TED(15)1003

FIRST SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY

(Common to all Diploma Programmes except DCP & CABM)

Engineering Physics 1 Model Question paper

(Time : 3 hours)

(Maximum marks : 100)

Part A

(*Answer all questions. Each question carries 2 marks)*

I.

1. Distinguish between fundamental and derived quantities.
2. State triangle law of addition of vectors
3. Name the different forms of energy associated with following fluids
4. Define simple harmonic motion
5. What is resonance?

(2 x 5 = 10)

Part B

(Answer any five questions. Each question carries 6 marks)

II.

1. Derive the equation for the displacement of a body moving with uniform acceleration during the n^{th} second of its motion.
2. Write the advantages of SI units over other unit systems. Write the fundamental quantities and their units in SI System.
3. Define the term resultant and equlibrant. The maximum value of resultant of two forces P and Q is 31N and the minimum value of resultant is 17N. Find the forces.
4. Explain resolution of a vector. Write expression for rectangular components. A force of 40N makes an angle 30˚with horizontal. Find its rectangular components.
5. Explain modulii of elasticity. Write their expressions and units.
6. A metal wire of length 4m and diameter 2mm is stretched by a mass of 8Kg. Find the extension produced if $Y=11\times10^{10}Nm^{-2}$
7. Explain the variation of velocity of sound with temperature. Velocity of sound in air at 30˚C is 348m/s. Find the velocity at 60˚C.

(6 x 5 = 30)

Part C

Module I

III. (a). Define displacement, velocity and acceleration 3

(b). Write the equation of motion for a body moving with uniform acceleration. Deduce equations of motion for a body projected vertically upwards. 6

(c). A stone is dropped from the top of a tower 49m high at the same time another stone is thrown upwards with velocity 25m/s. When and where will they meet? 6

OR

IV. (a). Define impulse of a force and show that it is equal to change in momentum. 3

(b). Prove the law of conservation of momentum from Newton's law of motion. 6

(c). Explain recoil velocity of a gun? A bullet of mass 25g is fired from a gun of mass 5kg with a speed 500m/s. Calculate the recoil velocity of the gun. 6

Module II

V. (a). Derive the expression for the magnitude and direction of resultant of two forces using parallelogram law of forces. 6

(b). Two unequal forces acting at an angle 150˚ have their resultant perpendicular to the smaller force. The larger force is 30N. Find the smaller force and the resultant. 6

(c). State and explain Lami's theorem. 3

OR

VI. (a). Define moment of force about a point. Write the conditions for equilibrium of a body under coplanar parallel forces. 3

(b). At marks 20cm, 40cm and 80cm of a uniform meter scale of mass 0.5kg weights 1kg, 2kg and 3kg respectively are suspended . Where should the scale be suspended so that it remain horizontal. 6

(c). Derive an expression for work done by a couple and hence deduce the equation for power. 6

Module III

VII. (a). Explain the principle of continuity for steady and uniform flow of an incompressible fluid. The radius of a water pipe decreases from 2.5cm to 1.5cm. If the velocity at the wider region is 2.5m/s, calculate the velocity at the narrow region. 6

(b). State Bernoulli's principle and explain the working of atomizer. 6

(c). Discuss the working principle of aerofoil. 3

OR

VIII. (a). Define coefficient of viscosity describe a method for finding the velocity of liquid using Poiseuilli's method. 6

(b). Discuss the variation of viscosity with temperature. 3

(c). Calculate the viscous force acting on a water drop of radius 0.1mm falling through air of viscosity $1.8\times10^{-5}kgm^{-1}s^{-1}$ with a constant velocity 0.15cm/s. 6

Module IV

IX. (a). Derive the relation between frequency, wavelength and velocity of a wave. Calculate the wavelength of ultrasonic waves of frequency 60 kHz. Velocity of sound is 340m/s. 6

(b). What are ultrasonic waves? Describe a method to produce ultrasonic waves. 6

(c). Give any three applications of ultrasonic waves. 3

OR

X. (a). Discuss the resonance column experiment to determine the velocity of sound in air. 6

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

(c). What is end correction a applied to vibration of air column contained in pipes. 3