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First Year (B.Sc. (Gen))
NP 23-PHY-124(MN): Fundamentals of Physics
(Semester I)

Program: B.Sc. Code (Gen03)
Program Specific: General B.Sc.
Course Type: Minor
Paper: 1

Credits: 2
Time: 2 Hours
Max. Marks: 30
SET: A

Instructions to the candidate:

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Draw a well labeled diagram wherever necessary.
- 4) Use of calculator is allowed.

SECTION: A

Q1) Answer the following

[5 X 1= 5]

1. Write relation between micrometer and meter.
2. What is the C.G.S unit of force?
3. Define stress.
4. State Newton's third law.
5. What is streamline flow?

SECTION: B

Q2) Answer the following (Attempt any 5/7)

[5 X 2 =10]

1. Write any four fundamental units and their symbols.
2. What is elastic and inelastic collision?
3. Calculate the work done by motion of a particle along a vector $\vec{r} = (3\vec{i} - \vec{j} + 6\vec{k})$ meter if the applied force is $\vec{F} = (\vec{i} - 3\vec{j} + 2\vec{k})$ newton.
4. State Hooke's law. Hence define Modulus of elasticity.
5. Explain the concept of viscosity.
6. What is the pressure on swimmer 11m below the surface of lake? (Given: $\rho = 1.013 \times 10^5 \text{ N/m}^2$)
7. Define angle of contact. When it is acute and obtuse?

SECTION: C

Q3) Answer the following/Write short notes on following (Attempt any 2/4)

[2 X 5 = 10]

1. State and explain Faraday's laws of electromagnetic induction.
2. State Bernoulli's principle and derive its equation.
3. The initial velocity of a body is 20m/sec, evaluate its velocity after 2.5 sec if it accelerates uniformly at 4.5 m/sec^2 .
4. One end of wire is 2m long and 0.2 cm^2 in cross-section is fixed to ceiling and a load of 4.8 kg is attached to free end. Find the extension of wire. Young's modulus for steel is $2 \times 10^{11} \text{ N/m}^2$. Take $g=10 \text{ m/s}^2$

SECTION: D

Q4) Answer the following (Attempt any 1/2)

[5 X 1 = 5]

1. The surface tension of water is 0.072 N/m. Find the vertical force required to detach floating pin of length 2cm from the surface of water.
2. State Coulomb's law. Calculate the force between two charges $12\mu\text{C}$ and 8 cm apart.
