BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
SENIOR SECONDARY CO-ED DAY CUM BOYS' RESIDENTIAL SCHOOL

POST MID TERM EXAMINATION -2024-25

PHYSICS (042)

Class : XI
Date : 08/01/2025

Duration: 1 Hr
Max. Marks: 25

Instructions:

i. There are three sections A, B, and C with 13 questions in total, Section A has 3 Multiple Choice Questions and 2 Assertion Reasoning based Question of one mark each, Section B has 4 questions of two marks each and Section C has 4 questions of three marks each.
ii. All questions are compulsory.
iii. Calculators are not allowed.

Section A

1. For which of the following liquids, the liquid meniscus in the glass capillary tube is, convex?
   (a) Water (b) Mercury (c) Both (a) & (b) (d) None of these
2. The pressure at the bottom of a tank containing a liquid does not depend on,
   (a) Acceleration due to gravity (b) height of the liquid column
   (c) Area of the bottom surface (d) nature of the liquid
3. The value of absolute zero is:
   (a) 273.15^0C (b) -273.15^0C (c) 100^0C (d) 180.15^0C

For Questions 4 and 5, two statements are given –one labelled Assertion (A) and other labelled Reason (R). Select the correct answer to these questions from the options as given below.
(a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason are false.

4. Assertion: The specific heat capacity of a given solid can be determined by using the principle of calorimetry.
   Reason: Heat gained is equal to the heat lost.
5. Assertion: Stress is the internal force per unit area of a body.
   Reason: Rubber is more elastic than steel.

Section B

6. Define turbulent flow. Write one example of this flow. 2
7. The two thigh bones (femurs), each of cross-sectional area 10 cm^2 support the upper part of a human body of mass 40 kg. Estimate the average pressure sustained by the femurs. 2
8. Write the method of measuring atmospheric pressure. 2
9. Define molar specific heat capacity. Write its types and also write the relation between different types of specific heat capacities. 2

Section C

10. A fully loaded Boeing aircraft has a mass of 3.3×10^5 kg. Its total wing area is 500 m^2. It is in level flight with a speed of 960 km/h.
    (a) Estimate the pressure difference between the lower and upper surfaces of the wings. 1
    (b) Estimate the fractional increase in the speed of the air on the upper surface of the wing relative to the lower surface. [The density of air is $\rho = 1.2$ kg m^{-3}] 2
11. State and prove Bernoulli's principle. Write its two applications in daily life. 3
12. State and explain the term 'Surface Tension' in fluids. Write its mathematical formula, S.I unit and dimensional formula. 3
13. A copper block of mass 2.5 kg is heated in a furnace to a temperature of 500 °C and then placed on a large ice block. What is the maximum amount of ice that can melt? (Specific heat of copper = 0.39 J g^{-1} K^{-1}; heat of fusion of water = 335 J g^{-1}). 3

----------All the Best----------