



GRAND TEST 2020-2021

Time Duration: 40 Minutes

SECTION "A" (M.C.Qs)

Max. Marks: 43

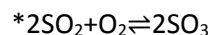
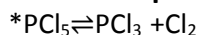
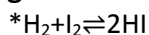
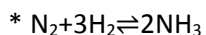
NOTE: This section consists of 43 part questions and all are to be answered each question carries one mark.

Q1. Choose the correct answers for each from the given options:

- Two substances have the same crystal structure are said to be:
* Allotropes * Isomorphus * Polymorphus * None of these
- The number of significant figures in 0.023 is
* 2 * 3 * 4 * 5
- The empirical formula of a compound is CH_2O and molecular mass is 60, so its molecular formula is:
* CH_2O * $\text{C}_2\text{H}_4\text{O}_2$ * $\text{C}_3\text{H}_6\text{O}_3$ * $\text{C}_4\text{H}_8\text{O}_4$
- The atmospheric pressure recorded in different places at the same time are given below:
Nathiagali Hunza Muree Gilgit
700 torr 650 torr 710 torr 600 torr
Water boils first in:
* Nathiagali * Hunza * Muree * Gilgit
- The number of orbitals in each energy level is given by the formula:
* $2n^2$ * $(2l+1)$ * $2(2l+1)$ * n^2
- The S.I unit of the dipole moment is:
* dyne/cm * poise * Debye * Coulomb-meter
- The bond found in fluorine molecule is due to this overlap of orbital:
* s – s * s – p * p – p * None of these
- This is not extensive property:
* Entropy * Viscosity * Enthalpy * Internal energy
- For the reaction $2\text{NH}_3 \rightleftharpoons \text{N}_2 + 3\text{H}_2$, the relationship between K_c and K_p is:
* $K_p = K_c$ * $K_p > K_c$ * $K_p < K_c$ * $K_p < K_c$
- The oxidation number of Sulphur in NaHSO_4 is:
* -2 * 0 * +4 * +6
- Unit of viscosity is:
* N/m^2 * dynes/cm * Poise * all of these
- One mission of α particles, ${}_{92}\text{U}^{238}$ changes into:
* ${}_{90}\text{Th}^{234}$ * ${}_{88}\text{Ra}^{226}$ * ${}_{84}\text{Po}^{210}$ * ${}_{91}\text{Pa}^{231}$
- The addition of a catalyst to a reaction changes:
* Internal energy * Activation energy * Threshold energy * Gibb's free energy
- The change in concentration of reacting substances in a unit time called:
* Rate of reaction * Rate constant * Rate law * Velocity constant
- Hess's law may be used to determine:
* ΔH * ΔS * ΔE * ΔV
- The symbol for an uranium atom is ${}_{92}\text{U}^{238}$. How many neutrons are present in this atom?
* 192 * 238 * 146 * 330
- Wave of visible radiation ranges from:
* 400nm to 500nm * 400nm to 600nm * 400nm to 700nm * 400nm to 800nm
- 'No two electrons in an atom can have all the four Quantum numbers identical' is the statement of:
* Pauli's exclusion principle * Hund's rule * Aufbau rule * (n+l) rule

19. The quantitative relationship between the substance according to balance equation describes.
 * Percentage compound * Limiting reactant * Stoichiometry * Reversible reaction
20. Capillary action of liquid is due to:
 * Viscosity * Surface tension * Density * Fluidity
21. On kelvin scale, absolute zero is equal to:
 * 273.16°C * 0°C * 20 K * -273.16°C
22. Glass is a/an:
 * Crystal solid * Amorphous solid * Covalent solid * Ionic solid
23. This one of the following colors has the shortest wavelength:
 * Red * Green * Violet * Orange
24. The following pair of ions is isoelectronic:
 * Na⁺ & Mg²⁺ * F & Cl * Li⁺ & Na⁺ * S²⁻ & O²⁻
25. If K_c is very small:
 * reverse reaction will occur * more products will be formed
 * forward reaction will occur * none of these
26. The strength for sigma bond is highest for:
 * s – s overlap * s – p overlap * p – p overlap * sp³– s overlap
27. In ethane (C₂H₄) molecules, there are:
 * Five sigma bonds and one pie bond * four sigma bonds and two pie bond
 * Five sigma bonds * None of these
28. Which of the compounds has sp² hybridization?
 * NH₃ * C₂H₂ * C₂H₄ * H₂O
29. Moseley found that wave length of x-rays emitted decreased regularly with increasing:
 * Atomic number * Atomic mass * Mass number * Atomic size
30. The color of universal indicator in neutral solution is:
 * Red * Green * Blue * Pink
31. According to n+l which sub energy level field first:
 * 3d * 5s * 4p * 4f
32. A closed system one which cannot transfer matter but transfer:
 * Heat * Radiations * Work * All of these.
33. The energy of each quantum of radiation is directly proportional to its:
 * Wavelength * Frequency * Wave number * Source of energy
34. A thermos is used to keep things either cold or hot , it is an example of:
 * Isolated system * open system * Closed system * reversible system
35. In which of the following is not an intensive property?
 * Pressure * Concentration * Density * Volume
36. Which one has high bond energy:
 * H–H * C–C * H–C * N ≡ N
37. A plot of volume versus the reciprocal of the pressure is
 * Hyperbola * Parabola * Straight line * Curvilinear
38. Phenolphthalein is a weak:
 * Acid * Base * Salt * Both a and b
39. When NH₄Cl is hydrolyzed, the solution will be:
 * Acidic * basic * neutral * amphoteric
40. For decomposition of H₂O₂ is used as negative catalyst.
 * MnO₂ * iron powder * glycerin * all of these
41. Real gases don't obey gas laws at:
 * Low temperature and high pressure * Low pressure and high temperature
 * Low pressure and low temperature * High temperature and high pressure
42. For an exothermic reaction, K_c with the rise of temperature
 * Remain constant * Increases * decreases * None of these

43. Which of the following has the same value of K_c and K_p:



Time: 1 Hour 20 Minutes

Marks:42

SECTION B

(SHORT-ANSWER QUESTION)

(25 Marks)

NOTE: Attempt any Five part questions from this section.

- Q2i) Acetic acid contain C, H and O. 4.24g of sample of acetic acid on combustion gave 6.12g of CO₂ and 2.54g of H₂O. The molecular mass of acetic acid is 60. Find out its molecular formula.
- ii) Define following.
* Molar volume * latent heat of fusion * Enthalpy * Velocity of reaction
- (iii) State and explain Graham's law of diffusion and explain in terms of kinetic molecular theory.
- (iv) Predict the effect of increase in temperature and pressure on the following system at equilibrium state (Only predict the direction)
* $N_2 + 3H_2 \rightleftharpoons 2NH_3 + \text{heat}$ * $N_2 + O_2 + \text{heat} \rightleftharpoons 2NO$
- (v) Define heat of formation. Calculate the heat formation of Propane from following data:
* $3C + 4H_2 \longrightarrow C_3H_8$ $\Delta H_f = ?$
* $C + O_2 \longrightarrow CO_2$ $\Delta H = -394 \text{ KJ/mole}$
* $H_2 + \frac{1}{2} O_2 \longrightarrow H_2O$ $\Delta H = -286 \text{ KJ/mole}$
* $C_3H_4 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$ $\Delta H = -2200 \text{ KJ/mole}$
- (vi) What is hydrogen bonding? Explain how does it affect the physical properties of compounds?
- (vii) Differentiate between the following (any two):
* Sigma and Pi bond * Hydration and Hydrolysis * Extensive and Intensive property
- (viii) 1.40dm³ Volume of gas measured at temperature 27^oC and pressure 900 torr was found to have mass 2.273gm. Calculate molecular mass of the gas.
- (ix) State Hund's rule. Write down the electronic configuration for ground state of each of following:
* Co = 27 * Br⁻ = 35 * Al⁺³ = 13 * Cu = 24
- (x) Explain the effects on surface area and temperature on rate of reaction.

SECTION C

(DETAILED ANSWER QUESTIONS)

(17 Marks)

NOTE: Attempt any One question from this section.

- Q3a) Write the Postulates of Bohr's Atomic Theory. Derive an expression for the radius of nth orbit of hydrogen atom using Bohr's Theory. (9)
- b) State Boyle's, Charles's and Avogadro's law and derive an expression for the equation of state. Calculate the value of Gas constant in two different units. (8)
- Q4a) State and explain the Law of Mass action. Derive the expression of K_c for general reversible reaction. In a reaction (A + B \rightleftharpoons 2C) when equilibrium was attained the concentration was [A]=[B]= 4 M and concentration of [C]= 6M. Calculate the equilibrium constant (K_c) and the initial concentration of A and B. (9)
- b) Write the postulates of electron pair repulsion theory. Explain the shape of H₂O and BF₃ on the basis of electron pair repulsion theory. (8)
- Q5a) Define oxidation and reduction. Balance the following equation by ion electron method. (9)
 $(MnO_4)^- + (SO_3)^{2-} + OH \rightarrow Mn^{2+} + (SO_4)^{2-}$ (Basic medium)
 $Cr_2O_7^{2-} + Fe^{+2} \rightarrow Fe^{+3} + Cr^{+3}$ (Acidic medium)
- b) State and explain First Law of thermodynamics. Prove that (8)
* $W = P\Delta V$ * $q_v = \Delta E$ * $q_p = \Delta H$