17202

16117

2 Hours / 50 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory*.

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any NINE of the following: **18**

a) A car moving with an initial speed of 54 km/hr decelerates to 25 km/hr in 9 seconds. Calculate the SOL deceleration.

b) State work energy principle.

c) State any two applications of centrifugal force.

d) State any two properties of ultrasonic waves.

e) State any two limitations of NDT methods.

f) State any two characteristics of thermocouple.

g) Define:

(i) Neutral temperature

(ii) Inversion temperature

Marks

h) The energy of a photoelectron is 2.8 eV. Calculate its wavelength (Planck's constant, $h = 6.625 \times 10^{-34}$ J-sec; speed of light, $c = 3 \times 10^{8}$ m/sec)

i) Draw a neat labelled diagram of photocell.

j) Define spontaneous and stimulated emission.

k) State any two applications of LDR.

l) State Joules effect. Write its mathematical form along with meaning of all symbols involved.

2. Attempt any <u>FOUR</u> of the following: **16**

a) A train crosses a tunnel in 20 seconds. At the entry of tunnel its velocity is 50 km/hr and at the exit of tunnel it is 100 km/hr. Find the length of the tunnel.

b) A bullet of mass 100 gram is fired with a velocity of 500 m/s from a gun of mass 10 kg. Calculate recoil velocity of gun.

c) Define the terms:

(i) Projectile

(ii) Trajectory

(iii) Angle of projection

(iv) Time of flight

d) Explain production of ultrasonic waves by piezoelectric method.

e) State the necessary criteria for selecting a NDT method in practice (any four points).

f) Differentiate between seeback effect and peltier effect (any four points).

Marks

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

a) State any four properties of X-Rays.

b) Threshold wavelength for silver is 3600 A°. Calculate the energy of photoelectrons emitted in eV when it is exposed U.V. light of wavelength 2500 A°.

c) State any two engineering applications and any two medical applications of laser.

d) Find minimum wavelength and maximum frequency of X-rays produced by an X-ray tube working of 50 kV.

e) State the three equations of motion of a body performing angular motion - along with the meaning of all symbols involved.

f) State any four characteristics of photoelectric effect.