PHYSICS QUESTION PAPER

Time : 2 Hrs.   **Max . Marks : 40**

Note : (i)   *Attempt all questions.*

(ii) *Neat diagrams must be drawn, wherever necessary.*

(iii) *Figures to the right indicate full marks.*

(iv) *Use of only logarithmic table is allowed.*

(v)   *All symbols have their usual meanings unless otherwise stated.*

(vi) *Answer to every question must be written on a new page.*

Q. 1. Select and write the most appropriate answer from the given   **[8]**
alternatives for each sub-question :

(i)   For constructive interference the phase difference between two
waves must be _____   (1)

(a) $0, \pi, 2\pi, 3\pi$ ....

(b) $\pi, 3\pi, 5\pi, 7\pi$ ....

(c) $0, 2\pi, 4\pi, 6\pi$ ....

(d) $0, 3\pi, 6\pi, 9\pi$ ....

(ii) The capacity of a par lel plate condenser is inversely
proportional to _____   (1)

(a)   area of each plate

(b)   dielectric constant

(c)   permittivity of medium

(d)   distance between two plates

(iii) Photo cell converts light energy into _____ (1)

    (a) mechanical energy

    (b) sound energy

    (c) electrical energy

    (d) heat energy

(iv) Optical fibre works on the principle of _____ (1)

    (a) total internal refraction

    (b) total internal reflection

    (c) polarisation

    (d) interference

(v) The absorption or evolution of heat at a junction of two dissimilar metals when the current passes is known as _____ (1)

    (a) Seebeck effect

    (b) Peltier effect

    (c) Thomson effect

    (d) Joule effect

(vi) The output of AND gate is _____ (1)

    (a) $Y = A \cdot B$ (b) $Y = A + B$

    (c) $Y = A + B$ (d) $Y = A - B$

(vii) The angle of incidence at which the polarisation of light reflected from the surface of glass is 58° then refractive index of glass is _____ (1)

    (a) 1·9   (b) 1·8

    (c) 1·7   (d) 1·6

(viii) In a tangent galvanometer deflection of 30° is produced by a current 0·1A, then deflection of 60° will be produced by a current of _____. (1)

    (a) 3 A   (b) 2 A

    (c) 0·3 A   (d) 0·2 A

Q. 2. **(A)** **Attempt any ONE :**   **[8]**

(i) In a potentiometer the balancing length of the string is found to be 2·5 m for a cell of e.m.f. 1·5 volt. Find the balancing length of the string for another cell of e.m.f. 1·2 volt on the same potentiometer.   (2)

(ii) In biprism experiment a source of wavelength 6500Å is replaced by source of wavelength 5500Å . Calculate change in fringe width if the screen is at 1 m dis   the slits which are 1 mm apart.   · (2)

(B) **Attempt any TWO :**

(i) Explain how a moving coil galvanometer is converted into an ammeter. Derive the necessary formula.   (3)

(ii) Obtain an expression for the e.m.f. induced in a coil rotating in uniform magnetic field.   (3)

(iii) What do you mean by remote sensing? State any 'four' applications of remote sensing.   (3)

Q. 3. **(A)** **Attempt any ONE :**   **[8]**

(i) Explain Huygens' construction of spherical wavefront.   (2)

(ii) State and explain Ampere's circuital law.   (2)

(B) **Attempt any TWO :**

(i) Derive an expression for energy stored in a charged condenser. Obtain its different forms.   (3)

(ii) Explain with neat circuit diagram how will you determine unknown resistance by using meterbridge experiment.   (3)

(iii) State Einstein's photoelectric equation. Explain 'two' characteristics on the basis of this equation.   (3)

Q. 4. **(A)** **Attempt any TWO :** [8]

(i) Draw a neat labelled diagram of reflection of light from a plane reflecting surface on the basis of wave theory. (2)

(ii) State Gauss' theorem and state its any 'two' applications. (2)

(iii) Draw a neat labelled energy level diagram of the Hydrogen atom. (2)

(B) **Attempt any ONE :**

(i) Give analytical treatment of interference bands and hence obtain the expression for fringe width.

(ii) What is rectifier? Explain with neat circuit diagram the action of semiconductor diode as a full wave rectifier. (4)

Q. 5. **Attempt any TWO :** [8]

(i) Calculate the magnitude of magnetic induction and magnetic potential due to a short magnetic dipole of moment $10 \, A \, m^2$ at a distance 100 cm from its centre along a line making an angle of $60°$ with its axis.

$[\mu_0 = 4 \pi \times 10^{-7} \, Wb/Am]$ (4)

(ii) The shortest wavelength for Lyman series is $9120 Å$. Find shortest wavelength for Paschen and Brackett series in Hydrogen atom. (4)

(iii) An alternating e.m.f. $e = 220 \sin (120 \pi t)$ volt is applied to a bulb of resistance 110Ω. Find peak value, effective value, frequency and period of alternating current through bulb. (4)