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6003

BOARD DIPLOMA EXAMINATION, (C-16)

AUGUST/SEPTEMBER—2021

FIRST YEAR (COMMON) 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. State any three limitations of dimensional analysis.

2. Define scalar and vector quantities. Give one example for each.

* 3. Define acceleration due to gravity. What is the average value of acceleration due to gravity on the surface of the Earth?

4. State the conditions of simple harmonic motion.

5. Define molar specific heats of gas.

6. List any three applications of beats.

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7. Define stress*and strain. Write their dimensional formulae.

8. Write Poiseuille's equation for coefficient of viscosity and name the physical quantities involved in it.

9. State Coulomb's inverse square law of magnetism.

10. State any three laws of photo-electric effect.

PART—B

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

(2) Each question carries ten marks.

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

11. *(a)* State parallelogram law of vectors and derive the expression for magnitude and direction of resultant of two vectors. 7

(b) A force $2\hat{i}+4\hat{j}+4\hat{k}$ acts on a body for 4 seconds and produces displacement $3\hat{i}+4\hat{j}+5\hat{k}$. Calculate power. 3

12. *(a)* Derive expression for maximum height and horizontal range of a projectile in oblique projection. 6

(b) A body is projected obliquely with a velocity of 19·6 m/s at an angle of 30º with the horizontal. Find the maximum height and horizontal range. 4

13. *(a)* Derive the expressions for *(i)* distance travelled and *(ii)* time taken to come to rest for a body moving on rough horizontal surface. 6

(b) State any four advantages of friction. 4

14. *(a)* Verify the law of conservation of energy in case of a freely falling body. 6

    (b) A body of mass 1 kg is falling freely from a height of 10 m. Calculate its potential energy and kinetic energy when it is at a height of 4 m from the ground. 4

15. *(a)* Derive the expression for time period of a simple pendulum. 6

    (b) A particle executes simple harmonic motion on a line of length 4 cm. Its velocity is π cm/s at the center of the line. Find its time period. 4

16. *(a)* Write any six differences between isothermal process and adiabatic process. 6

    (b) Calculate the value of universal gas constant R. 4

17. *(a)* Define Doppler effect and write any four applications of Doppler effect. 6

    (b) A boy hears an echo of his own voice from a distant hill after four seconds. If the velocity of sound is 350 m/s, find how far is the hill from his position. 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 wire of length 50 cm and diameter 0·2 mm has a resistance of 50 Ω. Calculate Specific resistance of the material of the wire. 4

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