6018

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 $\mathbf{A} = 2\mathbf{i} - \mathbf{j} + 2\mathbf{k}$, $\mathbf{B} = 5\mathbf{i} - 4\mathbf{j} + 6\mathbf{k}$ and $\mathbf{C} = \mathbf{i} - 2\mathbf{j} + 8\mathbf{k}$.

3. Define an oblique projectile and write two examples.

4. Calculate the length of seconds pendulum at a place where $g = 9{\cdot}8$ 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.

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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 $\vec{A} = \hat{i} + 4\hat{j} + 3\hat{k}$ and $\vec{B} = 2\hat{i} + 2\hat{j} + \hat{k}$ 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 ($g = 10$ 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. ($_k = 0.4$ and $g = 10$ m/s^2)   3

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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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