

TED (10)–1003 A

(REVISION—2010)

Reg. No. ....

Signature .....

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY—  
OCTOBER, 2013

**APPLIED SCIENCE–I (Physics)**  
(Common except DCP and CABM)

[Time : 1½ hours

(Maximum marks : 50)

PART—A

(Maximum marks : 4)

Marks

- I Answer the following questions in one or two sentences. Each question carries 2 marks.
- (a) What are nano and femto ?
- (b) Give the relation between angular momentum and angular velocity. (2×2=4)

PART—B

(Maximum marks : 16)

(Answer any two full questions. Each question carries 8 marks.)

- II (a) Derive the equation for the displacement of a body during the  $n^{\text{th}}$  second of its motion. 4
- (b) Derive an expression for acceleration due to gravity. 4
- III (a) Obtain an expression for the period of a simple pendulum using dimensions. 4
- (b) Define torque and angular momentum and give the relation between them. 4
- IV (a) Can a body possess zero velocity and still accelerate. Give example. 4
- (b) Explain Young's Modulus, Bulk Modulus and Rigidity Modulus of a material. 4
- (2×8=16)

PART—C

(Maximum marks : 30)

(Answer one full question from each unit. Each question carries 15 marks.)

UNIT—I

- V (a) State Newton's second law of motion. Hence derive the equation for force. 3
- (b) Define recoil of a gun. Applying law of conservation of momentum, obtain an expression for recoil velocity. 6

- (c) A stone is dropped into water from a bridge 44.1 m above the water level. Another stone is thrown vertically downward one second later. Both stones reach water surface simultaneously. Find the initial downward velocity of the second stone. [ $g = 9.8 \text{ ms}^{-2}$ ].

6

OR

- VI (a) Why wheels are made circular? 3
- (b) Derive an expression for :
- (i) the maximum height reached and
- (ii) horizontal range in the case of a body projected upwards 6
- (c) A train moves around a bend of radius 100 m with a speed of 72 kmph. Calculate the angle of banking and find the height of outer rail over inner rail if the distance between the rails is 1.52 m. 6

UNIT—II

- VII (a) Distinguish between deforming force and restoring force. 3
- (b) Derive an expression for moment of inertia of a uniform circular disc about an axis passing through its centre and perpendicular to its plane. 6
- (c) Calculate the orbital velocity required to maintain a satellite in circular orbit at 160 km above earth. Radius of earth is 6400 km and acceleration due to gravity at this height is  $9.8 \text{ ms}^{-2}$ . Also find the time period of the satellite. 6

OR

- VIII (a) What is the difference between ordinary and geostationary satellite? 3
- (b) The distance of moon from earth is  $3.8 \times 10^5 \text{ km}$  and its mass is  $7.36 \times 10^{22} \text{ kg}$ . Find the angular momentum of the moon about the earth. The angular velocity of moon around earth is  $6.46 \times 10^{-5} \text{ rad/s}$ . 6
- (c) The diameter of a brass rod is 6 mm. What force in newton will stretch by 0.2% of its length? [ $Y = 9 \times 10^{10} \text{ Nm}^{-2}$ ]. 6