Lecture Plan 1

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section A

S. No.	Topic: -Coherent Sources, Conditions for sustained interference	Time Allotted:-
1.	Introduction: - Two sources of light are said to be coherent if they emit waves of light of same frequency and maintain constant phase difference between them. **Conditions for sustained interference** 1. Waves of light from two sources must be propagated along the same direction with equal speed. 2. The two source of light must be narrow and also close to each other.	5 min. 35 min
2	Division of the Topic:- (1) Experiment arrangement (Young's double slit expt.) (2) Interference of light. (3) Theory (Principal of superposition) (4) Condition for constructive and destructive interference.	
3.	Conclusion:- Two sources of light are said to be coherent if they emit waves of light of same frequency and maintain constant phase difference between them We obtain the following conditions: Imax.=(a +a)2 Imin.= .=(a -a)2	5min 5min.
4	Question/Answer:- (1) What do you mean by interference of light? (2) What are the conditions for sustained interference?	

Assignment to be given:-

(1) What do you understand by Interference?
(2) Explain the condition for sustained interference?

Reference Readings:-

(1) A Text Book of Optics by N. Subramanyam
(2) Optics by S. P. Singh
(3)Gupta and Gaur

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Lecture Plan 2

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section A

S. No.	Topic: - Division of wave front: Fresnel's biprism.	Time Allotted:-
1.	Introduction: - Fresnel biprism is a device by which we can obtain two coherent sources of light. It consists of two acute angled prisms with their bases in contact.	5 min.
2	Division of the Topic:- (5) Experiment arrangement (6) Theory (7) Determination of wavelength of light. (8) Measurement: (a) Measurement of fringe width (ω) (b) Measurement of (D) (c) Measurement of (2d)	35 min
3.	Conclusion:- The purpose of the biprism is to produce two coherent images of a given slit which are separated at a certain distance and behave two coherent sources. It can also be used to measure the thickness of mica sheet.	5min
4	Question/Answer:- (3) What do you mean by interference of light? (4) Is there any loss of energy in interference phenomenon?	5min.

Assignment to be given:-

(3) What do you understand by Fresnel's biprism and explain the formation of interference fringes by it.

(4) How do you determine the wavelength of monochromatic light?

Reference Readings:-

(1) A Text Book of Optics by N. Subramanyam
(2) Optics by S. P. Singh
(3)Gupta and Gaur

Lecture Plan-3

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section A

S. No.	Topic :- Wedge shaped thin film	Time Allotted:-
1.	Introduction:- If two plane surface of glass are slightly inclined to each other at an some angle and enclose a liquid or some other material of given refractive index are set to form wedge shaped flim. The wedhe is illuminated by monochromatic light from a slit held parallel to the edge in contact. Interference occurs between the rays reflected at the surface above and below the film respectively.	5 min.
2	Division of the Topic:- Interference produce by the wave reflected from two different media having different refractive index.	35 min
3.	Conclusion:- Alternate dark and bright fringe are formed by monochromatic light and colored fringes are formed by white light.	5min
4	Question / Answer Write short note on wedge shape film.	5min.

Assignment to be given:-

(1) Explain the construction and working of a nuclear reactor.

Reference Readings:-

(1) Engineering Physics by Satya Prakash.
(2) Engineering Physics by R. K. Gaur and S. L. Gupta.

Lecture Plan 4

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section A

6S. No.	Topic :- Division of amplitude: Newton's rings	Time Allotted:-
1.	Introduction: - When a Plano-convex surface is placed on a glass plate, an air film of gradually increasing thickness is formed between the two. When monochromatic light is allowed to fall normally on film and viewed in reflected light, alternate dark and bright rings are observed. These rings are known as Newton's rings.	5 min.
2	Division of the Topic: Newton's Rings In Reflected Light: (1) Experimental arrangement (2) Theory (3) Diameter of dark and bright rings (4) Measurements of wavelength of sodium light	35 min
3.	Conclusion:- In this class the amplitude of the incoming beam is divided into two or more parts either by partial reflection or refraction. This divided part travels different paths and are finally brought together or produce interference. This class of interference requires broad light source.	5min
4	Question/Answer: (1) What are Newton's rings? (2) Why these rings are are circular?	5min.

Assignment to be given:-

(1) Describe and explain the formation of Newton's rings in reflected monochromatic light and also describe this method for determination of wavelength of light.
(2) Prove that in reflected light:
(a) Diameters of bright rings are proportional to the square root of odd natural number,
(b) Diameters of dark rings are proportional to the square root of natural number.

Reference Readings:-

(1) A Text Book of Optics by N. Subramanyam
(2) Optics by S. P. Singh

Lecture Plan 5

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section A

S. No.	Topic: - Michelson Interferometer.	Time Allotted:-
1.	Introduction: The interferometer is a device used to determine the wavelength of light utilizing the phenomenon of interference.	5 min.
2	Division of the Topic: (1) Apparatus (2) Working (3) Function of the plate Q (4) Types of fringes	35 min
3.	Conclusion: The Michelson's interferometer is a device to produce fringes of equal inclination called Haidinger's fringes. If the mirrors are exactly perpendicular, circular fringes are formed. But if the mirrors are slightly tilted from perpendicular position, straight line fringes are obtained.	5min
4	Question/Answer: (1) What do you mean by interferometer? (2) Are two mirrors simply plane mirrors? (3) How do you get circular fringes?	5min.

Assignment to be given:-

Describe the construction working of Michelson interferometer.

Reference Readings:-

(1) Engineering Physics by Satya Prakash.
(2) A Text Book of Optics by N. Subramanyam

Lecture Plan 6

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section A

S. No.	Topic: - Applications of Michelson Interferometer.	Time Allotted:-
1.	Introduction: The interferometer is a device used to determine the wavelength of light utilizing the phenomenon of interference.	5 min.
2	Division of the Topic: (1) Determination of the wavelength of monochromatic light. (2) Determination of difference in wavelength between two neighboring lines. (3) Determination of refractive index of thin film	35 min
3.	Conclusion:- This interferometer is used to determine the wavelength of monochromatic light, difference between two close wavelengths and refractive index of a thin transparent film.	5min
4	Question/Answer: (1) What are localized fringes? (2) When the mirror is moved through a distance $\lambda/2$, how many fringes appear or disappear?	5min.

Assignment to be given:-
How can Michelson interferometer be used to determine the,
(a) Wavelength of monochromatic light?
(b) Difference between two close wavelengths?
(c) Refractive index of a thin transparent film?

Reference Readings:- .
(1) A Text Book of Optics by N. Subramanyam.
(2) Optics by S. P. Singh.

Lecture Plan 7

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section:- A

S. No.	Topic: - Difference between Fraunhofer and Fresnel diffraction, Interference and Diffraction	Time Allotted:-
1.	Introduction: When the light falls on obstacle whose size is comparable with the wavelength of light. There is a departure from straight line propagation, the light bends around the corners of an obstacle. This bending of light is called diffraction.	5 min.
2	Division of the Topic: The diffraction is divided into two categories: (1) Fresnel diffraction (2) Fraunhofer diffraction	35 min
3.	Conclusion: - In Fresnel class of diffraction either the source of light or the screen or both are at finite distances from the diffracting element. In the Fraunhofer class of diffraction the source of light and the screen are effectively at infinite distances from the diffracting element.	5min
4	Question/Answer: What is meant by diffraction of light?	5min.

Assignment to be given:-

(1) Distinguish between Fresnel and Fraunhofer classes of diffraction.

Reference Readings:-

(1) Engineering Physics by Satya Prakash.
(2) A Text Book of Optics by N. Subramanyam

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Lecture Plan 8

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section A

S. No.	Topic: - Fraunhofer diffraction through a slit.	Time Allotted:-
1.	Introduction: In Fraunhofer class of diffraction the source of light and the screen are effectively at infinite distances from the diffracting element.	5 min.
2	Division of the Topic: (3) Discussion of single slit Fraunhofer diffraction (4) Derivation of an expression for its resultant intensity	35 min
3.	Conclusion: - The plane wave front is incident normally on the slit. This wave front is divided into large strips and each strip having equal amplitude. According to Huygen's theory, every point within the slit acts as a source of secondary waves and sends waves in all directions. By using this theory we can measure the resultant intensity in any direction.	5min
4	Question/Answer: Write the conditions of maxima and minima in diffraction pattern due to a single slit.	5min.

Assignment to be given:-
Discuss single slit Fraunhofer diffraction and derive an expression for its resultant intensity.

Reference Readings:- .
(1) Engineering Physics by Satya Prakash.
(2) Text BooK of Optics By N Subramanyam

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Lecture Plan 9

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section A

S. No.	Topic: - Plane transmission diffraction grating, Absent Spectra	Time Allotted:-
1.	Introduction: A plane transmission diffraction grating of equal width and separated by an equal opaque space. It is constructed by ruling large number of fine, equidistant and parallel lines on an optically plane glass plate with the help of fine diamond point.	5 min.
2	Division of the Topic: (1) Derivation (2) Principal maxima (3) Minima (4) Secondary maxima (5) Absent Spectra	35 min
3.	Conclusion:- A diffraction grating is an arrangement of a large number of parallel slits of equal width and separated from one another by equal opaque spaces. The diffraction pattern of a grating consists of a central maximum surrounded on either side by minima, secondary maxima and principal maxima.	5min
4	Question/Answer: (1) What is a diffraction grating? (2) What is grating element?	5min.

Assignment to be given:-

(1) Give the construction and theory of plane transmission diffraction grating (N-slits) and explain its spectrum.
(2) Which orders of maxima will be absent, if b = a and b = 2a?

Reference Readings:-

(1) Engineering Physics by Satya Prakash.
(2) A Text Book of Optics by N. Subramanyam

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Lecture Plan 10

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section A

S. No.	Topic: - Dispersive and resolving powers of grating, Rayleigh criterion of resolution	Time Allotted:-
1.	Introduction: The rate of change of angle of diffraction with wavelength is defined as dispersive power of grating. It depends upon grating element, angle of diffraction and order of spectrum. The ability of an optical instrument to just resolve the images of two nearby point sources is called its resolving power.	5 min.
2	Division of the Topic: Rayleigh criterion of resolution (1) Difference between the resolving and dispersive powers (2) Derivation of dispersive power (3) Linear dispersive power (4) Derivation resolving power of grating.	35 min
3.	Conclusion:- The dispersive power gives us an idea of the angular separation of the two spectral lines which is independent of the width of the spectral lines and the total numbers of rulings on the ruled surface. Greater is the angular separation between the spectral lines, higher is the dispersive power. On the other hand resolving power tells us about the closeness of the two spectral lines; which can be just distinguished as separate.	5min
4	Question/Answer: (1) What do you understand by dispersive power of grating? (2) What do you mean by resolving power of grating?	5min.

Assignment to be given:-

(1) Deduce an expression for the dispersive power of grating.
(2) Obtain an expression for the resolving power of grating.

Reference Readings:-

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(1) Engineering Physics by Satya Prakash.
(2) A Text Book of Optics by N. Subramanyam.

Lecture Plan 11

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section : B

S. No.	Topic:-Polarized and unpolarised light.	Time Allotted:-
1.	Introduction: - The light which has acquired the property of one side ness is called a polarized light. The ordinary light is symmetrical about the directions of propagation.	5 min.
2	Division of the Topic: (1) Unpolarised light, (2) Polarised light (3) Explanation of transverse wave nature by mechanical expt. (4) Plane of vibration and plane of polarization.	35 min
3.	Conclusion:- The asymmetry of vibrations about the direction of propagation of light wave is called the polarization. In unpolarised light the light vector having vibration along all possible direction of propagation of light. It is symmetrical about its direction of propagation.	5min
4	Question/Answer: (1) What do you mean by 'polarisation' light? (2) Distinguish between polarized and unpolarised light.	5min.

Assignment to be given:-

(1) Write differences between unpolarised and polarized light.
(2) Define plane of vibration and plane of polarization.

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.
(2) Engineering Physics by Satya Prakash.
(3) A Text Book of Optics by N. Subramanyam.

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Lecture Plan: 12

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: B

S. No.	Topic :-Double refraction, uniaxial crystal	Time Allotted:-
1.	Introduction:- When a beam of ordinary unpolarised light is incident on an uniaxial crystal , it splits up into two refracted beams. This phenomenon of splitting is known as double refraction.	5 min.
2	Division of the Topic: (1) Double refraction: (a) Ordinary ray (b) Extra-ordinary ray (2) Geometry of calcite crystal (a) Optic axis (b) Principal plane (3) Polarization by double refraction.	35 min
3.	Conclusion:- The splitting of an unpolarised beam into two polarized beams on entering any uniaxial crystal is known as double refraction. Out of these two refracted rays one ray follows the ordinary laws of reflection and refraction while the other ray does not follow any law.	5min
4	Question/Answer: (1) What do you mean by 'double refraction'? (2) What do you understand by 'ordinary' and 'extra-ordinary' ray?	5min.

Assignment to be given:-

(1) Explain ordinary and extra-ordinary rays in a uniaxial crystal.
(2) Explain the doubly-refracting crystals with special reference to calcite crystal.
(3) Explain polarization by double refraction with the help of neat and clean diagrams.

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.
(2) Engineering Physics by Satya Prakash.
(3) A Text Book of Optics by N. Subramanyam.

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Lecture Plan 13

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section : B

S. No.	Topic: - Nicol prism, quarter and half wave plates.	Time Allotted:-
1.	Introduction: - It is an optical device, invented in 1928 by William and is used for producing and analyzing plane polarized light in practice. It is plate of doubly refracting uniaxial crystal, whose refracting faces are cut parallel to the optics axis and its thickness is such that it introduces a phase change of л/2 (i.e. path change of λ/4) between the ordinary and extra-ordinary light waves is known as quarter wave plate.	5 min.
2	Division of the Topic: (1) Construction (2) Working (3) Nicol prism as plariser and analyzer (4) Quarter wave plate (5) Half wave plate.	35 min
3.	Conclusion:- It is a prism of calcite which is used to produce and analyse a plane polarized light. Its principle is based on double refraction.	5min
4	Question/Answer: (1) What do you understand by optical activity? (2) Define a quarter wave plate and half wave plate.	5min.

Assignment to be given:-

Describe the construction and working of Nicol prism. How is it used as polarizer and analyzer?

Reference Readings:-

(1) Engineering Physics by Satya Prakash.
(2) A Text Book of Optics by N. Subramanyam.

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Lecture Plan 14

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section : B

S. No.	Topic: - Laurent half shade and Bi-quartz polarimeters.	Time Allotted:-
1.	Introduction: Polarimeter is a device by which we can measure specific rotation of optically active substances	5 min.
2	Division of the Topic: Polarimeter: (2) Laurent's half shade polarimeter (a) Apparatus (b) Action of Laurent's half-shade plate (c) Determination of specific rotation of sugar. (3) Bi-quartz polarimeter (a) Apparatus (b) Action of Bi-quartz plate (c) Determination of specific rotation.	35 min
3.	Conclusion:- The arrangement of bi-quartz polarimeter is same as that of Laurent's half-shade polarimeter except that the half-shade plate is replaced by a biquartz plate. White light is used in place of monochromatic light and also working principle is based on specific rotation.	5min
4	Question/Answer: (1) What do you mean by the terms "Polariser" and "Analyser"? (2) Define specific rotation.	5min.

Assignment to be given:-
What do you understand by polarimeter? Discuss construction and working principle of (a) Laurent's half shade polarimeter and (b) Bi-quartz polarimeter.

Reference Readings:-
(1) Engineering Physics by Satya Prakash.
(2) A Text Book of Optics by N. Subramanyam.

Lecture Plan 15

Faculty:- Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section : B

S. No.	Topic:-Spontaneous and stimulated emissions, laser action, characteristics of laser beam, concepts of coherence.	Time Allotted:-
1.	Introduction: - It is a device that produces a highly intense, monochromatic, collimated and highly coherent light beam and is invented in 1960. In discussing the phenomenon of interference we define coherence between two sources of light as the existence of a constant phase difference between them.	5 min.
2	Division of the Topic:- (1) Absorption of radiation (2) Spontaneous emission (3) Stimulated emission (4) Einstein's coefficients A & B (5) Characteristics of laser beam. (6) Concepts of Coherence	35 min
3.	Conclusion:- From the relation of Einstein's coefficients A & B, the ratio of spontaneous emission and stimulated emission is proportional to ν^3 .	5min
4	Question/Answer:- (2) What is the full name of laser? (3) What do you mean by stimulated emission of radiation?	5min.

Assignment to be given:-

(1) What do you mean by laser and its and its working principle, important requirements and applications?
(2) Explain the term 'absorption'.

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.
(2) Engineering Physics by Satya Prak

Lecture Plan 16

Faculty:- Dr. Smita Srivastava emester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section : B

S. No.	Topic: - Helium-Neon laser.	Time Allotted:-
1.	Introduction: - Ruby laser does not generate a continuous laser beam. To overcome this difficulty the gas filled laser was made by A. Javan, W. Bennett and D. Harroit in 1961.	5 min.
2	Division of the Topic:- (1) Construction (2) Working Principle (3) Energy Level Diagram	35 min
3.	Conclusion:- The main advantages of gas laser are highly monochromatic, most pure spectrum and high stability of frequency. Hence the gas filled laser. Hence, gas filled laser have wide applications in various branches of science and engineering particularly in communications.	5min
	Question/Answer:- What are the main component of laser?	5min.

Assignment to be given:-

Describe the construction and operation principle of Helium-Neon laser.

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.
(2) Engineering Physics by Satya Prakash.

Lecture Plan 17

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: B

S. No.	Topic: - Semiconductor laser (simple ideas), applications.	Time Allotted:-
1.	Introduction:- Semiconductor laser is differ from the solid state and gas filled lasers in many aspects. It has remarkably small size, exhibits high efficiency and can be operated at low temperature.	5 min.
2	Division of the Topic:- (1) Principle and working (2) Applications	35 min
3.	Conclusion:- The population inversion in semiconductor is achieved by using a P-N junction diode of semiconductor, heavily doped with donors and acceptors.	5min
4	Question/Answer: What is semi conductor laser?	5min.

Assignment to be given:-

Describe the construction and working of semi conductor laser.

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.
(2) Engineering Physics by Satya Prakash.

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Lecture Plan-18

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: C

S. No.	Topic :- Propagation of light in fibres, numerical aperture	Time Allotted:-
1.	Introduction- Electronic communications use radio waves and microwaves to carry information from one place to another place over copper wires and coaxial cables. The information carrying capacity of these waves is highly restricted in the view of their limited bandwidths and does suffice for the modern needs.	5 min.
2	Division of the Topic:- (1) Optical Fibres (2) Propagation of light in fibres (3) Light through a cladded fibre (4) Acceptance angle and Numerical Aperture	35 min
3.	Conclusion:- In optical fibre system a greater volume of information or messages can be carried out. The optical fibre communication is noise free. Due to small diameter and light weight optical fibres may be used more easily.	5min
4	Question / Answer:- (1) What do you mean by the term fibre used in fibre optics? (2) What do you mean by numerical aperture in fibre optics?	5min.

Assignment to be given:-

Find the expression s for acceptance angle and numerical aperture.

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.

Lecture Plan-19

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: C

S. No.	Topic :- Single mode, multi mode fibres, applications.	Time Allotted:-
1.	Introduction:- Opticalfibres are in general of two types: namely single mode and multi mode fibres. A single mode fibre has a smaller core diameter and can support only one mode propagation. On the other hand, a multi mode fibre has a smaller larger core diameter and support number of modes.	5 min.
2	Division of the Topic:- (1) Single Mode Step Index Fibre (2) Multi Mode Step Index Fibre (3) Graded Index Optical Fibre (4) Applications of Fibre Optics	35 min
3.	Conclusion:- :- Fibre optics is widely used in transmitting signals. In medicine it is used to examine internal portion of the human body and also selective cauterization of tissues if necessary. It also used widely in industry.	5min
4	Question / Answer:- What are the types of optical fibre?	5min.

Assignment to be given:- Give the applications of fibre optics.

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.Engineering Physics by Satya Prakash.

Lecture Plan -20

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: C

S. No.	Topic:- Molecular theory, polarization, displacement, susceptibility.	Time Allotted:-
1.	Introduction:- The dielectrics are materials which contain no free electrons, so that no current a can flow through them. As a result the electrical conductivity of a dielectric is poor and for an ideal dielectric, it is zero. Glass, plastic, mica, wood, turpentine oil etc. are examples of dielectrics.	5 min.
2	Division of the Topic:- (1) Non-polar dielectric (2) Polar dielectric (3) Polarization of dielectric (4) Polarization density (5) Types of polarization (6) Electric susceptibility (7) Electric displacement vector.	35 min
3.	Conclusion:- When a non-polar molecule is placed in an electric field, the centre of negative charges is displaced relative to the centre of positive charge. The molecule thus acquires induced dipole moment. The induced dipole moment developed per unit volume in a dielectric slab on placing it inside electric field is known as polarization density.	5min
4	Question / Answer:- (1) What do you mean by a dielectric? (2) What do you mean by polar and non-polar molecules?	5min.

Assignment to be given:-

(1) What is meant by polarization of a substance?
(2) Explain electric susceptibility. How is it related to dielectric constant

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.
(2) Engineering Physics by Satya Prakash.

Lecture Plan-21

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: C

S. No.	Topic: - Dielectric coefficient, permittivity & various relations between these, Gauss's law in the presence of a dielectric.	Time Allotted:-
1.	Introduction:- The surface integral of displacement vector over a closed surface is equal to the net free charge enclosed within the surface.	5 min.
2	Division of the Topic:- (1) Dielectric coefficient (2) Permitivity & various relations between these (3) Gauss's law	35 min
3.	Conclusion:- The brief discussion about the above.	5min
4	Question / Answer:- (1) What do you mean by a dielectric? (2) State Gauss's law in dielectrics. (3) What is permittivity?	5min.

Assignment to be given:-

Prove Gauss' law in dielectrics.

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.
(2) Engineering Physics by Satya Prakash.

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Lecture Plan-22

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: C

S. No.	Topic:- Energy stored in an electric field, behavior of dielectrics in a.c. field (simple concepts) .	Time Allotted:-
1.	Introduction:- When a dielectric slab is placed in an electric field, it gets polarized. The work done for the displacement of charges is stored in the form of electrostatic energy of the dielectric.	5 min.
2	Division of the Topic:- (1) Energy stored in an electric field, (2) Behaviour of dielectrics in a.c. field	35 min
3.	Conclusion- Brief discussion about the above.	5min
4	Question / Answer:- No.	5min.

Assignment to be given:-

Deduce an expression for electrostatic energy.

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.
(2) Engineering Physics by Satya Prakash.

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Lecture Plan-23

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: C

S. No.	Topic:-Claussius Mossotti relation	Time Allotted:-
1.	Introduction:- When a dielectric material is placed to an electric field, the dissipates part of electrical energy is converted into heat energy.	5 min.
2	Division of the Topic: Derivation of Claussius Mossotti relation.	35 min
3.	Conclusion:- Brief discussion about the above.	5min
4	Question / Answer:- What do you understand by Local Field in dielectric?	5min.

Assignment to be given:-

Deduce an expression for Claussius Mossotti relation

Reference Readings:-

(1) Engineering Physics by R. K. Gaur S. L. Gupta.
(2) Engineering Physics by Satya Prakash.

Lecture Plan-24

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: C

S. No.	Topic:- Dielectric losses.	Time Allotted:-
1.	Introduction:- When a dielectric material is placed to an electric field, the dissipates part of electrical energy is converted into heat energy.	5 min.
2	Division of the Topic: Derivation of dielectric loss.	35 min
3.	Conclusion:- Brief discussion about the above.	5min
4	Question / Answer:- What do you understand by dielectric loss?	5min.

Assignment to be given:-

Deduce an expression for electrostatic energy.

Reference Readings:-

(3) Engineering Physics by R. K. Gaur and S. L. Gupta.
(4) Engineering Physics by Satya Prakash.

Lecture Plan-25

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: D

S. No.	Topic :- Michelson-Morley experiment	Time Allotted:-
1.	Introduction:- In nineteenth century, scientists assumed that a hypothetical medium is required to propagate electromagnetic waves which is called luminiferous ether.	5 min.
2	Division of the Topic:- (1) Experimental arrangement (2) Derivation (3) Explanation of Negative Results	35 min
3.	Conclusion:- He assumption of stationary ether is fully disproved because the moving earth drags ether with it. Einstein explained the constancy of speed of light and he proposed that the speed of light is constant and does not depend upon the relative motion of observer and source.	5min
4	Question / Answer What are the negative results in Michelson-Morley xperiment?	5min.

Assignment to be given:-

Describe Michelson-Morley experiment, indicating the importance of its results. .

Reference Readings:-

(1) Engineering Physics by R. K. Gaur and S. L. Gupta.
(2) Engineering Physics by Satya Prakash.
(3) Concepts of Modern Physics by Arthur Beiser

Lecture Plan-26

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: D

S. No.	Topic :- Lorentz transformations.	Time Allotted:-
1.	Introduction:- The invariance of speed of light in all inertial frames implies that Galilean transformation equations are not suitable, therefore, these transformation equations must be replaced by new ones. These transformation equations were discovered by Lorentz and are known as Lorentz transformation equations.	5 min.
2	Division of the Topic:- (1) Derivation of Lorentz transformation equations (2) Derivation of inverse Lorentz transformation equations	35 min
3.	Conclusion:- Lorentz transformation equations are derived by using two fundamental postulates of special theory of relativity. From the result it is clear that if the speed of moving frame is much smaller than the velocity of light. Then, the lorentz transformation equations reduce to Galilean transformation equations.	5min
4	Question / Answer What are postulates of	5min.

Assignment to be given:-

(1) Derive Lorentz transformation equations for space and time coordinates.
(2) Show that Lorentz transformation equations become the Galilean equations at very low speeds.

Reference Readings:-

(1) Engineering Physics by Satya Prakash.Concepts of Modern Physics by Arthur Beiser

Lecture Plan-27

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: D

S. No.	Topic: Consequences of L&T	Time Allotted:-
1.	Introduction: In principle, the theory of relativity is correct theory which reduce to Newtonian mechanics in the limit of $v/c<<1$, but for mechanical phenomenon in daily life ,it is an over elaboration. We examine some of the consequence of Lorentz transformation.	5 min.
2	Division of the Topic:- (1) Lorentz Fitzgerld Contraction (2) Time Dilation (3) Transformation of velocity	35 min
3.	Conclusion:- The length of meter scale is always appears less when it is in moving frame by the stationary observer. Just like length contraction the slowing of clocks is also reciprocal.	5min
4	Question / Answer (1) What is time dilation (2) Explain the phenomenon of contraction of length	5min.

Assignment to be given:-

(1) Drive the relation for time dilation and length contraction?

Reference Readings:-

(1) Engineering Physics by Satya Prakash.
(2) Engineering Physics by R. K. Gaur and S. L. Gupta.

Lecture Plan-28

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: D

S. No.	Topic :- Variation of mass with velocity.	Time Allotted:-
1.	Introduction:- The classical laws of addition of velocities have to be modified at very high velocity. These laws are are used in the derivation of equation variation of mass with velocity.	5 min.
2	Division of the Topic:- (1) Addition of velocities (2) Variation of mass with velocity	35 min
3.	Conclusion:- The law of conservation of momentum leads to very important conclusion, "mass of a body increase s with increase of velocity".	5min
4	Question / Answer	5min.

Assignment to be given:-

Deduce an expression for variation of mass with velocity and depict it graphically.

Reference Readings:-

(1) Engineering Physics by Satya Prakash.
(2) Concepts of Modern Physics by Arthur Beiser
(3) Engineering Physics by R. K. Gaur and S. L. Gupta.

Lecture Plan-29

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: D

S. No.	Topic :- Mass energy equivalence.	Time Allotted:-
1.	Introduction:- According to the classical mechanics, the mass of a moving particle depends upon it velocity. Contrary to this aspect, on the basis of Einstein's special theory of relativity, the mass of a moving body depends upon its velocity.	5 min.
2	Division of the Topic Derivation of mass energy equivalence.	35 min
3.	Conclusion:- From the result it is clear that the kinetic energy for a moving body is equal to gain in mass times the square of speed of light.	5min
4	Question / Answer Why does mass of the body varies with velocity?	5min.

Assignment to be given:-

Obtain Einstein's mass energy relation and discuss it Give some evidence showing its validity.

Reference Readings:-

(1) Engineering Physics by Satya Prakash.
(2) Concepts of Modern Physics by Arthur Beiser
(3) Engineering Physics by R. K. Gaur and S. L. Gupta.

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Revision: 00

Lecture Plan 30

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: D

S. No.	Topic: - Introduction of superconductivity and Meissner effect	Time Allotted
1.	Introduction: In 1911 Kimberling Ones found that the electrical resistance of some metals, alloys and compounds drops suddenly to zero when the specimen is cooled below a certain temperature. This phenomenon is known as Superconductivity.	10 min.
2	Division of the Topic: 1) Property of Superconductors 2) Electrical properties 3) Magnetic properties 4) Thermal properties A) Classification of superconductors • Type l • Type ll	30 min.
3.	Conclusion: From the above it is clear that electrical resistance of some alloys, compounds and metals below the critical temperature drops suddenly to zero.	5 min.
4	Question/Answer: (1) What is superconductivity? (2) What is Meissner effect?	5 min.

Assignment to be given:-

(1) What is Meissner effect? Distinguish between Type I Superconductors and TypeII

Reference Readings: -

(1) Solid State Physics by S. O. Pillai
(2) Engineering Physics by G. K. Shivakumar.

Lecture Plan 31

Faculty: - Dr. Smita Srivastava Semester:-I Class:I.T/M.E
Course Code: - PHY-101-F Subject: - Physics Section: D

S. No.	Topic: - London Equation	Time Allotted
1.	Introduction: In order to explain the Meissner effect, London gave certain equations. These equations are known as London Equations.	10 min.
2	Division of the Topic: (1) Maxwell's Equations (2) Derivation of London Equation.	30 min.
3.	Conclusion: With the help of London equations the Meissner effect can be explained completely.	5 min.
4	Question/Answer: Write Maxwell's equations.	5 min.

Assignment to be given:-

(1) Obtain an expression for the London equation for a superconductor.

Reference Readings: -

(1) Solid State Physics by S. O. Pillai.
(2) Engineering Physics by G. K. Shivakumar.