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**FIRST YEAR (B.Sc. Blended)**  
**24BLPH11101: Introductory Classical Physics**  
**(Semester I)**

**Program: B.Sc. Blended**  
**Program Specific: BSc. Blended (Chemistry)**  
**Course Type: DSC**  
**Paper: III**

**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 neat, labeled diagram wherever necessary.

**Q1) Attempt ANY FIVE of the following:**

**[5 X 2 = 10]**

- a) A coolie lifts a load of 30 kg and puts it on his head which is 200 cm above the surface of platform. Calculate the work done.
- b) State work-energy theorem.
- c) 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.
- d) State zeroth law of thermodynamics.
- e) Explain reversible change using an appropriate example.
- f) What are conservative and non-conservative forces?
- g) Define angle of contact. When it is acute and obtuse?
- h) State Newton's third law with example.

**Q2) Attempt ANY FOUR of the following:**

**[4 X 3 = 12]**

- a) 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<sup>2</sup>.
- b) The position of a car on a straight road with time is given by the following function of time  $x(t) = 10 + 25t + 5t^2$ , where  $x$  is in metres and time in seconds. Calculate the instantaneous velocities at time  $t = 1$  sec.
- c) Calculate the work done during an isothermal expansion of 4 moles of an ideal gas from a volume of 4 litres to 16 litres at 0°C. ( $R = 8.3$  J/mole/K)

- d) 1.2 litres of hydrogen at  $137^{\circ}\text{C}$  and  $10^6$  dyne/cm<sup>2</sup> pressure expands isothermally, until its volume is doubled. Find the pressure of the gas.
- e) State and explain Bernoulli's theorem.
- f) What is the pressure on swimmer 11m below the surface of lake? (Given:  $P_a = 1.013 \times 10^5$  N/m<sup>2</sup>)

**Q3) Attempt ANY TWO of the following:**

**[2 X 4 = 08]**

- a) One end of wire is 2m long and  $0.2\text{ cm}^2$  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  $2 \times 10^{11}$  N/m<sup>2</sup>. Take  $g=10\text{ m/s}^2$
- b) 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.
- c) Explain buoyancy. State Archimedes principle and Pascal's law.
- d) Distinguish between steady and turbulent flow. Obtain equation of Continuity.

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