



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.

- \* 7. Write the 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  
 (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
- $$x = 4 \cos \left( \frac{\pi}{2} t \right)$$
- 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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