

# 17207

**15162**

**2 Hours / 50 Marks**

Seat No.

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- 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 the term:
  - (i) Retardation
  - (ii) Velocity time graph
- b) Define one newton and one watt.
- c) Define:
  - (i) Time of flight
  - (ii) Horizontal range
- d) Define ultrasonic wave.
- e) Name any four non destructive testing method.
- f) Explain the term:
  - (i) Reverberation
  - (ii) Reverberation time
- g) Intensity of sound produced by thunder is  $0.2 \text{ wm}^{-2}$ . Calculate the level in decibel.

P.T.O.

- h) State the principle of photometry.
- i) Define threshold frequency and stopping potential.
- j) State the range of wavelength of x-ray.
- k) State photoelectric effect.
- l) State Newton's third law motion with equation.

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

**16**

- a) State the equation of K.E. of body:
  - (i) at rest
  - (ii) when its velocity is doubled
- b) Distinguish between centripetal force and centrifugal force.
- c) Describe piezoelectric method for their production.
- d) A hall of volume  $5000 \text{ m}^3$  has a reverberation time of 3 sec. The surface area of sound absorbing surface  $3500 \text{ m}^2$ . Calculate the average coefficient of absorption.
- e) Explain the working of Bunsen's photometer with help of a neat ray diagram.
- f) Find minimum wave length and maximum frequency of X-ray production by an X-ray tube work on 50 kV  
 $h = 6.62 \times 10^{-34} \text{ Js}$ ,  $c = 3 \times 10^8 \text{ m/s}$ ,  $e = 1.6 \times 10^{-19} \text{ C}$

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

**16**

- a) A flywheel starting from rest is subjected to an acceleration of  $150 \text{ rpm}^2$ . Find its angular displacement during the  $10^{\text{th}}$  sec.
  - b) A train weighing 300 kN is moving with a velocity of 60 km/hr. The velocity is reduced to 40 km/hr in a second by applying the brakes, find the braking force assuming it is to be uniform.
  - c) State the principle of LPT and explain its experimental procedure.
  - d) A lamp of 300 candela is at a distance of 10 m from a wall. Find the illuminance of the wall.
  - e) Derive Einstein photoelectric equation.
  - f) Explain the production of X-ray using Coolidge's X-ray tube.
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