

17207

11718

2 Hours / 50 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any NINE of the following :

18

- (a) Write formula for angular distance travelled by a particle in n^{th} second with meaning of symbols used.
- (b) Define :
 - (i) Power
 - (ii) Energy
- (c) State any two properties of ultrasonic waves.
- (d) Write any two applications of ultrasonic testing.
- (e) Draw a neat labelled diagram of modern Coolidge X-ray tube.
- (f) State any two applications of Bunsen's photometer.
- (g) State the principle of –
 - (i) Photo-resistor
 - (ii) Photoelectric cell
- (h) State any two properties of X-rays.

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P.T.O.

- (i) Why do the passengers fall forward when bus stops suddenly ?
- (j) Define intensity of illumination. State its SI unit.
- (k) Calculate frequency of radiation if energy of photon emitted is 5×10^{-19} J.

Planck's constant (h) = 6.62×10^{-34} Js.

- (l) A body is projected with velocity of 20 m/s at an angle of 30° with the horizontal. Calculate the time of flight. ($g = 9.81 \text{ m/s}^2$)

2. Attempt any FOUR of the following :

16

- (a) Define centrifugal force. State any three applications of it.
- (b) A bullet of mass 100 gm is fired with a velocity of 300 m/s from a gun. Find the mass of the gun if it recoils with a velocity of 3 m/s.
- (c) With a neat diagram, explain production of ultrasonic waves by piezo-electric method.
- (d) A body starts rectilinear motion with a velocity of 10 m/s. It accelerates uniformly and gains a velocity of 13 m/s in 6 seconds. Find the uniform acceleration. Also calculate the distance travelled in 6 seconds.
- (e) Write two advantages and two limitations of non-destructive testing methods.
- (f) State any four criteria for selection of non-destructive testing methods.

3. Attempt any FOUR of the following :

16

- (a) Define reverberation and reverberation time. Write Sabine's formula for reverberation time with meaning of symbols used.
- (b) State and explain any two indoor lighting schemes.

- (c) State any four properties of photons.
- (d) The minimum wavelength of X-ray produced by an X-ray tube is 0.2×10^{-10} m. Find the potential difference between anode and cathode of the tube.

$$[h = 6.62 \times 10^{-34} \text{ Js, } c = 3 \times 10^8 \text{ m/s, } e = 1.6 \times 10^{-19} \text{ C}]$$

- (e) Explain how loudness and focussing of sound can be adjusted for good acoustics.
- (f) A stone is dropped from the top of a tower 100 m high. After what time will it reach the ground ?

$$(g = 9.81 \text{ m/s}^2)$$
