

TED (10)–1003A
(REVISION—2010)

Reg. No.

Signature

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

APPLIED SCIENCE—I (Physics)
(Common-except DCP and CABM)

[Time : 1½ hours

(Maximum marks : 50)

Marks

PART—A

- I Answer the questions in one or two sentences. Each question carries 2 marks.
- (a) Write the limitations of dimensional analysis.
- (b) Define radius of gyration and write expression for it.

(2×2=4)

PART—B

- II Answer *any two* full questions. Each question carries 8 marks.
- (a) Explain why there is a speed limit for a vehicle going round a curved road. 4
- (b) Write the equation of motion of the body moving under gravity. 4
- III (a) The moment of inertia of a wheel about an axis of rotation is 3.1 kgm^2 and its kinetic energy of rotation is 600 J. What is its angular velocity? 4
- (b) When a body is thrown up, show that time of ascent is equal to time of descent. 4
- IV (a) Define parallel and perpendicular axes theorem. 4
- (b) Distinguish between stress and strain. Deduce the expression for young's modulus. 4

(2×8=16)

PART—C

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

UNIT—I

- V (a) Obtain the dimensional formula of the universal gas constant from the equation, $PV = RT$. 3
- (b) A particle is projected with a velocity 49 m/s at an angle 30° to the horizontal. Calculate maximum height, time of flight and horizontal range. 6
- (c) State the third law of motion and deduce the law of conservation of momentum. Give an example to illustrate the third law. 6

OR

- VI (a) Write the advantages and disadvantages of friction. 3
- (b) A stone of mass 900 gm is tied to the end of the string of length 60 cm, is whirled in a horizontal circle with a constant speed. If the stone makes 24 rotations in 25 seconds, what is the centripetal acceleration and force? 6
- (c) Find the initial velocity and acceleration of a particle traveling with a uniform acceleration in a straight line, if it traverses 55m in the 8th second and 85 m in the 13th second of its motion. 6

UNIT—II

- VII (a) Define torque of rotating body and give the relation between torque and angular momentum. 3
- (b) Derive an expression for the moment of inertia of a disc about an axis passing through the centre and perpendicular to its plane. 6
- (c) An artificial satellite is moving in circular orbit near earth. Prove that its time period is given by $T = 2\pi\sqrt{\frac{R}{g}}$. 6

OR

- VIII (a) Obtain the relation $g = \frac{GM}{R^2}$ 3
- (b) What is geostationary satellite? Deduce its orbital velocity. 6
- (c) A brass wire of young's modulus 90 Gpa of length 3.14 m and a diameter 0.4 mm is stretched. Find the mass to be suspended to produce an elongation of 0.98 cm. 6