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(REVISION — 2015)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2019

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. Write down the SI unit of coefficient of viscosity.
2. Is the magnitude of displacement always greater than the distance travelled, explain.
3. Define Resultant and Equilibrant of vectors.
4. State Bernoulli's principle and give one application.
5. Explain the phenomenon of resonance. (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Derive an equation for the distance travelled by a particle during the nth second of its motion, when the body is moving with uniform acceleration.
2. The maximum value of resultant of two forces P&Q is 42 N and minimum value of resultant is 10 N. Find the forces.
3. Describe an experiment to find the Young's modulus of wire.
4. Show that an open pipe produce all harmonic. Illustrate yours answer with diagrams.
5. State Bernoulli's theorem and hence explain different types of energy associated with fluid flow. Write their equations.
6. At marks 30 cm, 40 cm and 75 cm of a uniform meter scale of mass 0.5 kg, masses 1 kg, 2 kg and 2.5 kg are suspended respectively. Where should the scale be suspended so that it remains horizontal ?
7. Show that the projection of uniform circular motion along a diameter is simple harmonic. (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) Define the terms speed, velocity and acceleration. 3

(b) State the law of motion that helps to measure force. Define force and explain how force is measured. 6

(c) A body travels 30m in 5th second and 80m in 7th second of its motion. Find the distance travelled in the 9th second of its motion. 6

OR

IV (a) Define the terms force, momentum and impulse. 3

(b) Illustrate Newton's third law with an example. Explain the principle of recoil of gun and derive an expression for recoil velocity. 6

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

UNIT — II

V (a) Define resultant of vectors. Explain triangle method of vector addition. 3

(b) State law of parallelogram of forces. Find out the magnitude and direction of two forces P&Q acting at an angle θ. Discuss the cases for θ=0°, 90°&180°. 6

(c) What do you mean by couple ? Find the couple acting on the shaft of a electric motor when developing a power 9420 W at a speed 300 revolution per minute. 6

OR

VI (a) Define moment of force. State the conditions of equilibrium of a rigid body acted upon by a number of coplanar parallel forces. 3

(b) Derive an expression or work done by a couple and hence calculate the power. 6

(c) The bob of a simple pendulum is pulled aside by a horizontal force so that string makes an angle 30° with the horizontal. If mass of bob is 50 gm, find the horizontal force applied. 6

UNIT — III

VII (a) Write a note on the three types of strain. 3

(b) Give Poiseuille's formula. Describe Poiseuille's method to determine the coefficient of viscosity of water. 6

(c) 27 identical droplets of water come down through air with constant terminal velocity 3 cm/s. Find the terminal velocity when they combine to form a single drop. 6

OR

Marks

VIII (a) Write a note on two types of fluid flow. 3

(b) Give Stoke's formula. Describe Stokes method to determine the coefficient of viscosity of highly viscous liquid. 6

(c) A cable is replaced by another of same length and material but twice the diameter. Analyze how it effects the elongation under a given load. 6

UNIT — IV

IX (a) Write down the characteristics of a particle executing SHM. 3

(b) Derive an expression for the fundamental frequency and third harmonic in closed pipe of length 'L'. 6

(c) In resonance column experiment first and second resonance length were 17.6 cm and 53.2cm when executed by a tuning fork of frequency 484Hz. If the lab temp is 25°C, calculate the velocity of sound in air. 6

OR

X (a) Write a note on nodes and antinodes produced in a stationary wave. 3

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

(c) Velocity of sound at 30°C is 358 m/s. Find the velocity at 60°C. 6