



17207

21314

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) **Use** of Non-programmable Electronic Pocket Calculator is **permissible**.
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MARKS

1. Attempt **any nine** :

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- Define uniform acceleration. State its SI unit.
- State equations of kinetic energy and potential energy. Also state meanings of symbols used in it.
- State any two properties of ultrasonic waves.
- Name any four non-destructive testing methods.
- Draw a neat labelled diagram of Coolidge X-ray tube.
- Define luminous flux. State its symbol and SI unit.
- State any two properties of photon.
- State any two medical applications of X-ray.
- A body of mass 400 kg is being lifted with a uniform velocity of 2 m/s. Find the power involved in it.
- Define maintenance factor. State its formula.
- An accelerated electron emits a quantum of radiation with frequency 9×10^{19} Hz. Calculate energy of electron. ($h = 6.63 \times 10^{-34}$ Js).
- A projectile is thrown up with the velocity of 2 m/s at an angle of 60° . Find the time of flight.

P.T.O.

2. Attempt **any four** :

16

- a) Define angle of projection, maximum height of a projectile. State its formula with meanings of symbol used.
- b) A roller is pulled 60 m along the horizontal by a force of 300 N at 60° with the horizontal. Calculate workdone.
- c) Describe piezoelectric method for production of ultrasonic waves.
- d) A flywheel is rotating at 1000 revolution per minute. It is brought to rest in 50 revolutions. Calculate uniform retardation.
- e) State any four advantages of NDT methods.
- f) State principle and experimental procedure of LPT method.

3. Attempt **any four** :

16

- a) State conditions for good acoustics of an auditorium.
 - b) Explain principle and working of Bunsen's photometer. Draw neat labelled ray diagram.
 - c) State any four characteristics of photoelectric effect.
 - d) Find the minimum wavelength and frequency of X ray tube working on 100 kV. ($h = 6.634 \times 10^{-34}$ Js, velocity of light = 3×10^8 m/s, $e = 1.6 \times 10^{-19}$ C).
 - e) Define echo, reverberation. Also state Sabine's formula with meanings of symbol used.
 - f) A train crosses a tunnel in 30 second. At the entry of tunnel its velocity is 60 km/hr. and at the exit of tunnel its velocity becomes 30 km/hr. Find length of the tunnel.
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