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C16–C/CM–103

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BOARD DIPLOMA EXAMINATION, (C–16)

SEPTEMBER/OCTOBER - 2020

DCE—FIRST YEAR 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.

1. Define fundamental and derived physical quantities and mention one example for each quantity.

2. Find the magnitude of the resultant vector of **A** 2**i** **j** 2**k**, **B** 5**i** 4**j** 6**k** and **C** **i** 2**j** 8**k**.

3. Define an oblique projectile and write two examples.

4. Calculate the length of seconds pendulum at a place where g 9·8 m/s^2.

5. The volume of a gas at 27 °C is 100 cm^3. Find its temperature at which its volume is doubled, if the pressure remains constant.

6. State any three applications of echoes.

7. Define surface tension and capillarity.

8. State any three examples of viscosity.

9. If the lengths and radii of 2 wires of same material are in the ratios 2 : 3 and 4 : 5 respectively, then determine the ratio of their electrical resistances.

10. State the applications of superconductors.

PART—B

10×5=50

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

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

11. *(a)* Define dot product and write four properties of dot product. 6

(b) Find the area of a parallelogram formed by vectors $\vec{A} \quad \hat{i} \quad 4\hat{j} \quad 3\hat{k}$ and $\vec{B} \quad 2\hat{i} \quad 2\hat{j} \quad \hat{k}$ as its adjacent sides. 4

12. *(a)* Prove that in the case of body thrown up vertically, the time of ascent is equal to time of descent. 6

(b) A body is projected horizontally from a height of 1000 m has a range of 500 m. Find the velocity of projection and time to reach ground ($g \quad 10\ m/s^2$). 4

13. *(a)* State laws of friction. 4

(b) State disadvantages of friction. 3

(c) Calculate the time of motion of body, when allowed to move down from the top of a rough inclined plane having angle of inclination 60° to reach the bottom. ($_k \quad 0{\cdot}4$ and $g \quad 10\ m/s^2$) 3

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

(b) An engine is used to lift water from a well 50 m deep to fill a tank of dimensions 10 m×10 m×10 m in 2 hours 40 minutes. Find the power of the engine, if 25% energy is wasted (g 9·8 m/s^2). 4

15. *(a)* State any four conditions of simple harmonic motion. 4

(b) Derive expressions for velocity and acceleration of a particle executing simple harmonic motion. 6

16. *(a)* Derive ideal gas equation. 6

(b) State any four differences between adiabatic process and isothermal process. 4

17. *(a)* Define noise pollution and write five effects of noise pollution. 6

(b) A boy hears an echo of his own voice from a distant hill after 4 seconds. Find the distance of the hill, if the velocity of sound is 340 m/s. 4

18. *(a)* Derive an expression for the couple acting on a bar magnet placed in a uniform magnetic field. 6

(b) State Kirchhoff's laws of electricity. 4

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