3041

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2013

DME—FIRST YEAR EXAMINATION

ENGINEERING PHYSICS

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

PART—A

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 dimensional formula of each of the following :

    (a) Force

    (b) Work

    (c) Density

2. Define scalar quantity and vector quantity. Mention one example for each.

3. Derive the expression for the time of ascent of a body projected vertically upwards.

4. Write any three advantages of friction.

5. Define 'periodic motion' and give two examples.

6. State the laws of thermodynamics.

7. Define musical sound and state its characteristics.

8. Define surface tension and write its formula based on capillarity.

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

10. What is graded index optical fiber? Explain with a neat sketch.

PART—B

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.

11. *(a)* State polygon law of vectors. Explain with a neat diagram. 6

   (b) If $\vec{A} \quad 4\hat{i} \quad 5\hat{j} \quad \hat{k}$ and $\vec{B} \quad \hat{i} \quad 2\hat{j} \quad 6\hat{k}$ form two sides of a triangle, find the area formed by them. 4

12. *(a)* Derive the equations for the 'time of flight' and maximum height reached in case of oblique projection. 6

   (b) A stone is projected vertically upwards from the top of a tower of height 49 metres with a velocity of 14·7 m/s. Find the time taken to reach the foot of the tower. 4

13. *(a)* Define work, power and energy. Write their units and dimensional formula for each. 6

   (b) A machine gun fires 360 bullets per minute and each bullet travels with a velocity of 600 m/s. If the mass of each bullet is 5 gram, find the power of the machine gun. 4

14. *(a)* Describe the method to find specific resistance of a conductor using meter bridge. 6

(b) The resistance of a wire is 8 ohm. What is the resistance of another wire of same material having same length but of double area of cross-section? 4

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

(b) At a given place, the length of a seconds pendulum is 1 metre. What is the value of '*g*' at the place? 4

16. *(a)* Derive the gas equation $PV = RT$. 6

(b) The volume of a gas is 20 cc at 27°C. Pressure remaining constant, what is the temperature at which the volume of the gas is 40 cc? 4

17. *(a)* Derive an expression for the apparent frequency of sound when source is in motion and observer at rest. 6

(b) State the applications of beats. 4

18. *(a)* Define the three moduli of elasticity. 6

(b) Derive Newton's formula for viscous force on a layer of liquid. 4

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