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C16–A/AA/BM/CH/CHST/AEI/MET/
MNG/TT/IT/PCT—103

6003

BOARD DIPLOMA EXAMINATION, (C–16)
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 any three advantages of SI units.

2. State polygon law of vectors with a diagram.

3. Find the time of ascent of a body projected vertically upwards with an initial velocity of 19·6 m/s.

4. Define SHM and give two examples.

5. State gas laws.

6. Write any three applications of beats.

7. Write Poiseuille's equation for coefficient of viscosity and name the physical quantities involved in it.

8. Define stress and strain and write their SI units.

9. Derive an expression for specific resistance of the material of the conductor as a function of length and area of cross section of the conductor.

10. List out any three applications of photoelectric effect.

PART—B 10×5=50

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

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

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

11. *(a)* State parallelogram law of vectors. Derive the expression for the magnitude of resultant vector using parallelogram law of vectors. 2+5

(b) A force $F \quad 4i \quad 2j \quad k$ acts on a particle and produces in it a displacement of $S \quad i \quad 4j \quad 2k$. Find the work done. 3

12. *(a)* Show that the path of projectile is parabola in oblique projection. 6

(b) A ball is thrown at an angle 60° to the horizontal with an initial velocity of 30 ms ^{1}. Find the maximum height and range. 4

13. *(a)* Define friction. State the laws of limiting friction. 2+4

(b) Derive the expression for the displacement of a body moving on a rough horizontal surface before coming to rest. 4

14. *(a)* State and prove work-energy theorem. 6

(b) A body of mass 30 kg is lifted to a height 4 m from the ground in 5 seconds. Find the work done and power required. 4

15. *(a)* Derive an expression for time period of simple pendulum. 7

(b) The displacement of a body executing SHM is given by the equation $y \quad 8\sin[200t \quad /2]$. Find amplitude, angular velocity and time period. 3

16. *(a)* Derive the relation $C_p \quad C_v \quad R$. 6

(b) Calculate the value of universal gas constant. 4

17. *(a)* What is Doppler's effect? Write any four applications of Doppler effect. 2+4

(b) What are the effects of noise pollution? 4

18. *(a)* The values of resistance P, Q, R are 20 ohm, 10 ohm and 5 ohm respectively in the balanced condition of Wheatstone's bridge. Find the unknown resistance S. 3

(b) Derive an expression for the magnetic induction field strength at a point on the equatorial line of a bar magnet. 7

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