TED (15) – 1003

(REVISION — 2015)

Reg. No.....

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# DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

## ENGINEERING PHYSICS –1

[*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. Distinguish between speed and velocity.
2. State Lama's theorem.
3. Distinguish between streamline flow and turbulent flow.
4. Mention any two characteristics of stationary waves.
5. State Newton's first law of motion. (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 third law of motion. Deduce the law of conservation of momentum Using Newton's law of motion.
2. (a) What are the advantages of SI over all other unit system.
   (b) Write the equations of motion of a body moving under gravity.
3. Define the term couple and moment of a couple. Derive the formula for the work done by a couple.
4. Explain the term equation of continuity. A conical pipe has diameters 10cm and 6cm at the ends. If 6.28 litre of water flows through the pipe in one second, find out the velocities of flow at the two ends.
5. Discuss the resonance column experiment to determine the velocity of sound in air.
6. Define modulus of elasticity. Explain various modulii of elasticity. Write their expression and unit.
7. The resultant of two unequal forces acting at 150° is perpendicular to the smaller force. If the larger force is 3N, find the smaller force and resultant. (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 second law of motion and deduce the expression for force. 3

(b) A uniformly accelerated body travels 40m in $4^{th}$ second and 60m in $6^{th}$ second. Find out initial velocity and acceleration. 6

(c) A body projected vertically up with a velocity 'u'. Show that the time of ascent is equal to time of descent. 6

OR

IV (a) Derive the equation for displacement of a body during the $n^{th}$ second of its motion. A body thrown vertically down from a height 40m during the $4^{th}$ second of its motion. Determine its initial speed. 6

(b) Define impulse of force and shown that it is equal to the change in momentum. 3

(c) An engine pumps 100kg of water through a height 10m in 5 second. If the efficiency of the engine is 60%, what is the power of the engine ? 6

### UNIT — II

V (a) State parallelogram law of vector addition. Derive the expression for magnitude and direction of resultant of two vectors using parallelogram law. 6

(b) A force 4N acts along the X-direction another force 5N makes an angle 60° with the first force . Find the magnitude and direction of the resultant. 6

(c) Define parallel forces. State the condition of equilibrium of a body under the action of coplanar parallel forces. 3

OR

VI (a) Explain resolution in two rectangular components. 3

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

(c) A uniform metered scale as width 2.5cm and thickness 4mm. The scale is balanced at 60cm mark when a weight 50 gm is suspended at the 75cm mark. Calculate the density of the material of the scale. 6

Marks

UNIT — III

VII (a) Explain the working principle of Atomiser. 3

(b) A 10kg weight is attached to one end of a copper wire suspended from the Ceiling. The length of the wire is 4m and diameter is 2mm. If Y is $1.25\times10^{11}$ $N/m^2$, Evaluate the extension produced. 6

(c) Define terminal velocity. Using stokes law obtain an expression for the terminal velocity of a sphere falling through a viscous liquid. 6

OR

VIII (a) State Hook's law. Explain the term elastic fatigue. 3

(b) State Bernoulli's theorem and hence explain different type of energy associated with fluid flow. Write their equations. 6

(c) Find the terminal velocity of a rain drop of radius 0.3mm coefficient viscosity of air is $1.83 \times 10^{-5}$ SI unit. Density of air is 1.3kg/$m^3$. Density of water is 1000kg/$m^3$. 6

UNIT — IV

IX (a) Give few applications of ultrasonic waves. 3

(b) Derive the first, second and third modes of vibration of air in closed pipe, justify it with diagram. 6

(c) Velocity of sound in air at 30° C is 348m/s. Find the velocity at 60°C. 6

OR

X (a) Distinguish between free vibration and forced vibration, hence define resonance. 6

(b) Explain the characteristic of simple harmonic motion. 3

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