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MNG-TT-IT-PCT-103

6003

BOARD DIPLOMA EXAMINATION, (C-16)

JANUARY/FEBRUARY—2022

FIRST YEAR (COMMON) EXAMINATION

ENGINEERING PHYSICS

Time : 3 hours]

[Total Marks : 80]

PART—A

$3 \times 10 = 30$

- Instructions :**
- (1) Answer **all** questions.
 - (2) Each question carries **three** marks.
 - (3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. State any three limitations of dimensional analysis.
2. State and explain the triangle law of addition of vectors.
3. A body is projected vertically upwards with a velocity of 196 ms^{-1} . Find time of ascent.
4. Calculate the time period of oscillation of a particle in SHM when its acceleration is 12 m/s^2 at a displacement of 3 m.
5. State the differences between gas constant (r) and universal gas constant (R).
6. Define reverberation and reverberation time.
7. Define capillarity and state two examples for capillarity.
8. Define viscosity and mention its SI unit.
9. State any three properties of magnetic lines of force.
10. State any three applications of super conductors.

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PART—B

- Instructions :** (1) Answer *any five* questions.
(2) Each question carries **ten** marks.
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

- 11.** (a) State vector product and write any four properties. 7
(b) Show that the vectors $a = 2i - j + 6k$ and $b = i + 14j + 2k$ are perpendicular to each other. 3
- 12.** (a) Show that the trajectory of a horizontally projected body from a height above the ground is a parabola. 6
(b) Calculate the ratio of ranges of two oblique projectiles, whose velocities are in the ratio 1:2 and angles of projection are 30° and 45° respectively. 4
- 13.** (a) State laws of static friction. 4
(b) State the disadvantages of friction. 3
(c) A body, having mass 2 kg, is in the state of motion over a rough horizontal surface with a velocity 10 m/s. Evaluate displacement and time of motion, before coming to rest. ($\mu_k = 0.5$ and $g = 10 \text{ m/s}^2$). 3
- 14.** (a) Define Work, Power and Energy. 3
(b) State and prove Work-Energy Theorem. 5
(c) Determine K.E. of a body, whose mass and linear momentum are 2 kg and 8 kg m/s respectively. 2

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15. (a) Define S.H.M. and write any four conditions of S.H.M. 5

(b) The S.H.M. of a body is given by $y = 6 \sin\left(2\pi t + \frac{\pi}{4}\right)$. Find
(i) angular velocity, (ii) amplitude, (iii) phase angle, (iv) time period and (v) initial displacement.
(All parameters are in CGS system of units.) 5

16. (a) Show that $C_p - C_v = R$. 6

(b) The pressure and volume of a gas at 20 °C are 780 mm of Hg and 600 cc respectively. Find the volume at NTP. 4

17. (a) Define noise pollution and list out the demerits of Noise Pollution. 6

(b) An observer at a distance 'd' from a hill produces sound and hears an echo after 5 seconds. He receives another echo after 3 seconds when he moves 80 m distance towards the hill. Calculate the value of 'd' if the velocity of sound in air is 340 m/s. 4

18. (a) Derive an equation for balancing condition of a Wheatstone's Bridge. 7

(b) If the length and pole strength of a bar magnet are made half and one-third of its initial values, determine the value of new magnet moment in terms of initial magnet moment. 3

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