4016

BOARD DIPLOMA EXAMINATION, (C–14)
MARCH/APRIL—2016
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) Universal gravitational constant

(c) Coefficient of friction

2. A force of $(2\vec{i} \quad 3\vec{j} \quad 5\vec{k})\,n$ acts on a particle having the position vector $(3\vec{i} \quad 12\vec{j} \quad 6\vec{k})\,m$. Find the torque.

3. Define projectile. Give two examples.

4. Define SHM and give one example.

5. Write any three differences between gas constant and universal gas constant.

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6. Define beats. Write two applications of beats.

7. Define surface tension and capillarity. Give one example for each.

8. Write the Poiseuille's equation for coefficient of viscosity and explain the terms involved.

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

10. Write any three applications of optical fibres.

PART—B   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)* State the parallelogram law of vector addition, derive the expression for magnitude and direction of resultant vector.　　7

(b) If $\vec{A} = \vec{i} + 2\vec{j} + x\vec{k}$ and $\vec{B} = 4\vec{i} + 2\vec{j} + 2\vec{k}$ are perpendicular vectors, find the value of x.　　3

12. *(a)* Show that in the case of body thrown up vertically, the time of ascent is equal to time of descent.　　6

(b) An aeroplane flying horizontally with a speed of 360 kmph releases a bomb at a height of 490 m from the ground. When and where will the bomb strike the ground?　　4

13. *(a)* Define friction and write any two advantages of friction.　　3

(b) Explain any four methods to reduce the friction.　　4

(c) A body is sliding down a rough inclined plane which makes an angle 30° with the horizontal. Calculate the acceleration if coefficient of friction = 0·1.　　3

14. *(a)* State law of conservation of energy and verify it in the case of freely falling body. 7

(b) A force acts on a body of mass 2 kg increases its velocity from 5 ms^{1} to 10 ms^{1}. Find the work done by it. 3

15. *(a)* Derive the expression for velocity and acceleration of a particle executing simple harmonic motion. 6

(b) The time period of a simple pendulum of length 50 cm is 1·41 second. Find the value of *g* at that place. 4

16. *(a)* Define ideal gas and write ideal gas equation in terms of density. 2

(b) Explain why universal gas constant is same for all gases. 4

(c) A gas at a pressure of 10^5 N-m^{2} is allowed to expand isothermally until its volume is doubled. Find its final pressure. 4

17. *(a)* What is echo? Write two applications of echo. 3

(b) Write Sabine's formula and explain the terms. 3

(c) Write any four effects of noise pollution. 4

18. *(a)* Define magnetic moment and magnetic induction field strength. 4

(b) Derive the balancing condition for Wheatstone's bridge. 6

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