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C16–M/CHOT/RAC–103

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BOARD DIPLOMA EXAMINATION, (C–16)

OCTOBER—2020

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.

1. State any three advantages of dimensional analysis.

2. State polygon law of vectors with a neat diagram.

3. Calculate the ratio of maximum heights of two bodies, when they are thrown up with velocities in the ratio of 4 : 5.

4. Define amplitude, time period and frequency of a particle in SHM.

5. State any three differences between specific heats of gases.

6. State any three properties of musical sound.

7. Define elasticity and write the SI unit of coefficient of elasticity.

8. Write Poiseuille's equation for coefficient of viscosity and name the terms of the equation.

9. State Kirchhoff's laws of electricity.

10. Define an optical fibre and write any two applications.

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)* Define scalar product and write any five properties. 7

(b) Show that the resultant force bisects the angle between two equal forces, acting on a body simultaneously. 3

12. *(a)* Derive equations for time of flight and horizontal range of a projectile in oblique projection. 6

(b) A football is projected into air with a velocity of $10\ ms^{-1}$ and at an angle of 30° with the earth surface. Find maximum height and range. ($g = 10\ m/s^2$) 4

13. *(a)* Define static friction, kinetic friction and rolling friction. 6

(b) A body slides down on a rough inclined plane, which makes an angle of 30° with the horizontal. Calculate the acceleration of the body if $\mu_k = 0 \cdot 1$. 4

14. *(a)* State and prove law of conservation of energy. 7

(b) A body of mass 10 kg is allowed to fall freely from a height of 8 m above the ground. Find its PE and KE of the body at a height of 4 m above the ground. ($g = 10\ m/s^2$) 3

15. *(a)* Prove that the projection of uniform circular motion of a particle on any one of the diameters of its circular path is SHM. 6

(b) If the length of a simple pendulum is increased by 21%, determine the per cent of increase in its time period. 4

16. *(a)* Define an ideal gas and derive gas equation. 6

(b) A gas at 80 cm Hg pressure and temperature 27 °C is heated, keeping volume constant, until its pressure is tripled. Find the final temperature of the gas. 4

17. *(a)* State any six minimising methods of noise pollution. 6

(b) Define beats and write any two applications. 4

18. *(a)* Derive an equation for magnetic induction field strength at a point one the axial line of a bar magnet. 7

(b) The two resistances, connected, in left and right gaps in meter bridge experiment are 20 Ω and 30 Ω respectively. Compute the value of balancing length. 3

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