17207

21415

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 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) Retardation

b) Why does the gun recoil, when a bullet is fired from a gun?

c) State the range for infrasonic and ultrasonic waves.

d) What is meant by NDT? Name two popular NDT methods used in mechanical industry.

e) State the range of wavelength of X-rays. Write the formula for minimum wavelength of X-rays.

Marks

f) Define the terms:

(i) Luminous intensity

(ii) Illuminance

g) Define Photon. Write the formula for energy of a Photon.

h) Write any four properties of X-rays.

i) State Newton's second law of motion. Give one example.

j) A lamp of 300 candela is at a distance of 10 m from wall. Find the illuminance of the wall.

k) Write any two uses of Photo electric effect.

l) Define centrifugal force. Give one example.

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

a) A projectile is fired with a velocity of 60 m/s making an angle of 30° with the horizontal plane. Find its time of Flight, Range and maximum height.

b) A water tank of capacity 18000 lit is to be filled in 20 minutes by a pump. This water is to be lifted through a height of 12 m. If efficiency of pump is 70%, find the power of the pump.

c) With neat labelled diagram, explain piezo-electric method to produce ultrasonic waves.

d) A car is moving with a velocity of 80 km/hr. The diameter of wheels is 525 mm. Find the angular velocity of the wheel. Also find the angular retardation if the car which comes to rest over a distance of 700 m under constant retardation.

e) What is ultrasonic testing? State two advantages and two industrial application of ultrasonic testing.

f) What is the necessity of testing methods used in industries? State the four factors on which NDT method can be selected.

Marks

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

a) State the factors affecting acoustical planning of building. Explain how they are to be adjusted for good acoustics.

b) State and explain the factors affecting the indoor lighting scheme.

c) If light of wavelength 4000 A° is incident on metal surface of work function 5ev, will the electrons be ejected or not? $h = 6.63 \times 10^{-34}$ JS, $C = 3 \times 10^{8}$ m/s.

d) State any two engineering and two medical applications of X-rays.

e) Define reverberation of sound. Write Sabine's formula for reverberation time. State the factors on which reverberation time depends.

f) The speed of train is reduced from 110 kmph to 55 kmph over a distance of 350 m. Find the uniform retardation and distance further travelled before coming to rest.