



C16-A/AA/BM/CH/CHST/AEI/MET/  
MNG/TT/IT/PCT—103

6003

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2017

FIRST YEAR (COMMON) EXAMINATION

ENGINEERING PHYSICS

Time : 3 hours ]

[ Total Marks : 80

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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 any three limitations of dimensional analysis.
2. Define position vector, null vector and unit vector.
3. A ball is dropped from the top of a building of height 40 m. Find the velocity of the ball on reaching the ground.
4. Define simple harmonic motion. Give any two examples.
5. Define specific heat of a gas. Write its SI unit.
6. Write any three applications of beats.
7. Define elasticity. Name any two elastic substances.

- \* 8. Define capillarity and angle of contact.
9. State Kirchhoff's first and second laws.
10. Write any three applications 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 of two vectors. 2
- (b) Write any four characteristics of dot product. 4
- (c) Find the area of the parallelogram formed by the vectors  $\vec{A} = i + 2j + 3k$  and  $\vec{B} = 3i + 2j + k$ . 4
12. (a) Derive the expressions for maximum height and horizontal range of a body projected obliquely. 6
- (b) An aeroplane flying horizontally with a speed of 75 m/s releases a body at a height of 490 m from the ground. Find when and where the body strikes the ground. 4
13. (a) Define static friction, kinetic friction and rolling friction. 3
- (b) Brief any four methods of reducing friction. 4
- (c) A car is travelling at a speed of 10 m/s. Suddenly the brakes are applied causing all tyres to skid. How far the car will go before coming to a stop? (Coefficient of friction = 0.2) 3
- \* 14. (a) Define potential energy. Give two examples. 2
- (b) Derive the expression for kinetic energy. 5
- (c) A body of mass 10 kg falls from a height of 19.6 m. What is the kinetic energy of the body before striking the ground? 3

- \* **15.** (a) Derive the expressions for acceleration and time period of a particle executing SHM. 6

(b) The SHM of a body is given by equation

$$y = 2 \sin \left( 0.5 t - \frac{\pi}{3} \right)$$

where  $y$  is in cm. Find (a) amplitude, (b) angular velocity, (c) time period and (d) maximum velocity. 4

- 16.** (a) State first law of thermodynamics and second law of thermodynamics. 4

(b) Calculate the value of universal gas constant. 3

(c) For a gas at constant pressure of  $1.25 \times 10^5$  Pa, energy of 2200 J is supplied. If the volume of the gas is increased by  $5 \times 10^{-3} \text{ m}^3$ , then find the increase in its internal energy. 3

- 17.** (a) Define echo, reverberation and reverberation time. 3

(b) Write the methods of minimizing echoes. 3

(c) A boy hears an echo of his own voice from a distant hill after one second. If the velocity of sound is 340 m/s, what is the distance of the hill from the boy? 4

- 18.** (a) Define magnetic moment and magnetic induction field strength. 2

(b) Derive an expression for the magnetic induction field strength at a point on the axial line of a bar magnet. 5

(c) A current of 2 A passes through a conductor, when a potential difference of 50 V applied across it. Find the resistance of the conductor. 3

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