CLASS XI
SAMPLE PAPER
PHYSICS

11.2 TEMPERATURE AND HEAT

1 Write definitions of temperature and heat. 1

2 What is SI unit of Temperature and heat? 1

11.3 MEASUREMENT OF TEMPERATURE

3 Name the liquid which are used in commonly used the liquid-in-glass type thermometer. 1

4 Why thermometers are calibrated? 2

5 Define freezing and boiling point. 2

6 Match the following 2

Coloumn A	Coloumn B
(i) The ice and steam point have values	(a) the Fahrenheit temperature scale and the Celsius temperature scale.
(ii) Fahrenheit scale	(b) The ice and steam point have values 32 °F and 212 °F respectively
(iii) Celsius scale	(c) there are 180 equal intervals
(iv) Standard temp.	(d) there are 100.
(v) The two familiar temperature scales are	(e) 0 K

7 Plot the Fahrenheit temperature (tF) versus Celsius temperature (tc). 2

8 Write the relationship between Fahrenheit temperature (tF) versus Celsius temperature (tc). 2
Find the temperature of 149oF on kelvin scale.

11.4 IDEAL-GAS EQUATION AND ABSOLUTE TEMPERATURE

1 State and explain Boyle's law. 2

2 State and explain Charles' law. 2

3	State and explain ideal gas law. known as ideal gas law.	2
4	Explain ideal-gas equation.	3
5	Which relationship allows a gas to be used to measure temperature in a constant volume gas thermometer?	1
6	The size of the unit..... temperature on these scales are related by.....	1

11.5 THERMAL EXPANSION

1	A circular hole of diameter 2.00 cm is made in an aluminium plate at $0\ ^0$ C .what will be the diameter at 100^0 C? Linear expansion for aluminium = $2.3 * 10^{-3} / {}^0$ C	2
2	The pressure of the gas in constant volume gas thermometer are 80 cm,90cm and 100cm of mercury at the ice point,the steam point and in a heated wax bath resp.Find the temperature of the wax bath.	2
3	A rod of length L having coefficent of Linear expansion a is lying freely on the floor.it is heated so that temperature changes by b .Find the longitidunal strain developed in the rod a. 0 b. ab c. -ab d. none of the above	1
4	which is of them is not used as the measurable properties in thermometer? a.Resistance of platinum wire b.Constant volume of gas c.Contant pressure of gas d.None of the above	1
5	A metallic sphere has a cavity of diameter D at its center.If the sphere is heated,the diameter of the . cavity will a. Decrease b. Increase c. Remain unchanged d. none of the above	1
6	Define thermal expansion. Find the expression for linear, Area and Volume expansion.	5
7	Derive the relationship between (i) β and α (ii) α and γ.	3

8	Show that the coefficient of area expansions, $(\Delta A/A)/\Delta T$, of a rectangular sheet of the solid is twice its linear expansivity, αl .	3
9	A blacksmith fixes iron ring on the rim of the wooden wheel of a bullock cart. The diameter of the rim and the iron ring are 5.243 m and 5.231 m respectively at 27 °C. To what temperature should the ring be heated so as to fit the rim of the wheel?	3

11.6 SPECIFIC HEAT CAPACITY

1	State and explain heat capacity.	3
2	Explain specific heat capacity.	3
3	Explain molar specific heat capacity and its types.	3
4	Why the water warms up much more slowly than the land during summer?	1
5	Why in desert areas, the earth surface warms up quickly during the day and cools quickly at night?	1

11.7 CALORIMETRY

1	Explain principle of calorimetry .explain the device which is based on this principle.	3
2	A sphere of aluminium of 0.047 kg placed for sufficient time in a vessel containing boiling water, so that the sphere is at 100 ° C. It is then immediately transfered to 0.14 kg copper calorimeter containing 0.25 kg of water at 20 ° C. The temperature of water rises and attains a steady state at 23 ° C. Calculate the specific heat capacity of aluminium.	3

11.8 CHANGE OF STATE

1	Define change of state. .	1
2	Explain (i) melting ,melting point and normal melting point (ii) Regelation (iii) vaporisation , boiling point and normal BP.	3

11.8.1 Latent Heat

1	Define latent heat and explain its types. .	3
2	When 0.15 kg of ice of 0 °C mixed with 0.30 kg of water at 50 °C in a container, the resulting temperature is 6.7 °C. Calculate the heat of fusion of ice. (swater = 4186 J kg–1 K–1)	2
3	Calculate the heat required to convert 3 kg of ice at –12 °C kept in a calorimeter to steam at 100 °C at atmospheric pressure. Given specific heat	3

capacity of ice = 2100 J kg–1 K–1, specific heat capacity of water = 4186 J kg– 1 K–1, latent heat of fusion of ice = 3.35 × 105 J kg–1 and latent heat of steam = 2.256 ×106 J kg–1.

11.9 HEAT TRANSFER

1 heat is energy..... from one system to another or from one part of a system to another part, arising due to..... 1

2 What are the different ways by which this energy transfer takes place? Explain with suitable examples. 5

3 Derive an expression for thermal conductivity of the material. 3

4 What is the temperature of the steel-copper junction in the steady state of the system shown in Fig. 11.15. Length of the steel rod = 15.0 cm, length of the copper rod = 10.0 cm, temperature of the furnace = 300 °C, temperature of the other end = 0 °C. The area of cross section of the steel rod is twice that of the copper rod. (Thermal conductivity of steel = 50.2 J s–1 m–1K–1; and of copper = 385 J s–1m–1K–1). 3

5 An iron bar (L1 = 0.1 m, A1 = 0.02 m2, K1 = 79 W m–1 K–1) and a brass bar (L2 = 0.1 m, A2 = 0.02 m2, K2 = 109 W m–1K–1) are soldered end to end as shown in Fig. 11.16. The free ends of the iron bar and brass bar are maintained at 373 K and 273 K respectively. Obtain expressions for and hence compute (i) the temperature of the junction of the two bars, (ii) the equivalent thermal conductivity of the compound bar, and (iii) the heat current through the compound bar. 3

6 Match the following; 2

A	B
(i) Conduction and convection require	(a) is a mode of heat transfer by actual motion of matter.
(ii) Convection	(b) some material as a transport medium.
(iii) The air in contact with the warm ground is heated by	(c) the steady surface wind on the earth blowing in from north-east towards the equator, the so called trade wind.
(iv) natural convection is	(d) convection

SHANKAR PRASAD

P.G.T. PHYSICS

KV SECTOR-8 R K PURAM (FIRST SHIFT)

NEW DELHI-110022