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 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 $\vec{B} = 3\hat{i} - 6\hat{j} + 3\hat{k}$ and $\vec{B} = 3\hat{i} - 6\hat{j} + 3\hat{k}$ ·

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.

7. The pressure of a gas at 127 °C is 70 cm of Hg. Find its pressure if it is cooled to 27 °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° 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

(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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