



C16-C/CM-103

6018

BOARD DIPLOMA EXAMINATION, (C-16)

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.

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

1. What are dimensionless quantities? Give one example of each.
2. A force is acting on a body at an angle of 40° with the horizontal. If its horizontal component is 250 N, find the actual force and the vertical component.
3. Distinguish between acceleration and acceleration due to gravity.
4. Write any three conditions for simple harmonic motion.
5. Find the value of universal gas constant for one gram mole gas at NTP.
6. A man hears an echo of his own voice from a distant hill after 4 seconds. If the distance between the hill and the man is 690 m, find velocity of sound in air.

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7. State Hooke's law and write the units of elastic modulus.
8. Define surface tension and write its SI units.
9. State and explain Kirchhoff's laws.
10. Write Einstein's equation for photoelectric effect and explain the terms in it.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

11. (a) State parallelogram law of forces. Derive the expression for magnitude and direction of the resultant force. 7
(b) The magnitude of the cross product of two vectors is equal to $1/\sqrt{3}$ times of the dot product. Find the angle between the two vectors. 3
12. (a) Derive the expressions for maximum height and range in oblique projection. 6
(b) A ball is projected into air making an angle of 60° with horizontal with a velocity of 19.6 m/s. Find the time of flight and horizontal range. 4
13. (a) Define the terms normal reaction, angle of repose and coefficient of friction. 3
(b) Derive the expression for acceleration of a body moving down on the smooth inclined plane. 4
(c) A body rests on a rough inclined plane and just slides down at an angle of 30° . Find the acceleration of the body moving down the plane when the slope of the plane is 60° . 3

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- 14.** (a) State and verify the law of conservation of energy for a freely falling body. 7
- (b) A machine gun fires 240 bullets in a minute. Each bullet moves with a velocity of 500 m/s. If mass of each bullet is 3 gm, find the power of the gun. 3
- 15.** (a) Derive the expression for displacement and velocity of a particle executing SHM. 6
- (b) A particle in SHM has a velocity of 4 m/s at mean position. Its time period is 3.14 s. Find the amplitude. 4
- 16.** (a) State first and second laws of thermodynamics. 4
- (b) Derive gas equation for one gram mole gas. 6
- 17.** (a) Write the sources and effects of noise pollution. 6
- (b) Define the terms echo and reverberation. 4
- 18.** (a) Derive the expression for magnetic induction field strength at a point on the axial line of a bar magnet. 6
- (b) A bar magnet of length 30 cm and pole strength 2 A/m is making an angle of 30° with uniform field of strength 20 A/m. Find the couple acting on the magnet. 4

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