C16–EC–103/C16–CHPC-103/C16–PET–**103**

# 6029

**BOARD DIPLOMA EXAMINATION, (C–16)**

**OCT/NOV—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. State the limitations of dimensional analysis.

2. Define scalar and vector quantities and give one example for each.

3. Derive the expression for range of projectile.

4. The equation of a particle executing SHM is given by $y = 10 \sin\left(4\pi t - \frac{\pi}{3}\right)$, where the quantities are in SI units. Find *(a)* amplitude, *(b)* angular velocity and *(c)* phase at time $t = 0$.

5. State Boyle's law and express its relation in terms of density.

6. State any three conditions for good auditorium.

7. State Hooke's law, define stress, strain.

**8.** Define surface tension and give one example.

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

**10.** Write any three applications of optical fiber.

## 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)* Define parallelogram law of vectors. Obtain an expression for the magnitude and direction of the resultant vector.   2+5

    *(b)* The magnitude of resultant of two equal forces is 1000 N. Find the magnitude of each force if they are perpendicular.   3

**12.** *(a)* Define projectile and give one example.   2

    *(b)* Derive equations for the maximum height and range of an object projected at a certain angle with the horizontal.   5

    *(c)* A ball is projected into air by making an angle 45° to the horizontal with a velocity of 9·8 m/s. Find the range. Take the $g$ value as 9·8 m/s$^2$.   3

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

    *(b)* Derive the expression for an acceleration of a body sliding down on a smooth inclined plant.   4

    *(c)* Show that the coefficient of friction   Tan , where   is the angle of friction.   3

**14.** *(a)* Define the terms work, power and energy and state their units and dimensional formulae. 6

*(b)* If a force of $(2\hat{i} \quad 3\hat{j} \quad 4\hat{k})$ $N$ is applied on a body, the velocity attained is $(\hat{i} \quad \hat{j} \quad \hat{k})$ m/s. Find the power. 4

**15.** Derive expressions for *(a)* displacement, *(b)* velocity and *(c)* acceleration for a body in SHM. 4+3+3

**16.** *(a)* Derive $C_p \quad C_v \quad R$. 6

*(b)* Calculate the value of universal gas constant for one gram-mole gas at STP. 4

**17.** *(a)* What are beats? Mention three applications of beats. 5

*(b)* What is noise pollution? Write any three effects caused by noise pollution. 5

**18.** *(a)* State and explain Kirchhoff's laws with neat sketch. 4

*(b)* Explain Wheatstone's bridge and derive the condition for obtaining balance in the Wheatstone's bridge. 6