6018

BOARD DIPLOMA EXAMINATION, (C–16)
OCT/NOV—2018
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 dimensional formulae for the following physical quantities :

(a) Force

(b) Work done

(c) Power

2. Find the cross-product between the vectors $\vec{A} \quad 2\vec{i} \quad 3\vec{j} \quad \vec{k}$ and $\vec{B} \quad \vec{i} \quad \vec{j} \quad 2\vec{k}$.

3. Define acceleration due to gravity. Write its SI unit and dimensional formula.

4. Define SHM and give two examples.

5. State the first and second laws of thermodynamics.

6. Distinguish between musical sound and noise.

7. Define capillarity and give two examples.

8. Define stress. Write its SI unit and dimensional formula.

9. State Coulomb's inverse square law of magnetism and write the equation for it.

10. Write any three applications of optical fibres.

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PART—B

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10×5=50

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)* Define scalar product of two vectors. 2

(b) Write four characteristics of scalar product. 4

(c) The resultant of two forces 12 N and 16 N is 20 N. Find the angle between them. 4

12. *(a)* Derive the expression for maximum height reached and horizontal range of a obliquely projected body. 7

(b) A body is thrown up vertically with a velocity of 19.6 m/s. Calculate the time of ascent. 3

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

(b) Derive an expression for the acceleration of a body moving down the rough inclined plane. 5

(c) List any four methods of reducing friction. 2

14. *(a)* State and verify law of conservation of energy in the case of freely falling body. 1+6

(b) A bullet of mass 20 g is fired with a velocity of 250 m/s. Find its kinetic energy. 3

15. *(a)* Derive expressions for displacement and velocity of a particle executing simple harmonic motion.   3+3

(b) Calculate—*(i)* initial displacement, *(ii)* amplitude, and *(iii)* phase constant for a particle in SHM whose displacement is given by $y = 5\sin(10t + \pi/4)$.   4

16. *(a)* Derive the gas equation $PV = RT$.   2

(b) One litre of air is heated from 27 °C to 170 °C at constant pressure. Find the increase in volume.   4

17. *(a)* What is Doppler effect? Write any three applications of Doppler effect.   1+3

(b) Write the causes and three effects of noise pollution.   6

18. *(a)* State and explain Kirchhoff's voltage law.   4

(b) Derive the condition for balancing the Wheatstone bridge with necessary diagram.   6

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