C20-EC-CHPC-PET–103

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BOARD DIPLOMA EXAMINATION, (C-20)

MAY—2023

DECE - 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. List out any three limitations of dimensional analysis.

2. Find the area of the triangle which is formed by two vectors,

$A = 2i + 3j – k$ and $B = i – 4j + 2k$ as two adjacent sides.

3. Derive an expression for maximum height for a body projected vertically upwards.

4. Write any three methods of reducing friction.

5. A machine gun fires 180 bullets per minute, Each bullet of mass 4 g moves with a velocity of 50 ms^{-1}. Find the power of the machine gun.

6. State any three laws of simple pendulum.

7. By supplying 2000 **J** of heat to a gaseous system, volume of that gas is increased by 0.002 m^3 at a constant pressure of 2×10^5 Pa. Calculate increase in internal energy of the gas.

* **8.** Write Sabine's formula and identify the terms in it.

9. State Kirchhoff's laws in electricity.

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10. Define magnetic moment. Write it's SI unit and dimensional formula.

*   **PART—B**   8×5=40

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)*   Define cross product and write any six properties of cross product.

(OR)

(b)   Derive expressions for *(i)* time of descent and *(ii)* range in oblique projection.

12.   *(a)*   Calculate the acceleration of a body which is *(i)* sliding down and *(ii)* moving up on a rough inclined plane with inclination angle 60° with the horizontal direction. (μ = 0.25).

(OR)

(b)   Define Kinetic Energy (K.E). Give two examples for K.E and derive expression for K.E of a moving body.

13.   *(a)*   Derive an expression for time period of a simple pendulum.

(OR)

(b)   Show that PV = nRT for 'n' moles of an ideal gas at pressure 'P', temperature 'T' and volume 'V', where 'R' is universal gas constant.

14.   *(a)*   List out any four applications of *(i)* beats and *(ii)* Doppler effect phenomena exhibited by sound.

(OR)

(b)   Define capillarity and angle of contact. Write formula for surface tension based on capillarity and list the terms involved.

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

*   **(OR)**

*   *(b)*   Define *(i)* critical angle and *(ii)* total internal reflection. List out any four applications of optical fibres.

*   **PART—C**   10×1=10

Instructions :   (1) Answer the following question.

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

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

16.   Define S.H.M. Derive expression for velocity of a particle which executes S.H.M by using reference circle. Explain where the particle possesses maximum and minimum velocity in S.H.M.

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