17207

16172

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 angular velocity and state its SI unit.

(b) State work-energy principle.

(c) State any two properties of ultrasonic waves.

(d) State any two points of criteria for selection of NDT method.

(e) Write formula for minimum wavelength of X-rays with meaning of each symbol.

(f) State inverse square law of photometry.

(g) The photoelectric work function of certain metal is 3×10^{-19} J. Calculate its threshold frequency if planck's constant is 6.625×10^{-34} Js.

(h) What are X-rays ? Write any one property of X-rays.

(i) Why does the gun recoil, when a bullet is fired from a gun ? Explain.

(j) Define luminous intensity and state its SI unit.

(k) Draw the symbols of photoelectric cell and LDR.

(l) A bullet is fired with a velocity of 300 m/s in a direction making an angle of 30^{o} with the horizontal. Calculate time of flight.

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

(a) Write any four applications of centrifugal force.

(b) Define Impulse. If a body of mass 200 kg changes its velocity from 144 km/hr to 36 km/hr, calculate impulse acting on a body.

(c) Explain production of ultrasonic waves by piezoelectric method with the help of neat diagram.

(d) A flywheel of radius 4 cm rotating at 800 rpm accelerates to 2000 rpm in 10 minutes. Calculate linear acceleration and angular acceleration of flywheel.

(e) (i) Draw a neat labelled diagram of Bunsen's photometer.

(ii) State any two factors affecting the indoor lighting.

(f) Compare between LPT and UT method on the basis of principle of working, advantages, disadvantages and probing medium.

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

(a) State any four requirements of good acoustics of building.

(b) Write any four advantages of NDT method.

(c) With the help of neat labelled diagram, explain construction and working of photoelectric cell.

(d) The volume of a room is 1500 m^3. The wall area of the room is 260 m^2, the floor is 140 m^2 and the ceiling area is 140 m^2. The sound absorption coefficients are 0.03, 0.8 and 0.06 for wall, ceiling and floor respectively. Calculate the reverberation time.

(e) State applications of X-rays in scientific and engineering fields (any two each).

(f) A vehicle covers 60 m in 3^{rd} second and 100 m in 7^{th} second during its motion. Calculate its initial velocity and acceleration.
