C14–A/AA/AEI/BM/CH/CHST/C/CM/EC/EE/CHPP/CHPT/

CHOT/PET/M/RAC/MET/MNG/IT/TT/PCT–103

4003

BOARD DIPLOMA EXAMINATION, (C–14)
SEPTEMBER/OCTOBER - 2020
FIRST YEAR (COMMON) EXAMINATION

ENGINEERING PHYSICS

Time : 3 hours]　　　　　　　　　　　　[*Total Marks* : 80

PART—A　　　　　　3×10=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. Write three limitations of dimensional analysis.

2. State polygon law of vectors with neat diagram.

3. A stone is thrown vertically upwards from the ground with a velocity 14 m/s. Find the maximum height reached.

4. The displacement of an oscillating particle varies with time according to the equation $y = 3 \sin 0 \cdot 5\pi t$. Find *(a)* amplitude, *(b)* angular velocity and *(c)* time period.

5. State first law and second law of thermodynamics.

6. Write any three properties of musical sound.

7. Define stress, strain and mention their SI units.

8. Write the effects of temperature on viscosity of liquids and gases.

9. State Kirchhoff's laws of electricity.

10. State any three properties of superconductors.

PART—B 10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

11. *(a)* Define dot product of two vectors. Write its five properties.

   2+5=7

   (b) A force $(6\vec{i} + 12\vec{j} + 8\vec{k})$N produces a displacement of $(2\vec{i} + 8\vec{j} + 2\vec{k})$m. Find the work done.   3

12. *(a)* Show that the path of an oblique projectile is a parabola.   7

   (b) A ball is projected into air by making an angle of 45° to the horizontal and with a velocity of $19 \cdot 6 \, \text{ms}^{-1}$. Find its range.   3

13. *(a)* Write any four methods of minimizing friction.   4

   (b) Derive the expression for acceleration of a body moving downwards on a rough inclined plane with neat diagram.   6

14. *(a)* Derive an equation for the kinetic energy of a moving body.   6

   (b) A machine gun fires 240 bullets per minute. Each bullet moves with a velocity of 500 m/s, if the mass of each bullet is 3 gm. Find the power of machine gun.   4

15. *(a)* Define SHM and give two examples. 3

(b) Derive the formula for time period in case of simple pendulum. 7

16. *(a)* Derive the gas equation $PV = RT$. 6

(b) A gas of a pressure $10^5 \, \text{N/m}^2$ is allowed to expand isothermally until its volume is doubled. Find its final pressure. 4

17. *(a)* Define noise pollution. State three causes and three controlling methods of noise pollution. 1+3+3=7

(b) A boy hears an echo of his own voice from a distant hill after 3 sec, if velocity of sound is 350 m/s. Find the distance of the hill from the boy. 3

18. *(a)* Derive an expression for magnetic induction field strength at a point on the axial line of a short bar magnet. 7

(b) If 10 Ω and 30 Ω are connected in the left and right gaps in meter bridge experiment, find the balancing length. 3

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