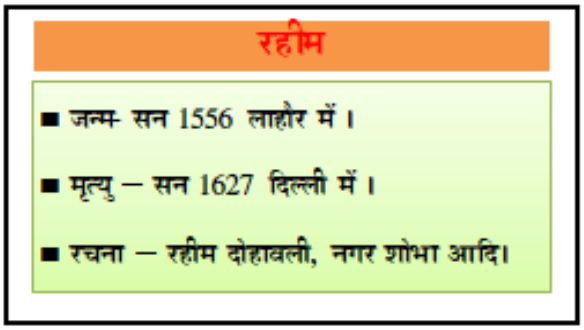
	(YouTube Video)		

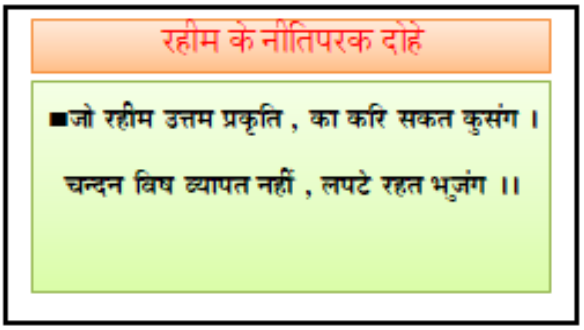
Few Slides of Presentation



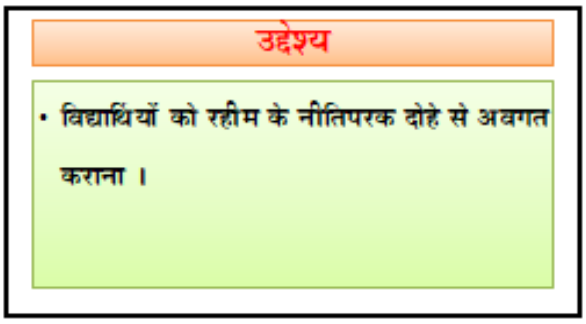




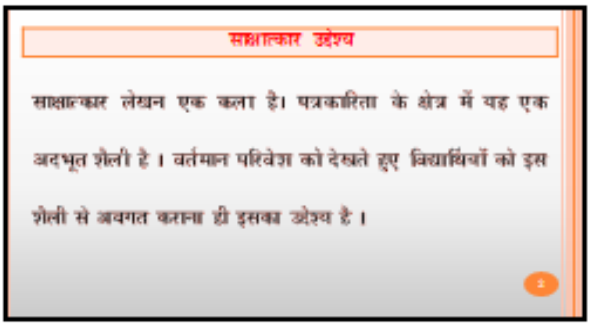


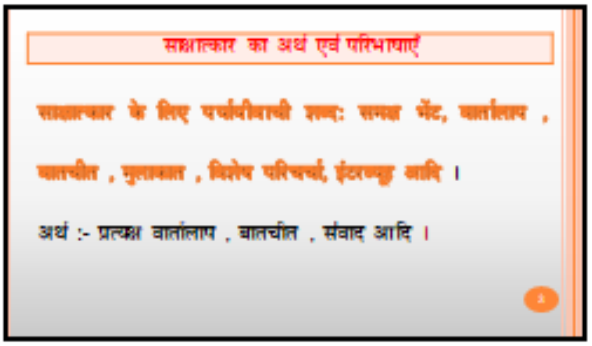


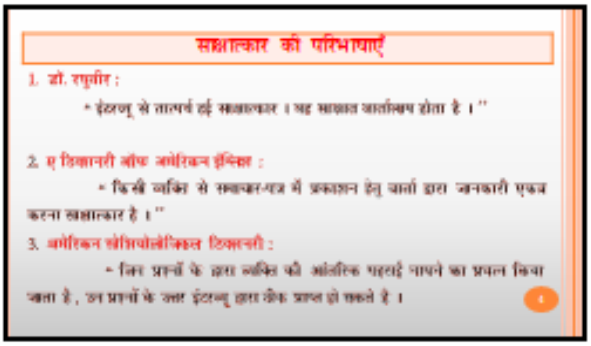

डी.वी. एफ. दयानंद कला व शास्त्र महाविद्यालय,सोलापुर
हिंदी विभाग
रहीम के नीतिपरक दोहे


उद्देश्य
• विद्यार्थियों को रहीम के नीतिपरक दोहे से अवगत कराना ।


डी.वी. एफ. दयानंद कला व शास्त्र महाविद्यालय,सोलापुर
हिंदी विभाग
साक्षात्कार लेखन


साक्षात्कार उद्देश्य
साक्षात्कार लेखन एक कला है। पत्रकारिता के क्षेत्र में यह एक अद्भुत शैली है । वर्तमान परिवेश को देखते हुए विद्यार्थियों को इस शैली से अवगत कराना ही इसका उद्देश्य है ।


साक्षात्कार का अर्थ एवं परिभाषाएँ
साक्षात्कार के लिए पर्यायवाची शब्द: समक्ष भेंट, वार्तालाप , बातचीत , मुलाकात , विशेष परिचर्चा, इंटरव्यू आदि ।
अर्थ :- प्रत्यक्ष वार्तालाप , बातचीत , संवाद आदि ।


साक्षात्कार की परिभाषाएँ
1. डॉ. रघुवीर :
" इंटरव्यू से तात्पर्य है साक्षात्कार । यह साक्षात वार्तालाप होता है । "
2. ए डिक्शनरी ऑफ अमेरिकन इंग्लिश :
" किसी व्यक्ति से समाचार-पत्र में प्रकाशन हेतु वार्ता द्वारा जानकारी एकत्र करना साक्षात्कार है । "
3. अमेरिकन सोशियोलॉजिकल डिक्शनरी :
" जिन प्रश्नों के द्वारा व्यक्ति की आंतरिक गहराई नापने का प्रयत्न किया जाता है , उन प्रश्नों के उत्तर इंटरव्यू द्वारा लेकर प्राप्त हो सकते हैं ।

ICT Enabled Tools for Effective Teaching and Learning Process

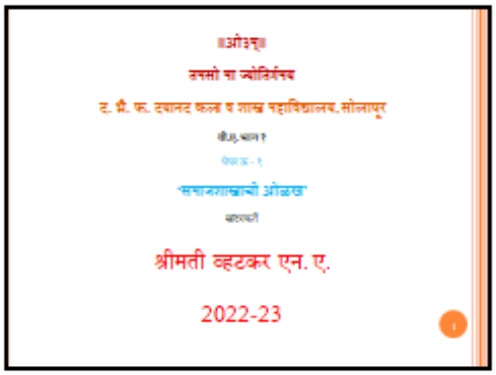
Department of Sociology

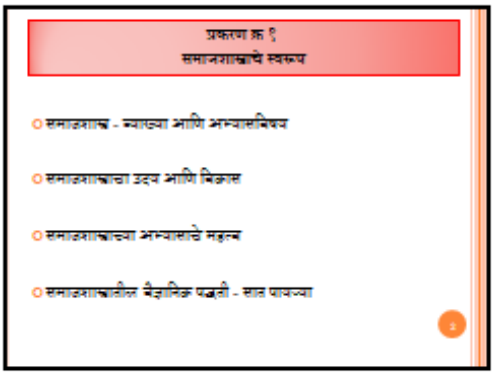
Academic Year 2023-24

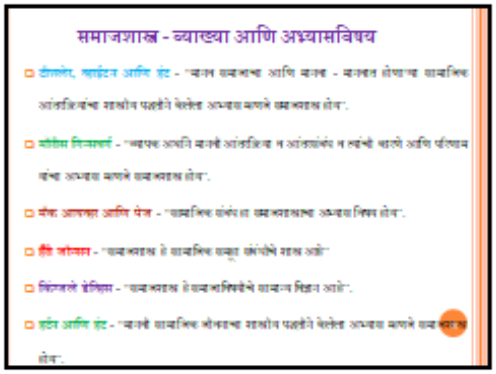
Class	Topic Name	ICT used	Link
Mrs. N. A. Vhatkar			
B. A. I	**समाजशास्त्राची ओळख**	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point Presentation
	समाजशास्त्राचा अर्थ व व्याख्या		https://www.youtube.com/w
	समाजशास्त्राची संकल्पना व अर्थ		https://www.youtube.com/w
	Meaning of Social Movement		https://www.youtube.com/w
	Types of Social Movement		https://www.youtube.com/w
Mr. K. N. Gadade			
B.A. III	ग्रामीण समुदायाचे बदलते स्वरूप (You- tube Video)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/	https://www.youtube.com/w
	शहरी समुदायाची वैशिष्ट्ये (You- tube Video)		https://www.youtube.com/w
	सामाजिक संशोधन पद्धती (You- tube Video)		https://www.youtube.com/w

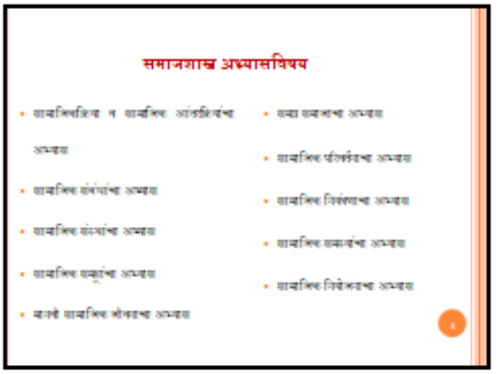
	संशोधन आणि सामाजिक संशोधन संकल्पना (You- tube Video)	Wikipedia	https://www.youtube.com/w
B.A. II	भारतातील सामाजिक समस्या		Power Point Presentation
	बेरोजगारी		https://www.youtube.com/w
	दारिद्रय		https://www.youtube.com/w

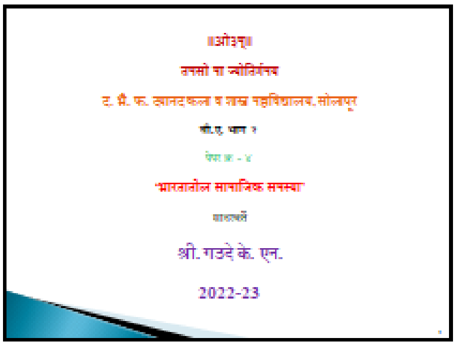
Few Slides of Presentation



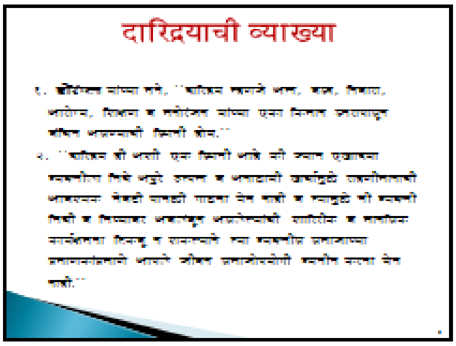


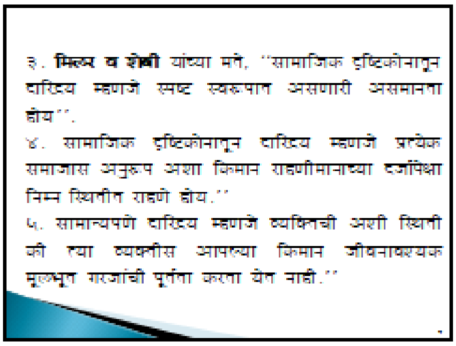


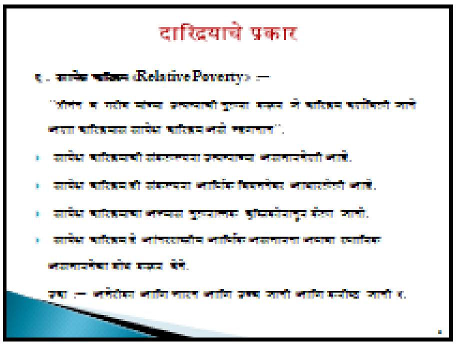


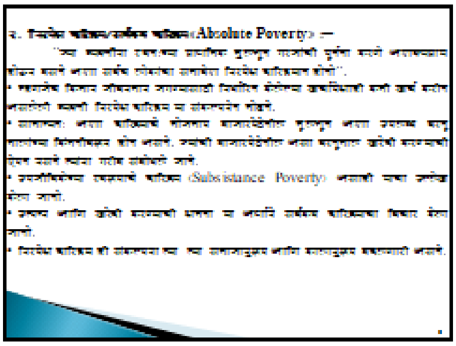

श्री. गउदे के. एन.
2022-23


दारिद्र्याची समस्या

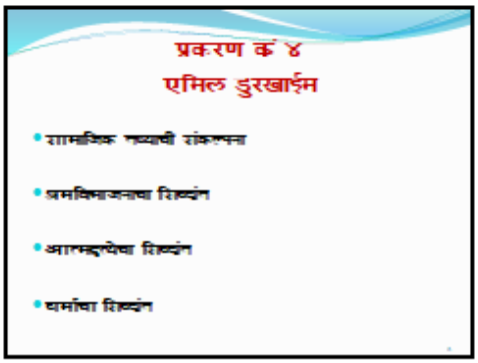

दारिद्र्याची व्याख्या

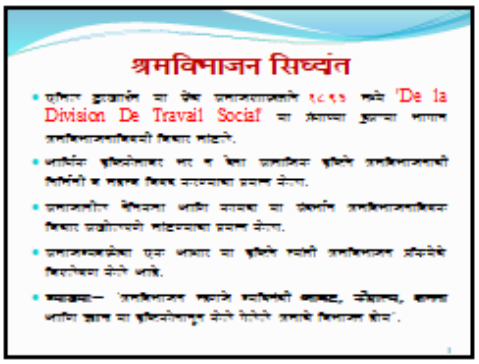

३. मिलर व रोबी यांच्या मते, "सामाजिक दृष्टिकोनातून दारिद्र्य म्हणजे स्पष्ट स्वरूपाची असणारी असमानता होय".
४. सामाजिक दृष्टिकोनातून दारिद्र्य म्हणजे प्रत्येक समाजास अनुरूप अशा किमान राहणीमानाच्या दर्जापेक्षा निम्न स्थितीत राहणे होय."
५. सामान्यपणे दारिद्र्य म्हणजे व्यक्तिची अशी स्थिती की त्या व्यक्तीस आपल्या किमान जीवनावश्यक मूलभूत गरजांची पूर्तता करता येत नाही."


दारिद्र्याचे प्रकार
(Relative Poverty)


(Absolute Poverty)


'समाजशास्त्रीय विचारवंत'
कु. चौधरी एस.बी.
2022-23


प्रकरण क्रं ४
एमिल डुरखाईम


श्रमविभाजन सिध्दांत


श्रमविभाजनास कारणीभूत घटक
घटक

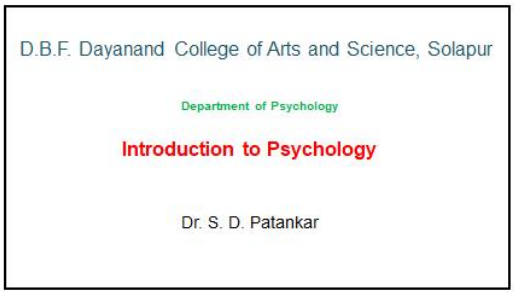
ICT Enabled Tools for Effective Teaching and Learning Process

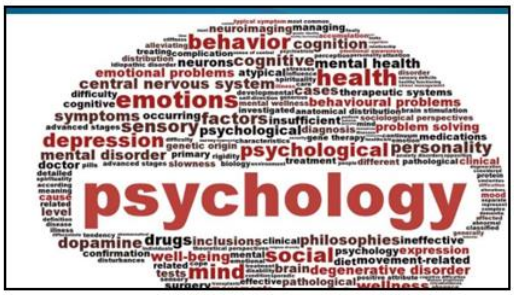
Department of Psychology

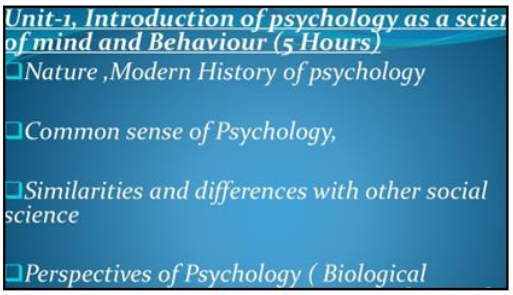
Academic Year 2023-24

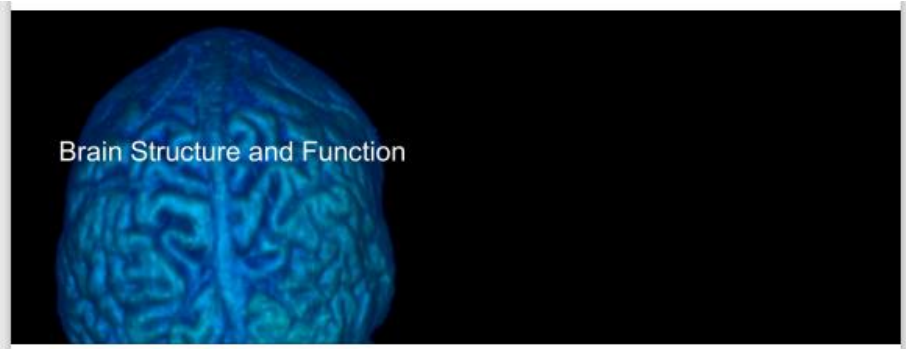
Class	Topic Name	ICT used	Link
Dr. S. D. Patankar			
B.A. II	Emotional Intelligence	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia/ V-Lab	Power Point Presentation
	Structure of Neuron		Power Point Presentation
	Personality Development		Power Point Presentation
	Gender Stereo Types YouTube Video		https://www.youtube.com/
B. A. I	Brain Structure		Power Point Presentation
	Introduction to Psychology		Power Point Presentation
	Memory and Forgetting (S. D. Patankar YouTube Video)		https://www.youtube.com/
	Psychoanalytic Theory of Personality YouTube Video		https://www.youtube.com/

Few Slides of Presentation







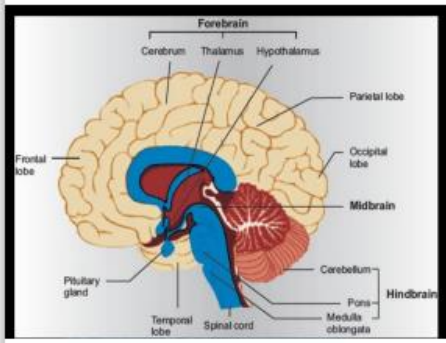


The brain

- Brain is situated inside a bony cranium (part of skull).
- Inside cranium, brain is covered by three layers called **meninges**
- The brain contains fluid-filled **ventricles** that are continuous with the **central canal** of spinal cord.
- Fluid within ventricles and central canal is called **cerebrospinal fluid** (CSF)

The Divisions of Brain

- There are three major regions in the brain of human and other vertebrates. These are
- forebrain,
- Midbrain
- hindbrain



Forebrain

(i) **Thalamus** lies just below cerebrum.

- It serves as a relay centre between various parts of brain and spinal cord.
- It also receives and modifies sensory impulses (except from nose) before they travel to cerebrum.
- Thalamus is also involved in pain perception and consciousness (sleep and awakening).

D.B.F. Dayanand College of Arts and Science, Solapur

Department of Psychology

Personality Development

Dr. S. D. Patankar

Definition of Personality Development

- Personality development is actually the development from the organized pattern of attitudes and behaviors which makes an individual distinctive.

THINGS TO ENHANCE YOUR PERSONALITY

- Don't compare your life
- Don't have negative thoughts or things you cannot control. Instead invest your energy in the positive present moment
- Don't waste your precious energy on gossip

HEALTH

- Drink plenty of water
- Eat breakfast like a King, lunch like a Prince an dinner like a Beggar
- Eat more foods that grow on trees
- Live with the 3 E's – Energy, Enthusiasm, and Empathy

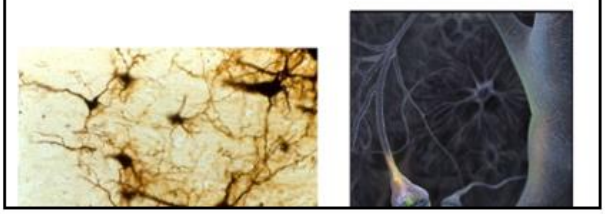
D.B.F. Dayanand College of Arts and Science, Solapur

Department of Psychology

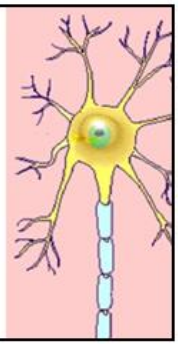
Structure of Neuron

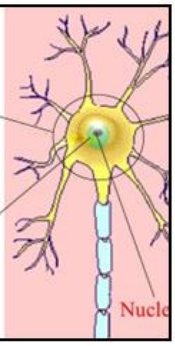
Dr. S. D. Patankar

Neurons



The basic unit of nervous tissue is the cell called the ***Neuron***.





Neurons consist of a main

Emotional Intelligence at Work

1

What is Emotional Intelligence?

Have you ever thought of why people of average intelligence outperform people with the highest levels of intelligence majority of the time?

2

What is Emotional Intelligence?

- **Emotional intelligence** (**EQ**) is the capacity of **recognizing** our own **feelings** and those of others, for **motivating** ourselves, for **managing** emotions in **ourselves** as well as in our **relationships**
- EQ is critical to managing your behavior, moving smoothly through social situations and making critical choices in life

3

Activity: Emotional Contagion

4

ICT Enabled Tools for Effective Teaching and Learning Process

Department of Sanskrit

Academic Year 2023-24

Class	Topic Name	ICT used	Link
Dr. R. H. Kulkarni			
B. A. III	Google Classroom (Code: xtuuklj)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia/ V-Lab	https://classroom.google.com
	Google Form (Registration)		https://forms.gle/8jTFF28ZJ
	सयवायिकारणम् R. H. Kulkarni Video		https://youtu.be/SjWjw9iDbn
	Website (Add on Course: Ayurved Paricharak)		https://sites.google.com/vi
	Google Classroom (Code: g5gnb3j)		https://classroom.google.c
B.A. II	Google Classroom (Code: oyy3tjr)		https://classroom.google.com
	Google Form (Add on Course)		https://forms.gle/MbBJV
	भगवद्गीता R. H. Kulkarni Video		https://youtu.be/IYCisH
	Google Classroom		https://classroom.google.co

B. A. I	(Code: jj5hpj7)		
	गेहेशूरः १ R. H. Kulkarni Video		https://youtu.be/TE91cwxw
	संधि R. H. Kulkarni Video		https://youtu.be/-VnxRwZ-

ICT Enabled Tools for Effective Teaching and Learning Process

Department of Philosophy

Academic Year 2023-24

Class	Topic Name	ICT used	Link
Dr. A. V. Nama			
B. A. III	Modern Classification of Propositions (Dr. A. V. Nama Blog)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://phillogic9.blogspot.c
	निरुपाधिक विधानातील पदांची व्याप्ती (Dr. A. V. Nama Blog)		https://phillogic9.blogspot.c
	Contradictory and Contrary Terms (Dr. A. V. Nama Blog)		https://phillogic9.blogspot.c
B. A. II	विधानातील घटक / पदे (Dr. A. V. Nama Blog)		https://phillogic9.blogspot.c
	निगामी आणि विगामी अनुमान (Deductive and Inductive Inference) (Dr. A. V. Nama Blog)		https://phillogic9.blogspot.c
	तर्कशास्त्र - एक आकारिक शास्त्र Logic as a formal science (Dr. A. V. Nama Blog)		https://phillogic9.blogspot.c
	सत्यता आणि युक्तता (वैधता) Truth and Validity in Marathi (Dr. A. V. Nama Blog)		https://phillogic9.blogspot.c
B. A. I	Nature of Inference अनुमानाचे स्वरूप (Dr. A. V. Nama Youtube Video)		https://youtu.be/1RQYqrLd

ICT Enabled Tools for Effective Teaching and Learning Process

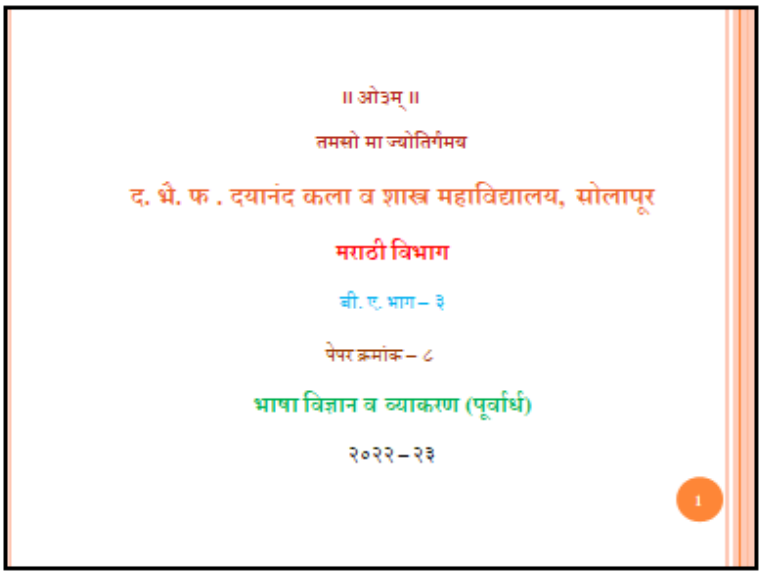
Department of Marathi

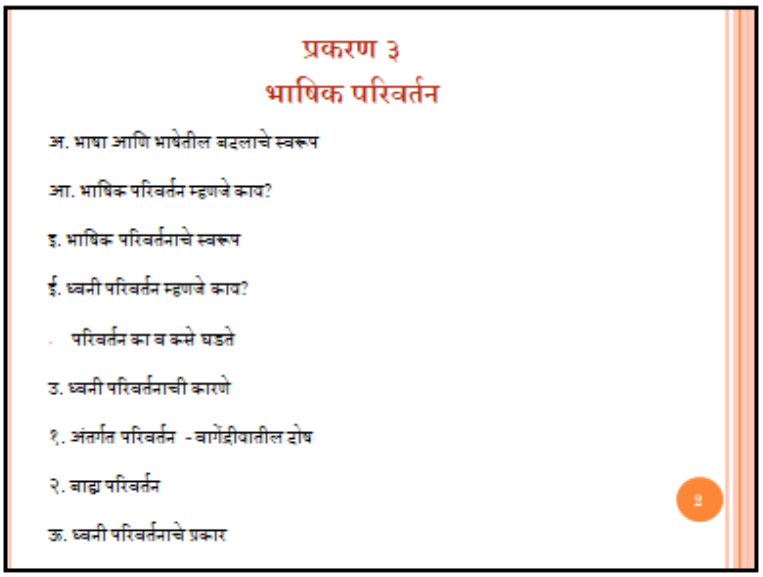
Academic Year 2023-24

Class	Topic Name	ICT used	Link
Prof. R. V. Shinde			
B.A. III	भाषा विज्ञान व व्याकरण	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	Power Point presentation
	भाषिक परिवर्तन (YouTube Video)		https://youtu.be/de1Sa53Pk1Y?
	भाषिक परिवर्तन (YouTube Video)		https://youtu.be/N3myNuw3B
B.A. II	**नाटक वाङ्मय प्रकार व उपयोजित मराठी**		Power Point presentation
	प्रेमा तुझा रंग कसा - मराठी नाटक		#marathiplay #drama
B.A. II	**ऐच्छिक मराठी**		Power Point presentation
	डोळे | अण्णाभाऊ साठे | मराठी कथा		https://youtu.be/6hrGDPK0CG
Prof. D. R. Gaikwad			
B. A. III	साहित्यशास्त्र, औचित्य विचार आणि ध्वनी विचार		https://youtu.be/Qnme
	काव्यलक्षण ध्वनी		https://youtu.be/YD8bR
	प्रयोजनविचार		https://youtu.be/iqDU
	प्रयोजनविचार भाग दुसरा		https://youtu.be/JyA85cR

	दलित साहित्याची प्रेरणा आणि प्रवृत्ती	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://www.youtube.com/w
	रससिद्धांत, विभाव, अनुभाव, व्यभिचारी भाव, सात्विक भाव - वस्तुनिष्ठ प्रश्न-उत्तरे व विवेचन		https://www.youtube.com/w
	भावे प्रयोग		https://www.youtube.com/w
B. A. II	छ. शाहू महाराजांचे शैक्षणिक धोरण		https://www.facebook.com/
	आता उच्च आणि तंत्रशिक्षण मातृभाषेतून		http://dhunt.in/D9wGK?s=a
	माणसाला ओळख देतात ग्रंथ		https://www.youtube.com/w
	डॉ. बाबासाहेब आंबेडकर आणि आजची महिला		https://fb.watch/hdd8axOF3q
B. A. I	संत नामदेव चरित्र आणि कर्तृत्व		https://www.youtube.com/w
	आवश्यक मराठी		https://www.youtube.com/w
	गवनेर- कथाकथन		https://youtu.be/KfUC

Few Slides of Presentation





॥ ओ३म् ॥

तमसो मा ज्योतिर्गमय

द. भै. फ. दयानंद कला व शास्त्र महाविद्यालय, सोलापूर

मराठी विभाग

बी. ए. भाग – २

ऐच्छिक मराठी

नाटक वाङ्मय प्रकार व उपयोजित मराठी

प्रेमा, तुझा रंग कसा? – वसंत कानेटकर

२०२२ – २३

1

नाट्य वाङ्मयप्रकार – स्वरूप संकल्पना

१. मराठी रंगभूमी – पूर्वइतिहास
मराठी नाटक – विकासक्रम
२. नाट्यमन्वंतर – नाटकातील प्रयोगशीलता व प्रयोगशील रंगभूमी
३. नाट्य प्रकार
अ. सुखात्मिका
आ. शोकात्मिका
४. वसंत कानेटकर यांच्या वाङ्मयीन योगदानाचा परिचय
अ. नाटके – १. ऐतिहासिक २. पौराणिक आणि ३. विनोदात्मक नाटके
ब. कादंबरिका – १. घर २. पंख ३. पोरका इ.

2

प्रेमा, तुझा रंग कसा?

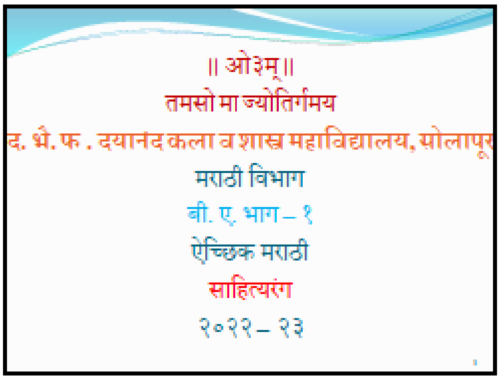
अ. प्रेमा, तुझा रंग कसा – सुखात्मिकेचे विश्लेषण
१. सुखात्मिकेचे स्वरूप आणि प्रस्तुत नाटकाचा आशय
२. सुखात्मिकेतील संघर्ष – प्रस्तुत नाटकातील पात्रगतातील संघर्ष
आ. प्रेमा, तुझा रंग कसा मधील स्त्री पात्रे
इ. प्रेमा, तुझा रंग कसा मधील पुरुषपात्रे
ई. प्रेमा, तुझा रंग कसा मधील विनोद
१. शब्दनिष्ठ विनोद २. प्रसंग निष्ठ विनोद ३. स्वभावनिष्ठ विनोद
उ. प्रेमा, तुझा रंग कसा मधील जीवनविषयक चिंतन

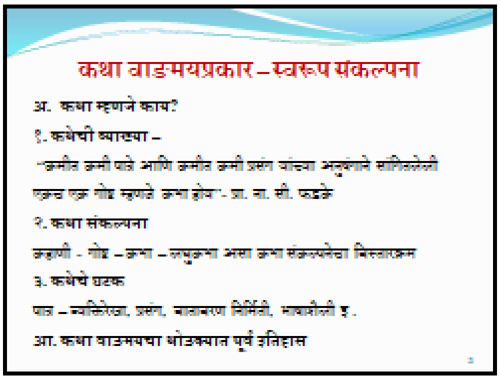
3

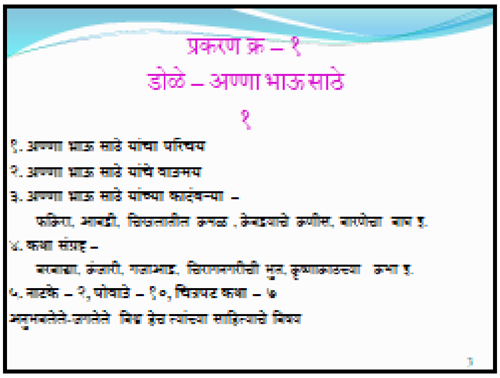
संदर्भ

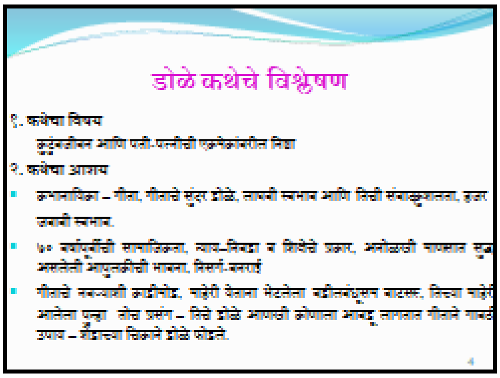
अधिक अभ्यासासाठी खालील यू ट्यूब लिंकवरून नाट्य प्रयोग पहावेत व ध्वनीनाट्य ऐकावेत.
१. https://youtu.be/bKqnneSYCk0?si=u6GrwzW2pvMrZhl8
२. https://youtu.be/O2mtD2mlNzCk?si=xmrJF2SRwH-a1p5P

4


|| ओ३म् ||
तमसो मा ज्योतिर्गमय
द. भै. फ. दयानंद कला व शास्त्र महाविद्यालय, सोलापूर
मराठी विभाग
बी. ए. भाग – १
ऐच्छिक मराठी
साहित्यरंग
२०२२ – २३


कथा वाङ्मयप्रकार – स्वरूप संकल्पना
अ. कथा म्हणजे काय?
१. कथेची व्याख्या –
२. कथा संकल्पना
कहाणी - गोष्ट – कथा – लघुकथा असा कथा संकल्पनेचा विस्तारक्रम
३. कथेचे घटक
पात्र – व्यक्तिरेखा, प्रसंग, वातावरण निर्मिती, भाषाशैली इ.
आ. कथा वाङ्मयाचा थोडक्यात पूर्व इतिहास


प्रकरण क्र – १
डोळे – अण्णा भाऊ साठे
१
१. अण्णा भाऊ साठे यांचा परिचय
२. अण्णा भाऊ साठे यांचे वाङ्मय
३. अण्णा भाऊ साठे यांच्या कादंबऱ्या –
४. कथा संग्रह –
५. नाटके – ३, पोवाडे – १०, चित्रपट कथा – ७
अनुभवलेले-जगलेले विश्व हेच त्यांच्या साहित्याचे विषय


डोळे कथेचे विश्लेषण
१. कथेचा विषय
कुटुंबजीवन आणि पती-पत्नीची एकमेकांवरील निष्ठा
२. कथेचा आशय

ICT Enabled Tools for Effective Teaching and Learning Process

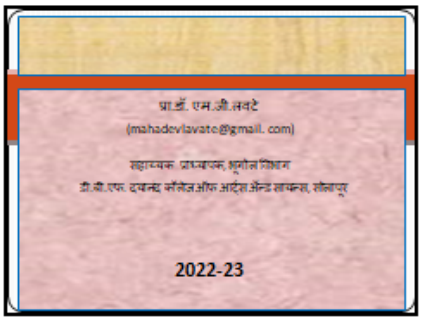
Department of Geography

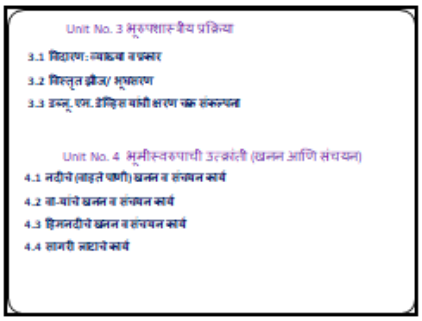
Academic Year 2023-24

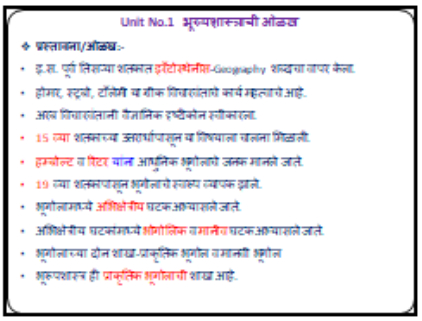
Class	Topic Name	ICT used	Link
Dr. M. G. Lavate			
M. A. II & M.Sc. II	Central Place theories of Christaller and Losch	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	https://www.youtube.com/
	Urban structure		https://en.wikipedia.org/w
B.A.III	Regional Planning		https://www.youtube.com/
	German geographers		https://en.wikipedia.org/wi
B.Sc. I	Geomorphology		https://www.youtube.com/
	Volcano		https://en.wikipedia.org/
B.A. I	भूरूपशास्त्राची ओळख		Power Point Presentation
	Continental drift		https://en.wikipedia.org/wi
Dr. V. C. Dande			
M. A. II	कला शाखेतील संधी (V. C. Dande Video)	Internet/ LCD	https://www.youtube.com/wa
M. A. I	झाडाला कलम करणे (V. C. Dande Video)		https://www.youtube.com/wa
	Geomorphology (Wikipedia)		https://en.wikipedia.org/wiki/
B.A. III	वेबरचा सिद्धांत		Power Point Presentation
	उद्योगाच्या स्थानिकीकरणावर परिणाम करणारे घटक		https://www.youtube.com/wa

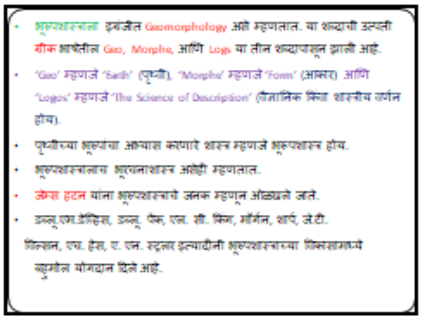
	(V. C. Dande Video)	Projector/ YouTube/ Google Classroom/ Google meet/ Wikipedia	
	जंगलाचे पर्यावरणातील स्थान		Power Point Presentation
B.A. II	हवामानशास्त्राचा अर्थ (V. C. Dande Video)		https://www.youtube.com/wa
	वाह्तुक व्याख्या व महत्व (V. C. Dande Video)		https://www.youtube.com/
	व्यवसाय / उद्योगधंदयाच्या स्थानिकीकरणाचे आवश्यक घटक		Power Point Presentation
	आर्थिक भूगोलाचे स्वरूप		Power Point Presentation
B. A. I	Geogrpahy को भारत में भूगोल क्यों कहते है (V. C. Dande Video)		https://www.youtube.com/wa

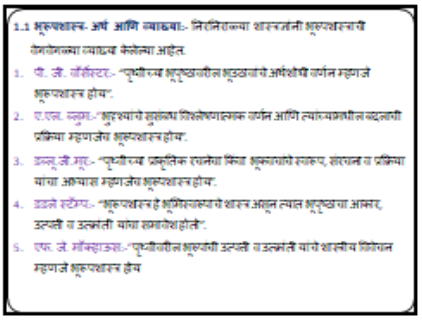
Few Slides of Presentation



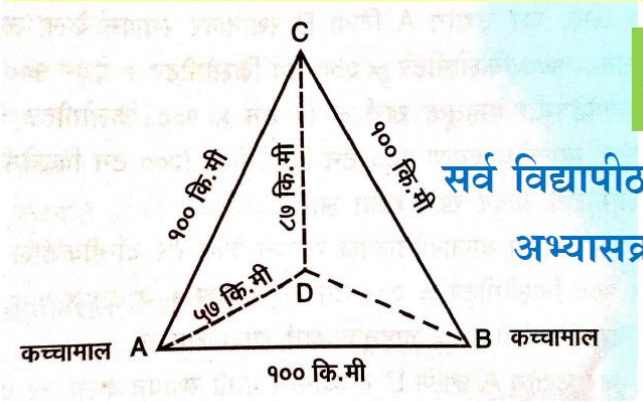








वेबरचा उद्योगधंद्याच्या स्थानिकीकरणाचा सिध्दांत
Weber's Theory of Industrial Location



आर्थिक भूगोल

सर्व विद्यापीठातील पदवी व पद्युत्तर अभ्यासक्रमासाठी आवश्यक

जंगलाचे पर्यावरणातील स्थान

व्याख्या (Definition) -

पृथ्वीवरील नैसर्गीक वनस्पतीने व्यापलेल्या भागालाच जंगल असे म्हणतात.

जंगलाचे पर्यावरणातील स्थान

१. हवामान
२. जमिनिची सुपीकता व तिचे संरक्षण
३. पूर नियंत्रण
४. पाऊस पडण्यास मदत व पाण्याचया सांठयांचे संरक्षण
५. प्राणी जीवनाचे आश्रयस्थान :

मानवी व्यवसायावरील नैसर्गिक घटकांचा प्रभाव

मैदानी व पठारी प्रदेश – शेती

सागर किनारी प्रदेश - मासेमारी

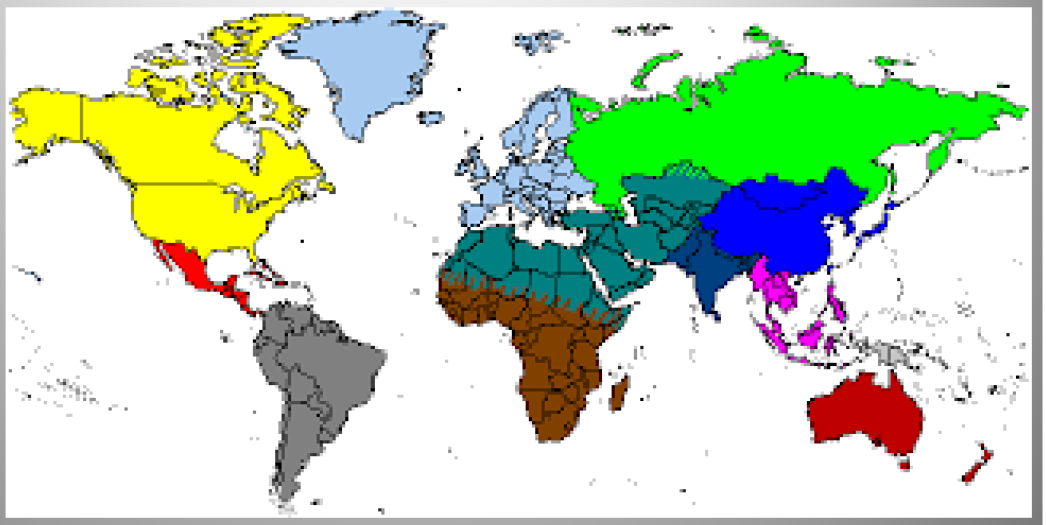
संसाधनांची उपलब्धता – खाणकाम

जंगल प्रदेश - लाकूडतोड

जंगल प्रदेश - संकलन

आर्थिक भूगोलाचे स्वरूप (Nature of Economic Geography) -

१. वर्णनात्मक स्वरूप :



ICT Enabled Tools for Effective Teaching and Learning Process

Department of Computer Science

Academic Year 2023-24

Class	Topic Name	ICT used	Link
Mr. D. D. Misal			
B.Sc. ECS-III	Introduction to ADO .Net (Google Drive)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet /Wikipedia	https://drive.google.com/fil
	.Net Application and Page Frameworks (Google Drive)		https://drive.google.com/fil
B.Sc. ECS-II	DBMS & RDBMS (Google Drive)		https://drive.google.com/fil
	Codd's Rules in DBMS (Google Drive)		https://drive.google.com/fil
B.Sc. ECS-I	Software Engineering and Requirement		https://docs.google.com/pre (Power Point Presentation)
	Fundamental of Computer (Google Drive)		https://drive.google.com/fil
	Input Output Devices		Power Point Presentation
Mr. A. S. Kale			
B.Sc.	ISO OSI Model in Networking		https://drive.google.com/fil

ECS-III	(Google Drive)	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet /Wikipedia	
	Android Application Development		https://docs.google.com/pr
B.Sc. ECS-II	Software Testing		https://drive.google.com/fil
	Data Structure Using C++ Sorting		https://drive.google.com/fil
B.Sc. ECS-I	Programming Using C		https://docs.google.com/pr (Power Point Presentation)
	OOP Using C++		https://docs.google.com/pr (Power Point Presentation)
Miss. Tadwalkar P.P.			
B.Sc. ECS-I	Circuit Elements	Internet/ LCD Projector/ YouTube/ Google Classroom/ Google meet /Wikipedia	PDF Notes
	Architecture of 8051		Power Point Presentation
	Introduction to BJT		http://www.youtube.com/@a
Miss. N. S. Anchigavi			
B.Sc. ECS-I	Graph Theory	Internet/	Power point Presentation

	Numerical Methods(numerical integration 8 videos)	LCD Projector/ YouTube/ Google Classroom/ Google meet /Wikipedia	http://www.youtube.com/@
	Class notes		http://drive.google.com/drive

Few Slides of Presentation

Mr. A. S. Kale
Department of Computer Science
Email: amolkale@dayanandsolapur.org

Introduction to C and C++:

Unit I