TED (15) – 1003 Reg. No...

(REVISION — 2015) Signature ....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2017

ENGINEERING PHYSICS – I

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer all questions in one or two sentences. Each question carries 2 marks.

1. What are the advantages of SI system over other unit systems ?
2. Show that power is the product of force and velocity.
3. State Lami's theorem for concurrent forces.
4. Distinguish between ductile and brittle solids.
5. Write any two characteristics of stationary waves. (5×2=10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. State Newton's second law of motion. From the law obtain an expression for force.
2. Derive the formula for the work done by a couple.
3. Obtain an expression for coefficient of viscosity from Stoke's formula.
4. Show that an open pipe produce all harmonics. Illustrate your answer with diagrams.
5. Write the equation of continuity for steady flow of an incompressible fluid. The radius of a pipe decreases from 3cm to 2cm. If the velocity of water in the wider portion is 2m/s, calculate the velocity in the narrow path.
6. At the marks 30cm, 45cm and 86cm of a meter scale of mass 0.5kg, weights 1 kg, 2kg and 3kg respectively are suspended. Where the scale should be suspended, so that it remains horizontal ?
7. Velocity of sound in air at 30°C is 348m/s. Find the velocity at 60°C. (5×6=30)

Marks

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) State Newton's first law of motion. When a moving bus is stopped suddenly, passengers are thrown forward. Why ? 3

(b) Deduce the law of conservation of linear momentum using Newton's third law of motion. 6

(c) Explain the principle of rocket propulsion. A shot of mass 200kg is fired horizontally from a gun of mass 80000kg with velocity 400m/s. Find the recoil velocity. 6

OR

IV (a) Write the three equations of motion for a body uniformly accelerated in a straight line. 3

(b) Derive the equation for the distance travelled by a particle during the n^{th} second of its motion, when the body is moving with uniform acceleration. 6

(c) A stone thrown vertically upwards was in air for 9 seconds. Find the velocity of propagation and the maximum height reached. 6

UNIT — II

V (a) Find out the magnitude and direction of the resultant of two forces P and Q acting at an angle θ. 6

(b) A force 4N acts along the X - direction. Another force 6N makes an angle 60° with the first force. Find the magnitude and direction of the resultant. 6

(c) Define the terms resultant and equilibrant. 3

OR

VI (a) Write the law of triangle of forces. 3

(b) Define parallel forces. Describe the conditions for translational and rotational equilibrium of a body under coplanar parallel forces. 6

(c) Find the couple acting on the shaft of an electric motor when developing a power 6280W at a speed 300 revolutions per minute. 6

UNIT — III

VII (a) Define stress and strain. State Hookes law for an elastic material. 3

(b) State Bernoulli's theorem. Explain the working of an atomiser. 6

(c) Find the elongation of a steel rod of length 4m and radius 2cm when subjected to an axial load of 5000kg. Y of steel is 20×10^{10}N/m^2. 6

OR

Marks

VIII (a) Explain the term viscosity. Describe the Poiseuille's method to determine the coefficient of viscosity of water. 6

(b) Discuss the variation of viscosity with temperature for gases and liquids. 3

(c) 64 identical droplets of water come down through air with constant terminal velocity 1cm/s. Find the terminal velocity when they combine to form a single drop. 6

UNIT — IV

IX (a) Derive an equation for the velocity of a wave in terms of frequency and wave length. 3

(b) Find out the fundamental frequency of the air column contained in a tube closed at one end and having a length 40cm. Velocity of sound in air is 340m/s. End correction can be ignored. 6

(c) What are ultrasonic waves ? Give its two applications. Describe a method to produce ultrasonic waves. 6

OR

X (a) Show that the projection of a uniform circular motion along a diameter of a circle is simple harmonic. 6

(b) What is end correction ? Give the equation for end correction. 3

(c) Calculate the wavelength of sound in air corresponding to the limits of audibility. The audible range is 20Hz to 20000Hz. Velocity of sound is 330m/s. 6