

TED (15) - 1003

(REVISION - 2015)

Reg. No.	
Signature	

## DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 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. Write the SI units of electric current and temperature.
  - 2. What are collinear vectors?
  - Define triangle law of vector addition.
  - 4. State Hooke's law for elastic materials.
  - Give two applications of ultrasonic waves.

 $(5 \times 2 = 10)$ 

## PART — B

(Maximum marks: 30)

- II Answer any five of the following questions. Each question carries 6 marks.
  - 1. State and prove the law of conservation of linear momentum in the case of elastic collision in one dimension.
  - 2. What are the rectangular components of a vector reacting at an angle  $\theta$  with the X axis? If one of the rectangular components of a force 40 N is 20 N, find the other component.
  - 3. A mass 5 kg is initially at rest. A force 20 N is applied on it. What is the kinetic energy at the end of 10 s?
  - 4. Two iron wires of the same radius have lengths in the ratio 1:3. They are subjected to forces in the ratio 2:1. Find the ratio of their elongations.
  - State Bernoulli's principle. Explain the lift of an air craft using Bernoulli's principle.
  - 6. Explain various modes of vibration in an open pipe.
  - Show that the projection of a uniform circular motion along a diameter is simple harmonic.

 $(5 \times 6 = 30)$ 



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		PART — C	
		(Maximum marks : 60)	
		(Answer one full question from each unit. Each full question carries 15 marks.)	
		Unit — I	
Ш	(a)	Give the dimensions of velocity and acceleration. A ball is thrown vertically up. What is the velocity and acceleration at the top?	3
	(b)	Obtain an expression for the distance travelled by a particle during the n <sup>th</sup> second of its motion.	6
	(c)	A body is thrown vertically up from the top of a cliff with a velocity 98 m/s. It reaches the bottom of the cliff after 22 s. Find the height of the cliff.	6
		OR	
IV	(a)	Show that impulse is equal to change in momentum.	3
	(b)	State Newton's second law of motion. From the law obtain an expression for force.	6
	(c)	A boy weighing 40 kg jumps upto a height 0.7m. Find his power if he can jump 20 times a minute.	6
		Unit — II	
v	(a)	Define moment of a force. What is its unit?	3
	, ,	Obtain an expression for the work done by a rotating couple.	6
		A couple 100 Nm acts on the shaft of a motor and rotates it at a speed 7 rev/s. Calculate the power developed.	6
		OR	
VI	(a)	State and explain Lami's theorem.	3
		What are coplanar forces? Describe the condition for translational and rotational equilibrium of a body under coplanar parallel forces.	6
	(c)	At the marks 30 cm, 45 cm and 86 cm of a meter scale of mass 0.5 kg, weights 1 kg, 2 kg and 3kg respectively are suspended. Where the scale should be suspended so that it remains horizontal?	6
		Unit — III	
VII	(a)	What are the energies associated with a streamline flow?	3
	<b>(b)</b>	Define the term viscosity. On what factors does the viscous force acting tangentially on a layer depend? Discuss the variation of viscosity of liquids with temperature.	6
	(c)	Calculate the viscous force on a water drop of radius 0.1mm falling through air of coefficient of viscosity $1.8 \times 10^{-5}$ kg/m/s with constant velocity 0.15 m/s.	$\epsilon$



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(a)	Define stress and strain. Give their units.	3
(b)	What is terminal velocity? Using Stoke's formula, obtain an expression for the terminal velocity of a sphere falling through a viscous liquid.	6
(c)	Calculate the pressure required to maintain the flow of a liquid at the rate of 10 litre/s through a horizontal tube 10cm in diameter and 1km in length. Coefficient of viscosity of liquid = $0.001 \text{ SI}$ unit. (1 litre = $10^{-3}\text{m}^3$ )	6
	Unit — IV	
(a)	What is simple harmonic motion? Give two examples of simple harmonic motion.	3
(b)	Discuss the resonance column experiment to determine the velocity of sound in air.	6
(c)	Velocity of sound in air at 0°C is 330 m/s. Find the increase in velocity when the temperature is 1°C.	6
	OR	
(a)	Describe briefly a method for the production of ultrasonic waves.	3
(b)	Distinguish between free vibration and forced vibration. What is resonance? When does it happen?	6
(c)	The shortest length of an air column contained in a pipe closed at one end and resonating with a tuning fork 384 Hz is 22.1 cm. Calculate the velocity	
	(b) (c) (a) (b) (c) (a) (b)	<ul> <li>(b) What is terminal velocity? Using Stoke's formula, obtain an expression for the terminal velocity of a sphere falling through a viscous liquid.</li> <li>(c) Calculate the pressure required to maintain the flow of a liquid at the rate of 10 litre/s through a horizontal tube 10cm in diameter and 1km in length. Coefficient of viscosity of liquid = 0.001 S1 unit. (1 litre = 10<sup>-3</sup>m<sup>3</sup>)  UNIT — IV </li> <li>(a) What is simple harmonic motion? Give two examples of simple harmonic motion.</li> <li>(b) Discuss the resonance column experiment to determine the velocity of sound in air.</li> <li>(c) Velocity of sound in air at 0°C is 330 m/s. Find the increase in velocity when the temperature is 1°C.  OR </li> <li>(a) Describe briefly a method for the production of ultrasonic waves.</li> <li>(b) Distinguish between free vibration and forced vibration. What is resonance? When does it happen?</li> <li>(c) The shortest length of an air column contained in a pipe closed at one end</li> </ul>