

21140



I SEMESTER B.Sc. EXAMINATION – MARCH/APRIL 2022

SCHEME: CBCS (NEP)

PHYSICS, PAPER - I

MECHANICS AND PROPERTIES OF MATTER

Time: 2 ½ Hours

Max. Marks: 60

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Instruction: Answer all questions from Part A, any three from Part B and any four from Part C.

PART-A

I

4x10=40

1. (a) Obtain an expression for Time dilation. 5
(b) State and explain the principle of conservation of linear momentum. 5

OR

- (a) Arrive at an expression for Relativistic addition of velocities. 6
(b) Write a note on motion of rockets. 4

2. (a) Obtain an expression for moment of inertia of a solid cylinder about an axis perpendicular to its length and passing through its centre. 5
(b) Give the theory of Compound pendulum. 5

OR

- (a) State and explain Newton's law of Gravitation. 3
(b) Obtain a relation between the angular momentum and torque. 4
(c) State Kepler's law of planetary motion. 3

3. (a) Obtain the relations among the three elastic constants q , k and σ . 7
(b) Explain the stress - strain diagram. 3

OR

- (a) How would you determine the value of q , n and σ by Searle's method. 7
(b) What is Poisson's ratio? Mention its limiting values. 3

4. (a) Obtain an expression for differences of pressure across a curved surface. 6
(b) Explain the following terms: (i) Angle of contact (ii) Surface energy. 4

OR

- (a) Explain equation of continuity. 3
(b) Explain the method to determine the co-efficient of viscosity by Poissulle's method. 7

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**PART- B**

- II Answer any THREE questions. 3x4=12**
5. A rocket was found to be of length 100 m when measured on the earth. It then leaves and move at a constant velocity of 2×10^8 m/s. What will be its length? 4
6. A flat circular disc of mass 0.05 kg and diameter 0.02 m rolls on its edge on a smooth horizontal surface with a velocity of 0.05 m/s. Calculate its total kinetic energy. 4
7. Calculate the work done in twisting a steel wire of radius 10^{-3} m and length 0.25 m through an angle of 45° . Given $n=8 \times 10^{10}$ N/m². 4
8. Calculate the excess of pressure between the inside and outside of a soap bubble of radius 1 cm. Surface tension of soap solution in 3.2×10^{-2} N/m. 4

PART-C

- III Answer any FOUR questions. 4x2=8**
9. (a) Write the dimensional formula for work and force. 2
- (b) State the postulates of special theory of relativity. 2
- (c) State Newton's second law of motion. 2
- (d) State Hooke's law. 2
- (e) Define surface tension and mention its unit. 2
- (f) What is stream line and turbulent flow? 2

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