

11th CHEMISTRY lesson 6 and 7 model question paper

CHEMISTRY

Marks : 70

(i) Choose and write the correct answer.

15X 1=15

- Use of hot air balloon in sports at meteorological observation is an application of
a) Boyle's law b) Newton's law c) kelvin's law d) Brown's law
- The temperature at which real gases obey the ideal gas laws over a wide range of pressure is called -----
a) critical temperature b) boyle temperature c) inversion temperature d) Reduced temperature
- Maximum deviation from ideal gas is expected from -----
a) CH₄(g) b) NH₃ (g) c) H₂ (g) d) N₂ (g)
- If temperature and volume of an ideal gas is increased to twice its values, the initial pressure P becomes -----
a) 4P b) 2P c) P d) 3P
- Compressibility factor for CO₂ at 400 K and 71.0 bar is 0.8697. The molar volume of CO₂ under these condition is -----
a) 22.04 dm³ b) 2.24 dm³ c) 0.41 dm³ d) 19.5 dm³
- 25 g of each of the following gases are taken at 27⁰ C & 600 m Hg pressure. Which of these will have the least volume?
a) HBr b) HCl c) HF d) HI
- What is the density of N₂ gas at 227⁰ C & 5 atm pressure? (R = 0.082 L atm K⁻¹ mol⁻¹)
a) 1.40 g/l b) 2.81 g/l c) 3.41 g/l d) 0.29 g/l
- In an adiabatic process, which of the following is true?
a) q = w b) q = 0 c) ΔE = q d) PΔV = 0
- In a reversible process, the change in entropy of the universe is -----
a) >0 b) ≥ 0 c) < 0 d = 0
- Heat of combustion is always
a) positive b) negative c) zero d) either positive (or) negative
- In an isothermal reversible compression of an ideal gas the sign of q, ΔS and W are respectively
a) +, -, - b) -, +, - c) +, -, + d) -, -, +
- Which of the following is not a thermodynamic function?
a) internal energy b) enthalpy c) entropy d) frictional energy
- Change in internal energy when 4 KJ of work is done on the system and 1 KJ of heat is given out by the system is -----
a) +1 KJ b) -5 KJ c) +3 KJ d) -3 KJ
- Molar heat of vapourisation of a liquid is 4.8 KJ mol⁻¹. If the entropy change is 16 J mol⁻¹ K⁻¹, the boiling point of the liquid is -----
a) 323 K b) 27⁰ C c) 164 K d) 0.3 K
- The bond dissociation energy of methane and ethane are 360 KJ mol⁻¹ and 620 KJ mol⁻¹ respectively then, the bond dissociation energy of c - c bond is -----
a) 170 KJ mol⁻¹ b) 50 KJ mol⁻¹ c) 80 KJ mol⁻¹ d) 220 KJ mol⁻¹

II. Answer the following questions (any 6) (Q.No : 21 is compulsory) :

6X2=12

- State Boyle's law.
- Explain : Aerated water bottles are kept under water during summer.
- Aerosol cans carry clear warning of heating of the can. Why?
- Define gibb's free energy.
- Give Kelvin statement of second law of thermodynamics
- Identify the state & path functions out of the following :
a) enthalpy b) entropy c) heat d) temperature
- State the third law of thermodynamics
- Can a vander waals gas with a = 0 be liquefied? Explain

III. Answer the following questions (any 6)(Q.No.28 is compulsory)

6X3=18

- Distinguish between diffusion and effusion.
- Would it be easier to drink water with a straw on the top of mount everest?
- Why do astronauts have to wear protective suits when they are on the surface of moon?
- Explain : the size of weather balloon becomes larger and larger as it ascends up into larger altitude.
- Predict the feasibility of a reaction when
i) both ΔH & ΔS positive ii) both ΔH & ΔS negative iii) ΔH decreases but ΔS increases
- Define calorific value of food. What is the unit of calorific value?
- List any three characteristics of Gibbs free energy.
- Define isothermal process and adiabatic process.

IV. Answer in detail (any 5)

5X5=25

- Derive the values of critical constants in terms of vander waals constants.
- A tank contains a mixture of 52.5 g of oxygen and 65.1 g of CO₂ at 300 K the total pressure in the tanks is 9.21 atm. Calculate the partial pressure (in atm) of each gas in the mixture.
- Write down the Born - Haber cycle for the formation of CaCl₂.
- Derive the relation between ΔH & ΔU for an ideal gas. Explain each term involved in the equation.
- State various statements of second law of thermodynamics.
- A sample of gas at 15⁰ C at 1 atm. Has a volume of 2.58 dm³. When the temperature is raised to 38⁰ C at 1 atm does the volume of the gas increase? If so, calculate the final volume.