6003

C16- COMMON - **103**

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BOARD DIPLOMA EXAMINATION, (C-16)

JUNE/JULY—2022

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. Write the base units and supplementary units of SI system along with their symbols.

2. Define scalar product of two vectors. Give one example.

3. Find the maximum height reached by a vertically projected body in the upward direction with an initial velocity of 9·8 m/s.

4. Define the terms amplitude, time period and frequency of a body in SHM.

5. Distinguish between isothermal process and adiabatic process.

6. Write Sabine's formula and name the physical quantities involved in it.

7. Explain the effect of temperature on viscosity of liquids and gases.

8. Define capillarity and give two examples.

9. State Kirchhoff's laws.

10. List out the applications of superconductivity.

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)* Write the properties of cross product. 4

(b) State and explain triangle law of vectors with a neat diagram. 3

(c) If two vectors $A = 6i + 2j + 2k$ and $B = 5i + 4j + k$ form two adjacent sides of a triangle, find the area formed by them. 3

12. *(a)* Show that the path of a horizontally projected body is parabola. 6

(b) A stone is thrown vertically up with a velocity of 15 m/s from the top of a building. If it reaches the ground in 8 s, find the height of the building. 4

13. *(a)* Derive the expression for acceleration of a body moving up on a rough inclined plane. 6

(b) State laws of static friction. 4

14. *(a)* Verify the law of conservation of energy in the case of a freely falling body. 7

(b) A machine gun fires 120 bullets per minute with a velocity of 300 m/s. If the mass of each bullet is 3 gm, find the power of the machine gun. 3

15. *(a)* Derive the expressions for velocity and acceleration of a particle in SHM. 6

(b) Calculate the change in the length of a simple pendulum in order to double its time period. 4

16. *(a)* Derive the gas equation $PV = RT$. 7

(b) The volume of a gas is 20 c.c. at 30 °C. Pressure remaining constant, what is the temperature at which the volume of the gas is 60 c.c.? 3

17. *(a)* State the conditions of a good auditorium. 5

(b) Define echo. Write the applications of echoes. 5

18. *(a)* If 5 ohm and 20 ohm are connected in the left and the right gap respectively in metre bridge experiment, find the balancing length. 3

(b) Derive an expression for the magnetic induction field strength at a point on the axial line of a bar magnet. 7

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