B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

POST MID-TERM EXAMINATION

PHYSICS (042)

Class: XI **Time: 1hr**
Date: 09.01.26 **Max Marks: 25**
Admission no: **Roll no:**

General Instructions:

(i) *There are three sections A, B, and C with 13 questions in total, Section A has 5 Multiple Choice Questions 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. The transfer of heat between two adjacent parts of body due to their temperature difference is called as:
   (a) Radiation (b) Convection (c) Conduction (d) None
2. When steam is converted into water, internal energy of the system:
   (a) increases (b) decreases (c) remains constant (d) becomes zero
3. The efficiency of a Carnot engine working between 227°C and 27°C is:
   (a) 100% (b) 50% (c) 20% (d) 40%
4. Quantitatively heat conduction can be described as?
   (a) Heat flow for a given temperature difference
   (b) Time rate of heat flow for a given temperature difference
   (c) Temperature difference caused due to heat flow per unit time
   (d) Temperature difference per unit quantity of heat transferred

   Directions: Question 5 contain two statements, Assertion and Reason, has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.
   (a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
   (b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
   (c) Assertion is correct, reason is incorrect
   (d) Assertion is incorrect, reason is correct.

5. **Assertion:** Specific heat of a body is always greater than its thermal capacity.
Reason: Thermal capacity is the required for raising temperature of unit mass of the body through unit degree.

Section-B

6. Derive an expression of work done in an isothermal process. 2
7. A thermometer has the wrong calibration. It reads the melting point of ice as -10℃. It reads 60℃ in the place of 50℃. What is the temperature of the boiling point of water on the scale? 2
8. Differentiate between isothermal and adiabatic processes. 2
9. State and explain the first law of thermodynamics. 2

Section-C

10. What are the modes of heat transfer? Explain each mode with the help of a suitable example. 3
11. Derive the relation between heat current and temperature gradient in a conducting rod. 3
12. Derive the relation between Cp and Cv for an ideal gas. 3
13. A Carnot engine absorbs 600 J of heat from the source at 500 K and rejects heat to a sink at 300 K. Find (a) efficiency, (b) work done and (c) heat rejected. 3

---ALL THE BEST---