17207

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) Define:

(i) Uniform velocity

(ii) Uniform acceleration

b) Define kinetic energy. Write its formula.

c) State any two properties of ultrasonic waves.

d) State the NDT method to be used for testing if there are cracks on the surface or near the surface of job with appropriate reason.

e) State any two properties of X-rays.

f) Define intensity of illumination. State its SI unit.

g) Draw a neat labelled diagram of photoelectric cell.

h) Write the formula for minimum wavelength of X-rays with meaning of each symbol involved in it.

P.T.O.

Marks

i) While swimming in water, Newton's third law of motion is followed. Explain.

j) Which lighting system is preferred in workshops? Why?

k) An accelerated electron emits a quantum of radiation with frequency 9×10^{19} Hz. Calculate the energy. ($h = 6.63 \times 10^{-34}$ J-sec)

l) A ball is thrown with a velocity of 50 m/s making an angle of 40° with the horizontal. Calculate the range covered by a ball.

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

a) Differentiate between centripetal force and centrifugal force. (any four points)

b) A cubical water tank has a side of 2 m each. It is placed with its base 9 m above the ground level. Find the potential energy of the water when the tank is full.

c) Describe the ultrasonic testing method for the testing of a specimen with the help of diagram, principle and experimental procedure.

d) In case of uniform circular motion, if radius vector of 90 cm subtends an angle of $\frac{\pi}{3}$ radians in 3 sec, calculate angular velocity and linear velocity.

e) What is NDT? State its any three advantages.

f) Explain the production of ultrasonic waves by Piezoelectric method.

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

a) State conditions for good acoustics of an auditorium.

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

c) State any four characteristics of photoelectric effect.

d) The energy of X-ray spectrum is 3.3 eV. Find its frequency. (Given $h = 6.63 \times 10^{-34}$ J-sec and $1e^{V} = 1.6 \times 10^{-19}$J)

e) The volume of the hall is 9000 m^3 and reverberation time is 1.8 second. If the absorption surface of the hall has area 5000 m^2, determine the coefficient of absorption.

f) A car has initial velocity of 5 m/s. It accelerates for 10 second at rate of 2.5 m/s^2. Determine the final velocity and distance travelled during this time.