TED (10)–1003

(REVISION—2010)

Reg.No.....

Signature.....

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY OCTOBER, 2010

APPLIED SCIENCE–I

(Common–except DCP and 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 questions in one or two sentences. Each question carries 2 marks)

Marks

I (a) Give the physical quantities and their units in which SI is based on.

(b) State and explain Newton's law of gravitation. (2×2=4)

PART—B

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

II (a) Deduce that a projectile can have two angles of projection for ranges other than the maximum range. 4

(b) Analyze the statement—Newton's first law defines force and second law provides a means to measure force. 4

III (a) A cycle wheel can be set into rotation easily if force is applied at the rim rather than at a point near to the axis of rotation. Give reason. 4

(b) Differentiate between inertia and moment of inertia. 4

IV (a) Give reason why a body weighs more at the poles. 4

(b) A cable is replaced by another of the same length and material but twice the diameter. Analyze how it affects the elongation under a given load. 4

(2×8=16)

Marks

PART—C

(Answer *two* full questions. Each question carries 15 marks)

V (a) Differentiate between dimension, dimensional formula and dimensional equation with a suitable example. 3

(b) A body covers 120 m in the 4th second. If it travels 240 m in 8 s, calculate its acceleration, initial velocity and velocity at the end of 8th second. 6

(c) A stone of mass 0.3 kg is tied at the end of a string and whirled in a horizontal plane forming a circle of radius 1 m with a speed of 40 revolutions per minute. What is the tension on the string ? What is the linear velocity of the stone ? 6

OR

VI (a) When projected from horizontal at certain angle, a ball just passes over a pole at 10 m height. Find the time taken by the ball to hit the ground. 3

(b) Demonstrate the conservation of linear momentum in the collision of two bodies. If two masses 12 kg and 8 kg with velocities 10 ms^{-1} and 5 ms^{-1} move together after collision, find their common velocity. 6

(c) What is centripetal force ? What is its relevance in the banking of a track ? 6

VII (a) Define radius of gyration. Determine the radius of gyration of a circular disc of radius R rotating about an axis passing through its centre and perpendicular to its plane. 3

(b) A disc of mass 1 kg with radius 0.5 m is set to rotation in a horizontal plane about an axis passing vertically through its centre. If it makes 10 revolutions in 5 S, determine the torque and rotational kinetic energy. 6

(c) Deduce an expression for the orbital velocity of a satellite. What will be the velocity of the satellite if its orbit is close to the surface of earth ? 6

OR

VIII (a) Calculate the height at which geostationary satellites revolve above earth. $g = 9.8\ ms^{-2}$, radius of earth = 6400 km. 3

(b) Deduce expressions for Young's modulus, rigidity modulus and bulk modulus. 6

(c) A steel wire of length 4.7 m and cross-section $3 \times 10^{-5}\ m^2$ stretches by the same amount as a copper wire of length 3.5 m and cross-section $4 \times 10^{-5}\ m^2$ under a given load. What is the ratio of Young's modulus of steel to that of copper ? 6

(2×15=30)