4016

BOARD DIPLOMA EXAMINATION, (C–14)
MARCH/APRIL—2017
DCE–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. Write the advantages of the SI units.

2. Find the unit vector in the direction of $2\vec{i}\quad 3\vec{j}\quad 4\vec{k}$.

3. A ball is thrown at an angle of 30° to the horizontal with an initial velocity of 20 m/s. Find its maximum height reached.

4. Define seconds pendulum. Determine the length of seconds pendulum on the surface of earth, where value of g is 10 m/s^2.

5. State Boyle's law and write it in terms of density.

6. Define Sabine's formula. Write the equation for it.

7. Define stress and strain.

8. Define surface tension and give two examples.

9. Define specific resistance and state its SI units.

10. Define photoelectric effect. Write two applications of photoelectric cell.

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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.

11. *(a)* State parallelogram law of vectors. Derive the equation for magnitude of the resultant.   2+4=6

(b) Find the dot product and cross-product of two vectors

$$\vec{A} = 2\vec{i} + 3\vec{j} + 4\vec{k} \text{ and } \vec{B} = 4\vec{i} + 2\vec{j} + 3\vec{k}$$ 2+2=4

12. *(a)* Derive expression for the maximum height range of a projectile in oblique projection.   3+3=6

(b) A bullet is projected with a velocity of 196 m/s at an angle of 30° to the horizontal. Find the greatest height attained and its time of flight.   2+2=4

13. *(a)* State the laws of static friction.   3

(b) Derive the expression for acceleration of a body sliding down on a rough inclined plane.   7

14. *(a)* Define potential energy and give two examples.   3

(b) Derive expression for kinetic energy.   4

(c) A bullet of mass 10 grams is fired with a velocity 300 m/s. Find its kinetic energy.   3

15. *(a)* Define SHM and give two examples. 3

(b) Define the terms amplitude time period, phase of a particle in SHM. 3

(c) Derive expression for *(i)* displacement and *(ii)* velocity of a body in SHM. 4

16. *(a)* State gas laws. Derive the ideal gas equation *PV RT*. 7

(b) The volume of a gas at 30 °C is 200 cc. What is the volume of the gas if the temperature of the gas is raised to 100 °C at constant pressure? 3

17. *(a)* Explain the effects of noise pollution. 5

(b) Explain the methods of reducing of noise pollution. 5

18. *(a)* Derive the condition for balancing point in Wheatstone bridge. 6

(b) State Coulomb's inverse square law of magnetism. Write the equation for couple acting on a bar magnet placed in a uniform magnetic field. Explain the terms. 2+2=4

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