5174

BOARD DIPLOMA EXAMINATION, (C–16)
MARCH/APRIL—2018
DME—FIRST SEMESTER EXAMINATION

ENGINEERING PHYSICS

Time : 3 hours]　　　　　　　　　　　　　[*Total Marks* : 80

PART—A　　　　　　　　　　　　　2×15=30

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

(2) Each question carries **two** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Write any four advantages of SI system.

2. State any two applications of dimensional analysis.

3. Write any two limitations of dimensional analysis.

4. Write the dimensional formulae of *(a)* power and *(b)* frequency.

5. Define scalar and vector quantities.

6. Define unit vector.

7. State triangle law of vectors.

8. If a force of 50 N acting on a body at an angle of 30º with the horizontal, find its horizontal component of force.

9. List out any two applications of photoelectric effect.

10. Write any two applications of optical fiber.

11. What is a superconductor?

12. State any two applications of superconductor.

13. State Boyle's law.

14. Define first and second laws of thermodynamics.

15. Why is $C_p \quad C_v$?

16. What is absolute zero temperature?

17. Define time of ascent and time of descent.

18. A body is allowed to fall freely from a height of 4·9 m. Find the time taken by the body to reach the ground.

19. What is a projectile? Give an example.

20. Define horizontal range of a projectile.

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PART—B 10×5=50

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

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

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

21. What is photoelectric effect? Explain the working of a photoelectric cell. State any four laws of photoelectric emission.

2+4+4

22. What is optical fiber? Explain the principle and working of optical fiber. Name different types of optical fibres. 2+6+2

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23. Derive $PV = nRT$. Calculate the value of universal gas constant.

7+3

24. *(a)* Define C_p and C_v. Prove that $C_p - C_v = R$. 2+5

(b) The density of a gas at STP is $1\cdot3$ kg/m^3. What is the density of gas at 27 °C and 86 cm if Hg pressure? 3

25. *(a)* Derive the expression for magnitude and direction of the resultant. 7

(b) The resultant of two equal and perpendicular forces is 1414N. Find the magnitude of each force. 3

26. *(a)* Define scalar and vector products of two vectors. 2+2

(b) If $\vec{A} = 2\hat{i} + 3\hat{j} + 7\hat{k}$ and $\vec{B} = 2\hat{i} + 3\hat{j} + 5\hat{k}$, find the magnitude of $\vec{A} \cdot \vec{B}$ and $\vec{A} \times \vec{B}$. 2+4

27. *(a)* Show that the path of an oblique projectile is a parabola. 6

(b) A stone projected upwards with a velocity $9\cdot8$ m/s from the top of a tower reaches the grounds in 4 seconds. Find the height of the tower. 4

28. *(a)* Derive the expressions for the maximum height and horizontal range of a projectile. 3+3

(b) An aeroplane flying horizontally with a speed of 360 km/hr releases a bomb at a height of 490 m from the ground, when and where the will bomb strike the ground? 4

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