



C16-C/CM-103

6018

BOARD DIPLOMA EXAMINATION, (C-16)

OCT/NOV—2017

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.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Write the dimensional formulae of the following :

(a) Universal gas constant

(b) Force

(c) Stress

2. State triangular law of vectors and explain.

3. A body is falling freely from a height of 78.4 m. Find the velocity of the body on reaching the ground. The value of  $g$  is  $9.8 \text{ m/s}^2$ .

4. State the conditions of simple harmonic motion.

5. Write any three differences between isothermal process and adiabatic process.

6. Write any three applications of Doppler effect.

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7. Write the <sup>\*</sup>Poiseuille's equation for the coefficient of viscosity and name the symbols involved.
8. Define the terms 'stress' and 'strain'.
9. State Kirchhoff's laws.
10. Write three 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 criterion for valuation is the content but not the length of the answer.

11. (a) Define dot product. 2
- (b) Mention any four properties of dot product. 4
- (c) Find the area of parallelogram formed by two vectors  $P = \hat{i} + 2\hat{j} + 3\hat{k}$  and  $Q = \hat{i} + \hat{j} + \hat{k}$  as two adjacent sides. 4
12. (a) Define projectile and give one example. 2
- (b) Show that the path of a projectile is a parabola in the case of oblique projection. 5
- <sup>\*</sup>(c) The range of projectile is equal to maximum height reached, find the angle of projection. 3
13. (a) Explain any three methods of reducing friction. 3
- (b) Derive the expression for the acceleration of a body slides down on a rough (with friction) inclined plane. 4
- (c) Find the force of friction on a body of mass 100 kg when it is just start sliding on horizontal surface if  $\mu = 0.5$ . The value of  $g$  is  $9.8 \text{ m/s}^2$ . 3

14. (a) State the law of conservation of energy and prove it in the case of freely falling body. 6
- (b) An engine is used to lift water from a well 60 m deep to fill a tank of dimensions 5 m × 5 m × 10 m in 40 minutes. Find the power of the engine if 30% energy is wasted. Take  $g$  as  $9.8 \text{ m/s}^2$ . 4
15. (a) Derive the equation for time period of a simple pendulum. 6
- (b) The displacement of a particle executing SHM is given by
- $$x = 4 \cos \left( 2\pi t - \frac{\pi}{4} \right)$$
- All values are in S.I units.
- Find (i) amplitude (ii) angular velocity, (iii) maximum velocity and (iv) epoch. 4
16. (a) What are the gas laws. Explain. 6
- (b) 15000 J of heat is given to a gas when its volume increased by  $0.025 \text{ m}^3$  at a constant pressure  $5 \times 10^5 \text{ Pa}$ . Calculate increase in the internal energy of the gas. 4
17. (a) Write any three differences between musical sound and noise. 3
- (b) Write any three effects of noise pollution and write any four measures to be taken to minimise the noise pollution. 7
18. (a) Derive an expression for magnetic induction field strength at a point on the axial line of a bar magnet. 6
- (b) In the meter bridge experiment, if the resistance in the left and right gaps is in the ratio 3 : 4, find where the balancing point is obtained. 4

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