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C20-M/CHOT-103

7050

BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

DME - 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.

**Note :** Take  $g = 9.8 \text{ m/s}^2$  for solving numerical problems.

1. Write the dimensional formula of the following terms :
  - (a) Surface tension
  - (b) Acceleration
  - (c) Work
2. Find the angle between the two given vectors  $B = 3\hat{i} - 6\hat{j} + 3\hat{k}$  and  $B = 3\hat{i} - 6\hat{j} + 3\hat{k}$ .
3. Define momentum. Write its formula and SI units.
4. Write any three advantages of friction.
5. Find the work done in lifting a body of mass 25 kg against gravity to a height of 10 m from the ground.
6. Define the terms time period, frequency and amplitude of a body executing SHM.

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7. The pressure of a gas at  $127\text{ }^{\circ}\text{C}$  is 70 cm of Hg. Find its pressure if it is cooled to  $27\text{ }^{\circ}\text{C}$ , keeping the volume constant.
8. Write any three applications of Doppler's effect.
9. Two magnetic poles each of strength 50 Am and 10 Am are separated by a distance of 5 cm. Find the force between them.
10. Define specific resistance. Write its SI units.

### PART—B

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **eight** marks.  
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. (a) State triangle law of vectors. If two forces 30 N and 40 N act simultaneously on a particle at right angles to each other, find the magnitude and direction of the resultant. 2+6

**(OR)**

- (b) Define projectile. Show that the path of a horizontally projected body is a parabola. 2+6

12. (a) Define angle of repose. A body of mass 1 kg is placed on a rough inclined plane inclined at angle of  $45^{\circ}$  with the horizontal. If the coefficient of friction is 0.25, calculate the acceleration of the body when it is (i) sliding down and (ii) projected up. 2+6

**(OR)**

- (b) Prove the law of conservation of energy in case of a freely falling body. 8

13. (a) Define seconds pendulum. A particle executes SHM with a time period of 3.14 seconds and an amplitude of 30 cm. Find its (i) maximum velocity and (ii) maximum acceleration. 2+6

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(OR)

(b) State Charles' laws. Derive ideal gas equation  $pV = nRT$ . 2+6

14. (a) Define reverberation. Write Sabine's formula and name the parameters involved in it. 2+6

(OR)

(b) Define capillarity. Explain surface tension based on molecular theory. 2+6

15. (a) Derive an expression for the balancing condition of Wheatstone's bridge with a neat circuit diagram. 8

(OR)

(b) Define critical angle and total internal reflection. Write any four applications of optical fiber. 4+4

**PART—C**

10×1=10

**Instructions :** (1) Answer the following question.

(2) Question carries **ten** marks.

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

\* 16. Derive expressions for the time of ascent and maximum height reached in case of a body projected obliquely. Extend these expressions to represent vertical motion of the body. 6+4

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