



C16-C/CM-103

6018

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2018

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. List the base and supplementary units of the SI system with their symbols.
2. Two forces of magnitude 30 N and 40 N are acting on a body perpendicular to each other. Find the magnitude of resultant force.
3. Derive the expression for height of the tower when a body is projected vertically upwards from the top of the tower.
4. Determine the length of the Second's pendulum on the earth. Take the value of g as 9.8 m/s^2 .
5. The volume of a gas at 27°C is 50 cm^3 . Find its temperature at which its volume is doubled, if the pressure remains constant.

- * 6. Distinguish between musical sound and noise.
7. Define surface tension and capillarity. Give an example for surface tension.
8. What is the effect of temperature on viscosity of liquids and gases?
9. State and explain Coulomb's inverse-square law of magnetism.
10. State the laws of photoelectric effect.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.
(2) Each question carries **ten** marks.

11. (a) Define cross product. Write three properties of cross product. 5
- (b) Under what conditions the sum and difference of two vectors will be equal in magnitude? 5
- * 12. (a) What is projectile? Give two examples. 2
- (b) Prove that in the case of body thrown up vertically, the time of ascent is equal to time of descent. 5

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- (c) A stone is projected vertically upwards from the top of a tower of height 105 m with a velocity of 20 ms^{-1} . Find the time taken by the stone to reach the bottom of the tower. ($g = 10 \text{ ms}^{-2}$) 3
- 13.** (a) Explain any four methods of minimizing the friction. 4
- (b) A body placed at the top of a 10 m long plane surface, inclined at an angle of 30° with the horizontal, slides down. If coefficient of friction = 0.18, find the—
- (i) acceleration of the body;
- (ii) velocity of the body at the bottom of the plane;
- (iii) time taken by the body it reaches the bottom. 6
- 14.** (a) Define kinetic energy. Derive the expression for kinetic energy of a body of mass m and moving with a velocity v . 6
- (b) A body of mass 1 kg falls from a height of 40 m. Find the potential and kinetic energies of the body after 2 seconds of its motion. 4
- 15.** (a) Define simple harmonic motion. Give two examples. 4
- (b) Derive the expressions for velocity and acceleration of a particle executing SHM. 6
- 16.** (a) State first and second laws of thermodynamics. 4
- (b) Distinguish between isothermal and adiabatic processes. 4
- (c) What is ideal gas? Write the ideal gas equation for n moles. 2
- 17.** (a) Define Doppler effect. Write any four applications of Doppler effect. 5

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- (b) Write Sabine's formula and name the parameters contained. 3
- (c) Find the minimum distance between reflecting surface and listener to hear an echo, if the velocity of sound in air is 330 ms^{-1} and persistence of hearing is 0.1 second. 2
- 18.** (a) Define magnetic moment. Derive an expression for the strength of magnetic induction field at a point on the axial line of a bar magnet. 7
- (b) Three currents 1 mA, 3 mA and i_3 mA are flowing towards the junction, and two currents 2 mA and 3 mA are flowing away from the junction. Find the value of i_3 . 3
