

Version No.			
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ROLL NUMBER					



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Answer Sheet No. _____

Sign. of Candidate _____

Sign. of Invigilator _____

Section - A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

CHEMISTRY HSSC-I SECTION - A (Marks 17) Time allowed: 25 Minutes

حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ کاٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔ لیز پینسل کا استعمال ممنوع ہے۔

Fill the relevant bubble against each question:

ہر سوال کے سامنے دیے گئے درست دائرہ کو پر کریں۔

1. No. of atoms of oxygen present in 500g of $KClO_3$ is (M.Wt, K=39, Cl=35.5, O=16) 7.3×10^{24} 3.61×10^{24} 2.45×10^{24} 36.8×10^{23}
2. Magnesium reacts with Sulphur to produce MgS . How many grams of MgS can be made from 24g of Mg with excess of Sulphur by the reaction $Mg + S \rightarrow MgS$ (M.Wt, Mg=24, S=32) 35g 56g 58.3g 12g
3. Which of the following is NOT a state function? Pressure Volume Temperature Work
4. If frequency of Photon is $4 \times 10^{15} \text{ Hz}$, then its energy will be: ($h = 6.626 \times 10^{-34} \text{ Js}$) $26.5 \times 10^{-18} \text{ J}$ $26.5 \times 10^{-19} \text{ J}$ $26.5 \times 10^{19} \text{ J}$ $26.5 \times 10^{18} \text{ J}$
5. According to Moseley's law, when metals having large atomic number will be used as an anode then it will produce X-rays of: Longer wavelength Low wave number Shorter wavelength Low energy
6. Total No. of Sigma and Pi bonds in Ethyne $CH \equiv CH$ are: 2 Sigma and 3 Pi bonds 3 Sigma and 2 Pi bonds 5 Sigma and 3 Pi bonds 3 Sigma and 5 Pi bonds
7. Identify the species with maximum bond angle: CH_4 NH_3 H_2O H_2S
8. In lead storage battery electrolyte is: 30% HCl 30% HNO_3 30% H_2SO_4 30% HBr
9. According to Le-chatelier's Principle, in an exothermic reaction, what should be done to temperature of system to obtain maximum product at equilibrium? Kept Low Kept High Kept Same Temperature has no effect
10. According to Graham's law which one has highest rate of diffusion? (M. Wt, S=32, O=16, H=1) SO_2 SO_3 H_2S SCl_2

11. Electric current can pass through graphite in one direction but not through other direction of crystal, such a property is called: Allotropy Anisotropy Isotropy An isomorphism

12. Which one is conductor but not malleable? Iron Graphite Silver Copper

13. Which of the following Concentration Units does NOT depends on Temperature? Molarity Molality % $\frac{v}{v}$ % $\frac{m}{v}$

14. Which of the following will contain lowest vapor pressure at 50°C? CH₄ HF NH₃ H₂O

15. A solution of HCl having pH = 4 will be: 0.4M 4.0M 0.0001M 0.0004M

$K_c = 0.04$ at 723K for following reaction
 $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$
 16. K_p of the reaction will be: 0.04 2.37 0.64 0.40
 where ($R = 0.082 \text{ atm dm}^3 \text{ mol}^{-1} \text{ K}^{-1}$)

In a mixture containing 44g each of CO₂, SO₂, SO₃ and Cl₂ gases, which of the following will have highest partial pressure according to Dalton's Law? CO₂ SO₂ SO₃ Cl₂
 (where molar masses CO₂=44, SO₂=64, SO₃=80, Cl₂=71)

SUPPLEMENTARY TABLE

Atomic No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Symbol	H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca
Mass No	1	4	7	9	11	12	14	16	19	20	23	24	27	28	31	32	35.5	40	39	40

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ROLL NUMBER					



CHEMISTRY HSSC-I

26

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

NOTE: Answer any FOURTEEN parts from Section 'B' and attempts any TWO questions from Section 'C' on the separately provided answer book. Write your answers neatly and legibly.

SECTION - B (Marks 42)

Q. 2 Answer any FOURTEEN parts from the following. All parts carry equal marks. (14 x 3 = 42)

- (i) Why actual yield is always less than theoretical yield? Write three arguments.
- (ii) For $C + O_2 \longrightarrow CO_2$ $\Delta H = -393 kJ / mol$
 $H_2 + \frac{1}{2} O_2 \longrightarrow H_2O$ $\Delta H = -285.8 kJ / mol$
 $CH_3COOH + 2O_2 \longrightarrow 2CO_2 + 2H_2O$ $\Delta H = -875 kJ / mol$
- Deduce the value of standard enthalpy of formation of acetic acid.
- (iii) How X-rays are produced? Discuss according to Moseley's law.
- (iv) By using formula of radius derived by Bohr, how it can be proved that size of ${}^4_2He^{1+}$ is larger than that of ${}^6_3Li^{2+}$? $r = \frac{\epsilon_0 h^2 n^2}{z \pi m e^2}$
- (v) Write three defects of valence bond theory?
- (vi) Give two causes for deviation of gases from ideality.
- (vii) Write three differences between Sigma and Pi bond.
- (viii) What is meant by molar heat of fusion and molar heat of vaporization? Why ΔH_v is always greater than ΔH_f ?
- (ix) Boiling point increases continuously in hydrides of group IV from CH_4 to SnH_4 with the increase in atomic size of central atom. Which forces are responsible for this regular change and why?
- (x) Describe briefly Lattice energy in two ways with suitable example.
- (xi) Briefly explain with chemical equation, why:
 (i) NH_4Cl is acidic (ii) $NaCl$ is neutral (iii) CH_3COONa is basic
- (xii) Consider the following reaction $H_2 + Br_2 \rightleftharpoons 2HBr$ if concentrations of H_2 , Br_2 and HBr are 0.5M, 0.3M and 0.1M respectively at equilibrium then calculate value of K_c .
- (xiii) How relative lowering of vapour pressure helps to determine the molar mass of non-volatile and non-electrolyte solute in a dilute solution? Relationship of relative lowering of V.P is $\frac{\Delta P}{P^0} = X_2$
- (xiv) What is freezing point of a solution containing 30g of Sucrose $C_{12}H_{22}O_{11}$ dissolved in 50g of water? ($K_{f \text{ of water}} = 1.86$)
- (xv) Differentiate between ΔE and ΔH . Under what conditions ΔH and ΔE will be equal?
- (xvi) Briefly describe the construction and working of standard hydrogen electrode (SHE).
- (xvii) What is galvanizing? Why is it called sacrificial corrosion?
- (xviii) Write thermochemical equation for the following:
 (a) Standard enthalpy of formation of CH_3COCH_3 is $-248.1 kJ / mol$
 (b) Standard enthalpy of combustion of C_8H_{18} is $-5512 kJ / mol$
 (c) Standard enthalpy of atomization of Cl_2 is $+121 kJ / mol$
- (xix) What is bond energy? Why bond energy of HF is greater than that of H-I?
- (xx) Enlist two factors that affect London Dispersion Forces. Why London Dispersion Forces are stronger in Radon (Rn) than Helium (He) in noble gases?

SECTION - C (Marks 26)

Note: Attempt any TWO questions. All questions carry equal marks. (2 x 13 = 26)

- Q. 3 a. How catalyst increases the rate of reaction? Explain its action with suitable example along with the graph. Describe the types of Catalysis. (07)
 b. Derive Vander Wall's equation for real gases and also derive the units of 'a' and 'b'. (06)
- Q. 4 a. Balance the following redox equations with given methods: (06)
 (i) $P + HNO_3 + H_2O \longrightarrow H_3PO_4 + NO$ Oxidation number method
 (ii) $Cr_2O_7^{2-} + Cl^- \longrightarrow Cr^{+3} + Cl_2$ Ion electron method (in acidic media)
- b. Explain buffer, its types and composition and buffer action with one suitable example. (07)
- Q. 5 a. Explain the quantitative aspects of freezing point depression and prove that ΔT_f is inversely proportional to molar mass of solute. (07)
 b. (i) A small piece of Al metal having a volume of $2.50 cm^3$ is reacted with excess of HCl. What is the weight of H_2 liberated? The density of Al is $2.70 g cm^{-3}$. $2Al + 6HCl \longrightarrow 2AlCl_3 + 3H_2$ (06)
 (ii) In a particular experiment 0.3g of H_2 gas was obtained. Calculate percentage yield of this reaction.

SUPPLEMENTARY TABLE

Atomic No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Symbol	H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca
Mass No	1	4	7	9	11	12	14	16	19	20	23	24	27	28	31	32	35.5	40	39	40