TED (10)–1003A

(REVISION—2010)

Reg. No. .....

Signature .....

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/ TECHNOLOGY—OCTOBER, 2014

APPLIED SCIENCE—I (PHYSICS)

(Common to all except DCP and CABM)

[*Time* : 1½ hours

(Maximum marks : 50)

Marks

PART—A

(Maximum marks : 4)

Answer the following questions in one or two sentences. Each question carries 2 marks.

I (a) Give the dimention of gravitational constant G.

(b) State and explain Hooke's law. (2×2=4)

PART—B

(Maximum marks : 16)

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

II (a) Derive an expression for distance travelled by a particle during the n^{th} second.

(b) Define the parallel and perpendicular axis theorem.

III (a) What is second law of motion and obtain the expression for force ?

(b) If the maximum height reached by a projectile is ¼ of the horizontal range. Calculate the angle of projection.

IV (a) Define the period of a satellite and derive its equatiion.

(b) Derive kinetic energy of a rolling disc on a horizontal surface.

(2×8=16)

PART—C

(Maximum marks : 30)

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

UNIT—I

V (a) What is impulse and show that it is equal to change in momentum ? 3

(b) Derive an expression for horizontal range of a body projected upwards and give the equation for maximum range. 6

(c) What is friction and explain the different types of friction? 6

OR

Marks

VI (a) Distinguish between linear and angular acceleration. 3

(b) A machine gun of mass 10 Kg. fires 30gm bullets at the rate of 6 bullets per second each with velocity 400m/s. Find the recoil velocity of the gun and what force must be applied to keep the gun in position. 6

(c) A body projected vertically up with a velocity u. Show that the time of ascent is equal to the time of decent. Find also the maximum height reached. 6

UNIT—II

VII (a) Define Torque and give the relation between Torque and angular Momentum. 3

(b) A body moving with uniform acceleration travels 50m in 5 seconds. If it covers 14m during the 5^{th} second. Find out the initial velocity and acceleration. 6

(c) Obtain the expression for Moment of inertia of a disc about an axis passing through the centre and perpendicular to its plane. 6

OR

VIII (a) Explain Geostationary satellite. 3

(b) Calculate the height at which a geostationary satellite revolves above the earth. If $g = 9.8\ m/s^2$ and $R = 6400$ km. 6

(c) Determine the force required to stretch a steel wire to double its length when its area of cross section is $10^{-4}\ m^2$. Y of the material is $2 \times 10^{11}\ N/m^2$. 6