C16–A/AA/BM/CH/CHST/
AEI/ME/T/MNG/
TT/IT/PCT–103

6003

BOARD DIPLOMA EXAMINATION, (C–16)

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 any three advantages of SI system.

2. State and explain triangular law of vectors.

3. Derive expression for the time of ascent for a body projected vertically upwards.

4. Define the terms time period, frequency and phase of particle in SHM.

5. Calculate the value of universal gas constant.

6. Define reverberation and reverberation time.

7. Define surface tension and capillarity.

8. Define the term viscosity and write examples for viscosity.

9. Define resistivity. Derive the expression for it and write its SI unit.

10. Write 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 scalar product. Write any four properties of scalar product. 6

(b) A body is projected with a velocity of 300 m/s at an angle of 60° with vertical. Find its horizontal and vertical components. 4

12. *(a)* Define projectile. Derive the expression for time of flight and horizontal range of a projectile in oblique projection. 7

(b) A football is projected with a velocity of 9·8 m/s at an angle of 30° to the horizontal. Find the time of flight. 3

13. *(a)* Write the laws of friction. 4

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

14. *(a)* State and prove the law of conservation of energy in the case of a freely falling body. 6

(b) Calculate the power of an engine used to pump 5000 litres of water per minute from a well of deep 20 m, if 25% of power is wasted. 4

15. *(a)* Define simple pendulum and derive the expression for acceleration for a body executing simple harmonic motion. 6

(b) The length of seconds pendulum is 100 cm. Find the length of the pendulum if the time period changes to 1·5 s. 4

16. *(a)* Write the differences between isothermal process and adiabatic process. 6

(b) State first law of thermodynamics. Discuss the application of first law in *(i)* isothernal process, *(ii)* adiabatic process. 4

17. *(a)* Define noise pollution. Write any five causes for noise pollution. 6

(b) State and explain the phenomenon of beats. 4

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

(b) In a Wheatstone's bridge $P = 2$ ohm, $Q = 4$ ohm and $S = 8$ ohm. What is the resistance required to balance the bridge. 3

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