17207

14115

2 Hours/50 Marks

Seat No. | | | | | | | | |

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) Define linear velocity and angular velocity.
   b) Define impulse. State its SI unit.
   c) State any two properties of ultrasonic waves.
   d) List the four names of N.D.T. methods used in industries.
   e) State two engineering applications of X-Ray's
   f) Define intensity of illumination. State its SI unit.
   g) Draw a labelled ray diagram of photoelectric cell.
   h) State any two properties of X-Rays.
   i) State Newton's third law of motion with example.
   j) State inverse square law of photometry.
   k) The photoelectric work function of a metal is 5eV. Calculate its threshold frequency ($h=6.63\times10^{-34}$ JS).
   l) A bullet is fired with a velocity 250 m/s in the direction making an angle of 45° with horizontal. Calculate its Range.

2. Attempt **any four** of the following : **16**
   a) Define :
      i) trajectory
      ii) angle of projection
      iii) time of flight
      iv) range of projectile.

P.T.O.

MARKS

b) A freely falling body of mass 15kg is at a distance of 20m above the ground, it has downward velocity of 12 m/s. Calculate :

i) Potential energy

ii) Kinetic energy and

iii) Total energy of the body with respect to ground level.

c) Explain piezoelectric method for production of ultrasonic waves.

d) A train crosses a tunnel in 20 sec. At the entry of tunnel, velocity is 72 km/hr and at the exit of the tunnel, velocity is 36 km/hr. Find the length of tunnel.

e) Explain ultrasonic testing method with the help of principle and experimental procedure.

f) State the factors on which selection of NDT method depends.

3. Attempt **any four** of the following : **16**

a) State the conditions for good acoustic in an auditorium.

b) Explain principle, construction and working of Bunsen's photometer.

c) Define :

i) threshold frequency

ii) threshold wavelength

iii) stopping potential

iv) photoelectric work function.

d) Find minimum wavelength and maximum frequency of X-Rays produced by an X-Ray tube working on 50 kV.

($h = 6.62\times10^{-34}$ JS, $C = 3\times10^{8}$ m/s, $e = 1.6\times10^{-19}$C)

e) A lecture hall has a total surface absorption equivalent to 180 sabine. The reverberation time is 3.30 sec., find the volume of the hall.

f) i) State the formula for distance travelled by a body during n^{th} second in rectilinear motion with meaning of each symbol.

ii) State the three equations of motion when a body is freely falling under gravity with meaning of each symbol.
