

E – SCHEME

Sample Question Paper - I

Course Name : All Branches of Diploma in Engineering / Technology.

**Course Code : AE/CD/CE/CH/CM/CO/CR/CS/CV/DE/ED/EE/EI/EJ/EN/EP/ET/EV/
EX/FC/FE/IC/IE/IF/IS/IU/ME/MH/MI/MU/PC/PG/PN/PS/PT**

Semester : First

Subject : Basic Physics

Marks : 100

12001

Time: 3 Hrs.

Instructions: 1) All the questions are compulsory.

2) Figures to the right indicate full marks.

3) Assume suitable additional data, if necessary.

4) Draw diagrams wherever necessary.

Q.1 Attempt any EIGHT of the following:

20 Marks

1. Define fundamental unit and derived unit.
2. Distinguish between elastic and plastic body.
3. Define surface tension and angle of contact.
4. State Newton's law of viscosity.
5. "We do not receive heat from the Sun by conduction", Give reason.
6. Define coefficient of thermal conductivity.
7. State laws of refraction.
8. State any two Engineering applications of LASER.
9. Define the term Frequency and Wavelength.
10. Draw a labeled diagram for photoelectric cell.
11. if a metal rod of length 50cm is heated upto 100° C, its length increases by 2 mm. Find coefficient of linear expansion of metal.
12. The vibrating length of air column is 18cm for a frequency 512 Hz .Find velocity of sound.

Q.2 Attempt any FOUR of the following:**16 Marks**

1. Define accuracy and precision. and differentiate between them
2. The length of an object measured by vernier caliper is 10 ± 0.02 cm, calculate the percentage error.
3. Describe the behavior of wire under continuously increasing load by using stress strain curve.
4. A weight exerts force of 100 N on a steel wire of cross-sectional area 0.02 cm^2 . Find the extension produced if the length of wire is 5 m.
5. Define cohesive force, adhesive force, capillarity and angle of contact
6. Define Instrumental error, Systematic error and random error.

Correct the formula, Percentage error = Absolute error x 100

Q.3 Attempt any FOUR of the following:**16 Marks**

1. Define deforming and restoring force. State the SI unit of stress.
2. Define 'surface tension'. What is the effect of temperature and impurities on the surface tension of liquid
3. What is Reynolds's number? State its significance.
4. State the law of thermal conductivity of heat and define coefficient of thermal conductivity of heat. State its SI unit.
5. A plate of nickel 4 mm thick has a temperature difference of 32°C between its faces. It transmits 200 kcal / hr through an area of 5 cm^2 . Calculate the thermal conductivity of nickel.
6. 1) State law of Thermal conductivity
2) Define coefficient of Thermal conductivity. State its S.I. unit.

Q.4 Attempt any FOUR of the following:**16 Marks**

1. State Boyle's law, Charle's law and Gay Lussac's law for gases. Define absolute zero temperature.
2. A gas at 17°C and pressure of 60 cm of mercury has volume 2 liters. Find its volume at 27°C and pressure 70 cm of mercury.
3. Define three coefficients of expansions in solid. State relation between them.
4. A length of copper rod at 0°C is 90 cm. When heated upto 100°C , it increases by 0.14cm. Find the coefficient of Linear expansion.
5. Define diffraction and polarization of light. State meaning of spectrum of light.
6. State the conditions constructive and destructive interference of light.

Q.5 Attempt any FOUR of the following:

16 Marks

1. Describe spontaneous and stimulated emission in case of LASER
2. Describe construction and working of He –Ne laser
3. State any four characteristics of longitudinal waves.
4. 1) Define Resonance.
2) Calculate the fundamental frequency of an air column in a tube of length 25 cm closed at one end, if velocity of sound in air is 350 m/s. Neglect End correction.
5. State properties of LASER.
6. 1) Define the term free and forced vibration.
2) A body produces waves of wavelength 33 cm. What is the frequency, if the velocity of propagation is 330m/sec₂.

Q.6 Attempt any FOUR of the following:

16 Marks

1. State Planck's hypothesis. Define work function of a metal.
2. State Einstein's photoelectric equation. Determine the maximum kinetic energy of photoelectrons ejected from the surface of metal by the light of wavelength 3000 Å. (Given: Threshold wavelength of metal = 4500 Å)
3. State engineering, medical and scientific applications of X- rays.
4. 1) Describe continuous and characteristics spectra of X-rays.
2) What potential difference must be applied to an X-ray tube to produce X-rays of 0.5 Å
5. Describe construction and working of photoelectric cell.
6. Explain production of X-rays using Coolidge X-ray tube.