TED (10)–1003

(REVISION—2010)

Reg. No. .....

Signature .....

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/ TECHNOLOGY—OCTOBER, 2011

APPLIED SCIENCE — I

(Common-Except DCP & CABM)

[*Time* : 3 hours

(Maximum marks : 100)

[*Note* : Section-I Physics and Section-II Chemistry to be answered in separate answer books.]

SECTION – I

Physics

(Maximum marks : 50)

PART–A

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

Marks

I (a) What are peta and pico ? 2

(b) Why are springs made of steel and not of copper ? 2

PART– B

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

II (a) When a body is thrown up, show that time of ascent is equal to time of descent. 4

(b) State and explain parallel and perpendicular axes theorem. 4

III (a) Derive the equation for the displacement of a body during the n^{th} second of its motion. 4

(b) Derive an expression for the moment of inertia of a uniform circular disc about an axis passing through its centre and perpendicular to its plane. 4

IV (a) Explain why the outer edge of the road bed is raised over the inner on the curved portion of the road. 4

(b) When the diameter of the earth is reduced to half, its mass will become $1/8^{th}$ of its present value. What will be the value of 'g' for the new earth ? 4

Marks

PART – C

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

UNIT – I

V (a) Obtain the dimensional formula for Plank's constant from the equation E=hv. 3

(b) A boy can throw a ball 40 M vertically upwards, find the greatest horizontal distance he can throw. 6

(c) If a gun of mass 20 Kg fires 4 bullets per second each of mass 35×10^{-3} Kg with a velocity of 400 m/s, calculate the force required to stop the recoil of the gun. 6

OR

VI (a) What are the causes of friction ? Why is it difficult to move a cycle with its brake on ? 3

(b) Assuming that the moon completes one revolution in a circular orbit around the earth in 27.3 days, calculate the centripetal acceleration of the moon towards the earth. Radius of orbit = 3.85×10^5 km. 6

(c) A stone is dropped into a well and the sound of the splash is heard after 3.91s. If the depth of the well is 67.6M, find the velocity of sound. 6

UNIT – II

VII (a) Define moment of inertia of a rigid body and radius of gyration. 3

(b) A stone of mass 5 Kg is tied to one end of a string of length 1 M and is rotated in a horizontal circle at the rate of 5 revolutions per second. What are the moment of inertia and kinetic energy of rotation ? 6

(c) An artificial satellite is moving in a definite circular orbit near earth. Prove that its time period is given by $T = \sqrt{(3\pi/G\rho)}$ where ρ is the density of earth and G the gravitation constant. 6

OR

VIII (a) Where should the force be applied on a wrench to produce the best screwing effect ? 3

(b) What are geostationary satellites ? Deduce its orbital velocity.
($G = 6.67 \times 10^{-11}$ Nm^2kg^{-2}, mass of the earth = 6×10^{24} kg and radius of the earth = 6400 km, h = 36,000 km) 6

(c) A metal wire of length 4 M and diameter 2 mm is stretched by a mass of 8 Kg. Find the extension produced if $Y = 11 \times 10^{10}$ Nm^{-2}. 6