

1st Year Chemistry Guess Paper 2026 Ruff.Pk

TOP 135 MULTIPLE CHOICE QUESTIONS

1. The substance used for decolourization of undesirable color in a crystalline substance

A	H ₂ SO ₄	B	Silica gel	C	NaNO ₃	D	Animal Charcoal
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2. Which substance does not undergo sublimation

A	KMnO ₄	B	Nephthalene	C	NH ₄ Cl	D	Iodine
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3. The most common solvent used in solvent extraction is:

A	Acetone	B	Ethanol	C	Rectified Spirit	D	Diethyl ether
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4. Solvent extraction method is particularly useful technique for separation when the product to be separated is:

A	Non-volatile or thermally unstable	B	Volatile or thermally stable
C	Non-volatile or thermally stable	D	Volatile and thermally unstable

5. Solvent extraction is an equilibrium process and it is controlled by:

A	Law of mass action	B	The amount of solvent used
C	Distribution Law	D	The amount of solute

6. The chromatography in which stationary phase is a solid:

A	Gas liquid Chromatography	B	Partition Chromatography	C	Adsorption Chromatography	D	Paper Chromatography
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7. The comparative rates at which solutes move in chromatography depends on:

A	The size of paper	B	R _f values of solutes
C	Temperature of the experiment	D	Size of chromatographic tank used

8. One torr is equal to:

A	One Pascal	B	One mm of Hg	C	76 cm of Hg	D	One atmosphere
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9. The absolute zero is:

A	Attainable	B	May be attainable	C	Unattainable	D	May not be attainable
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10. Normal human body temperature is?

A	37 °C	B	98.6 °C	C	37 °F	D	273 K
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11. Which has same number of molecules at STP?

A	11.2 dm ³ of O ₂ and 32 g of O ₂	B	44 g of CO ₂ and 1 dm ³ of CO ₂
C	28 g of N ₂ and 5.6 dm ³ of O ₂	D	280 ml of CO ₂ and 280 cm ³ of N ₂ O

12. Partial pressure of O₂ in lungs is:

A	760 torr	B	320 torr	C	116 torr	D	159 torr
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13. The exothermic process is:

A	Evaporation	B	sublimation	C	respiration	D	boiling
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14. If absolute temperature of a gas is doubled and pressure is reduced to one half, the volume of the gas will

A	Remains unchanged	B	Increases four times
C	Reduces to $\frac{1}{4}$	D	Be doubled

15. Which gas will diffuse more rapidly among the following?

A	N ₂	B	H ₂	C	NH ₃	D	CO
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16. Smell of cooking gas during leakage from a gas cylinder is due to the property of gases?

A	Diffusion	B	Evaporation	C	Osmosis	D	All of these
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17. How should the conditions be changed to prevent the volume of a given gas from expanding when its mass is increased?

A	Temperature is lowered and pressure is increased.
B	Temperature is increased and pressure is lowered.
C	Temperature and pressure both are lowered.
D	Temperature and pressure both are increased.

18. Gases deviate from ideal behavior at high pressure. Which of the following is correct for non-ideality?

A	At high pressure, the gas molecules move only in one direction.
B	At high pressure, the collisions between the gas molecules are increased manifolds.
C	At high pressure, the volume of the gas becomes insignificant.
D	At high pressure, the intermolecular attractions become significant.

19. Plasma are found everywhere from the sun to

A	atoms	B	molecules	C	electrons	D	quarks
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20. A real gas obeying van der Waal's equation will resemble ideal gas if:

A	Both 'a' and 'b' are large	B	Both 'a' and 'b' are small
C	'a' is small and 'b' is large	D	'a' is large and 'b' is small

21. Deviation of gas from ideal behavior is maximum at:

A	-10 °C and 5 atm	B	-10 °C and 2 atm	C	400 °C and 2 atm	D	0 °C and 2 atm
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22. Dipole-dipole interactions are present in:

A	Atoms of He gas	B	Molecules of CCl ₄	C	Molecules of solid iodine	D	Molecules of NH ₃
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23. Forces which are present between ion and water molecules are:

A	Dipole-induced dipole forces	B	Dipole-dipole forces	C	Ion-dipole forces	D	London dispersion forces
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24. London dispersion forces are significant for:

A	Polar molecules	B	Ionic solids	C	Metals	D	Non-polar molecules
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25. NH₃ shows a maximum among the hydrides of VA group elements due to:

A	Very small size of nitrogen	B	Lone pair of electrons present on nitrogen
C	Enhanced electronegative character of N	D	Pyramidal structure of NH ₃

26. The boiling point of glycerin at 1 atmospheric pressure is:

A	210 °C	B	270 °C	C	290 °C	D	300 °C
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27. Boiling point of water and ethanol is:

A	Equal	B	Different	C	98 °C and 70 °C	D	100 °C and 90 °C
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28. Vapour pressure of a substance does not depend upon:

A	Temperature	B	Intermolecular forces
C	Surface Area	D	Physical state of substance

29. Amorphous solids:

A	Have sharp melting points	B	Undergo clean cleavage when cut with knife
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C	Have perfect arrangement of atom	D	Can possess small portions of orderly arrangement
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30. Glass may begin to crystallize by a process called:

A	Super cooling	B	Sublimation	C	Crystallization	D	Annealing
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31. Allotropy is the property of:

A	Compound	B	Element	C	Atom	D	Mixture
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32. The branch of science which deals with structure of crystals is called:

A	Anisotropy	B	Isomorphy	C	Crystallography	D	Stoichiometry
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33. In orthorhombic crystal, the unit cell dimensions are:

A	$a = b \neq c$	$\alpha = \beta = \gamma = 90^\circ$	B	$a \neq b \neq c$	$\alpha = \beta = \gamma = 90^\circ$
C	$a \neq b \neq c$	$\alpha = \beta \neq \gamma = 90^\circ$	D	$a \neq b \neq c$	$\alpha = \beta = \gamma \neq 90^\circ$

34. The example of hexagonal structure is:

A	Sulphur	B	NaCl	C	Graphite	D	Diamond
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35. The no. of Cl^- ions per unit cell of NaCl:

A	6	B	4	C	2	D	8
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36. There are _____ Bravais lattices:

A	7	B	10	C	14	D	17
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37. The molecules of CO_2 :

A	Ionic crystals	B	Metallic crystals	C	Covalent crystals	D	Any type of crystal
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38. The diameter of atoms are of the order:

A	2 m	B	0.2nm	C	0.2m	D	0.2um
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39. 1 a.m.u =

A	$1.661 \times 10^{-27} \text{kg}$	B	$1.661 \times 10^{-24} \text{g}$	C	$1.661 \times 10^{-21} \text{mg}$	D	All of these
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40. Masses of atoms ranges from:

A	$10^{-27} - 10^{-25} \text{kg}$	B	$10^{-24} \text{g} - 10^{-22} \text{g}$	C	$10^{-21} \text{mg} - 10^{-19} \text{mg}$	D	All of these
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41. Nickel has isotopes:

A	3	B	5	C	9	D	11
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42. Total No. of naturally occurring isotopes is:

A	240	B	40	C	280	D	154
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43. 27g of Al will react completely with how much mass of O_2 to produce Al_2O_3

A	8g	B	16g	C	32g	D	24g
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44. In combustion analysis H₂O vapors are absorbed by:

A	Mg (C CO ₂) ₂	B	Mg(CCO ₃) ₂	C	Mg(C CO ₄) ₂	D	50% KOH
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45. The number of CO₂ which contain 8.0 g Oxygen

A	0.25	B	0.50	C	0.75	D	1.0
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46. Largest number of molecules are in:

A	3.6 g of H ₂ O	B	4.8 g of C ₂ H ₅ OH	C	2.8 g of CO	D	5.8 g of N ₂ O ₅
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47. Tin has isotopes

A	7	B	9	C	11	D	5
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48. How many isotopes are present in palladium:

A	Four	B	Five	C	Six	D	Seven
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49. In the ground state of an atom, the electron is present:

A	In the nucleus	B	In the second shell	C	Nearest to the nucleus	D	Farthest from the nucleus
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50. One mole of SO₂ contains:

A	6.02 x 10 ²³ atoms of oxygen	B	18.1 x 10 ²³ molecules of SO ₂	C	6.02 x 10 ²³ atoms of Sulphur	D	4 g atoms of SO ₂
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51. Volume occupied by 1.4 g of N₂ at S.T.P is:

A	2.24 dm ³	B	22.4dm ³	C	1.12 dm ³	D	112.0cm ³
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52. The number of carbon atoms in 22.0 g of CO₂ are:

A	3.01 x 10 ²³	B	6.02 x 10 ²³	C	3.01 x 10 ²²	D	6.02 x 10 ²²
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53. The e / m value for the positive rays is maximum for the gas:

A	Hydrogen	B	Helium	C	Oxygen	D	Nitrogen
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54. The nature of positive rays /anode rays depends on:

A	The nature of electrode	B	The nature of the discharge tube
C	The nature of residual gas	D	All of these

55. Free neutron decays into a proton with the emission of an electron and a:

A	Positron	B	Neutrino	C	Beta particle	D	Helium nucleus
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56. The velocity of photon is:

A	Independent of its wavelength	B	Depends on its source
C	Equal to square of its amplitude	D	Independent on its wavelength

57. According to Bohr's atomic mode, radius of second orbit of hydrogen atom is:

A	0.529 Å	B	5.0 Å	C	2.116 Å	D	4.0 Å
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58. Negative charge on cathode rays was established by:

A	William Crook	B	J. Perin	C	J.J. Thomson	D	Hittrof
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59. ${}_{29}^{65}\text{Cu} + {}_0^1\text{n} \rightarrow {}_{29}^{66}\text{Cu} + \text{X}$. What is 'X' ?

A	Electron	B	Proton	C	Neutron	D	GAMMA Rays
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60. Which of the following series lie in ultra-violet region?

A	Lyman	B	Balmer	C	Paschen	D	Brackett
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61. The limiting line of Balmer series lies in:

A	U.V region	B	Visible region	C	I.R region	D	None of these
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62. Splitting of spectral lines when excited atoms are subjected to strong electric field is called

A	Zeeman effect	B	Stark effect	C	Photoelectric effect	D	Compton's effect
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63. All the d-orbitals have:

A	Spherical shape	B	Dumb bell shape	C	Four lobe shape	D	None of above
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64. Quantum number values for 3d orbitals are:

A	$n = 3, \ell = 1$	B	$n = 3, \ell = 2$	C	$n = 3, \ell = 0$	D	$n = 2, \ell = 2$
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65. When 6d orbital is complete, the next entering electron goes into:

A	7f orbital	B	7s orbital	C	7p orbital	D	7d orbital
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66. How many unpaired electrons are present in an atom of configuration: $1s^2, 2s^2, 2p^4$?

A	Four	B	Zero	C	Two	D	Three
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67. The decrease in atomic radius is small when travel from left to right in transition elements. It is due to:

A	Valence electrons	B	Number of shells	C	Nuclear charge	D	Intervening electrons
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68. The elements having low ionization energy are:

A	Non-metals	B	Metals	C	Semi-metals	D	Metalloids
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69. The value of third ionization energy of Mg is:

A	1450 kJ mol^{-1}	B	7730 kJ mol^{-1}	C	7850 kJ mol^{-1}	D	1890 kJ mol^{-1}
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70. Ionic and coordinate covalent bond is present in:

A	SO_2	B	C_2H_5	C	NH_4Cl	D	H_2O
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71. VSEPR theory was proposed by?

A	Nyholm and Gillespie	B	Kossel	C	Lewis	D	Sidwick
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72. Bond angle between two H-S-H bond is

A	104.5°	B	107.5°	C	92°	D	95°
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73. Which of the following is AB_4 type molecule with two lone pairs?

A	BeCl_2	B	CH_4	C	BF_4	D	H_2S
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74. The hybridization in ammonia molecule is:

A	dsp^2	B	sp^2	C	sp^3	D	sp
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75. Total number of sigma bonds in ethyne (C_2H_2)

A	Five	B	Three	C	Two	D	Four
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76. The number of bonds in nitrogen molecule is:

A	One sigma(σ) and one Pi(π) bond	B	One sigma(σ) and two Pi(π) bonds
C	Three sigma(σ) bonds only	D	Two sigma(σ) and one Pi(π) bond

77. Which has unpaired electrons in anti-bonding molecular orbitals?

A	N_2^{-2}	B	O_2^{+2}	C	B_2	D	F_2
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78. The paramagnetic property of oxygen is well-explained on the basis of

A	VSEPR-theory	B	VB-theory	C	MOT-theory	D	None of these
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79. The bond order of O_2^{-2}

A	One	B	Two	C	Three	D	Four
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80. Which of the hydrogen halide has highest percentage of ionic character?

A	HCl	B	HBr	C	HF	D	HI
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81. If an endothermic reaction is allowed to take place very rapidly in the air, the temperature of the surrounding air:

A	Remains constant	B	Increases	C	Decreases	D	Remains unchanged
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82. For a given process, the heat changes at constant pressure (q_p) and at constant volume (q_v) are related to each other as

A	$q_p = q_v$	B	$q_p > q_v$	C	$q_p < q_v$	D	$q_p = q_v/2$
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83. Which of the following is not a state function?

A	Enthalpy	B	Temperature	C	Heat	D	Pressure
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84. The units of heat capacity is:

A	$\text{kJ K}^{-1} \text{mol}^{-1}$	B	$\text{kJ K}^{-1} \text{g}^{-1}$	C	kJ K^{-1}	D	$\text{kJ K}^{-1} \text{mol}^{-2}$
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85. The change in heat energy of a chemical reaction at constant temperature and pressure is called

A	Enthalpy change	B	Bond Energy	C	Internal energy	D	Heat of sublimation
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86. The pressure of oxygen inside of bomb calorimeter:

A	100 atm	B	50 atm	C	125 atm	D	20 atm
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87. The enthalpy of atomization of hydrogen is:

A	180 kJ mol^{-1}	B	218 kJ mol^{-1}	C	$-1368 \text{ kJ mol}^{-1}$	D	$-57.4 \text{ kJ mol}^{-1}$
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88. Molar concentration is called:

A	Active mass	B	Weight	C	Mass	D	None of these
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89. For which system does the equilibrium K_c have units of (conc^{-1}) ?

A	$\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$	B	$\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$
C	$2\text{NO}_2 \rightleftharpoons 2\text{N}_2\text{O}_4$	D	$2\text{HF} \rightleftharpoons \text{H}_2 + \text{F}_2$

90. Equilibrium constant for gaseous equilibrium is represented by

A	K_a	B	K_c	C	K_x	D	K_p
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91. When K_c value is small, the equilibrium position is

A	Towards left	B	Towards right	C	Remains unchanged	D	None of these
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92. Which statement about the following equilibrium is correct:

$2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$ $\Delta H = -183 \text{ kJ mol}^{-1}$. The yield of SO_3 will be maximum if:

A	Both temperature and pressure are reduced	B	Temperature is increased and pressure is kept constant
C	Both temperature and pressure are increased	D	Temperature is reduced and pressure is increased

93. The unit of ionic product of water

A	$\text{Mol}^{-1} \text{dm}^{-3}$	B	$\text{Mol}^{-2} \text{dm}^{-6}$	C	$\text{Mol}^{-2} \text{dm}^{-3}$	D	$\text{Mol}^2 \text{dm}^{-6}$
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94. The ionic product of water will increase if:

A	H^+ ions are added	B	OH^- ions are added
C	Temperature is increased	D	H^+ and OH^- ions are added in equal amount

95. The law of mass action was given by

A	Vant's Hoff	B	Bondeinstin	C	Guldberg and Waage	D	Berthelot
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96. When 50% of reactants in a reversible reaction are converted into product, the value of equilibrium constant K_c is:

A	2	B	1	C	3	D	4
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97. The term pH was introduced by:

A	Henderson	B	Sorenson	C	Goldsmith	D	Thomson
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98. The pH of $10^{-2} \text{ moles dm}^{-3}$ of an aqueous solution of NaOH is:

A	2	B	12	C	3	D	10
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99. Which relationship is correct about the strength of an acid with the strength of its conjugated base?

A	$K_a \propto \frac{1}{K_b}$	B	$K_a \propto K_b$	C	$K_a \propto \sqrt{K_b}$	D	None of these
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100. Sum of $\text{p}K_a$ and $\text{p}K_b$ is equal to:

A	14	B	7	C	0	D	1
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101. Ionization of hydrogen sulphide gas is suppressed by:

A	KCl	B	NaCl	C	HCl	D	NH_4Cl
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102. The K_{sp} value for PbSO_4 is 1.8×10^{-8} . The maximum concentration of Pb^{+2} ions is:

A	1.8×10^{-8}	B	1×10^{-8}	C	1.34×10^{-4}	D	1.69×10^{-8}
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103. When a small amount of acid or a base is added to a buffer solution, its pH value will change:

A	Drastically	B	A little	C	Rapidly	D	Not at all
104. If NaOH is added to a solution of CH ₃ COOH, then							
A	pH of solution decreases			B	H ⁺ ions concentration decreases		
C	CH ₃ COO ⁻ ions concentration increases			D	OH ⁻ ions concentration increases		
105. pOH of a solution is 4. The [H ⁺] ion concentration of the solution is:							
A	10 ⁻¹⁰ mol dm ⁻³	B	4 mol dm ⁻³	C	0.4 mol dm ⁻³	D	4 x 10 ⁴ mol dm ⁻³
106. Molarity of pure water is:							
A	1	B	18	C	55.5	D	6
107. A solution of glucose is 10 %. The volume in which 1g mole of it is dissolved will be:							
A	1 dm ³	B	1.8 dm ³	C	200 cm ³	D	900 cm ³
108. The consolute temperature of water-aniline system is:							
A	69.5 °C	B	64.5 °C	C	167 °C	D	49.1 °C
109. If 2.0 g of NaCl is dissolved in 20 g of water, the percentage by weight of NaCl:							
A	0.99 %	B	10 %	C	9.09 %	D	0.90%
110. Which one is not equation of Raoult's law:							
A	Δp = p ^o x	B	Δp/p ^o = x ₂	C	PV = nRT	D	p = p ^o x ₁
111. Which of the following pair of liquids is practically immiscible?							
A	Water and phenol	B	Water and aniline	C	Water and benzene	D	Water and Nicotine
112. In azeotropic mixture showing positive deviation from Raoult's law, the volume of the mixture is:							
A	Slightly more than the total volume of the components			B	Slightly less than the total volume of the components		
C	Equal to total volume of components			D	None of these		
113. Which of the following solution has the highest boiling point?							
A	5.58 % solution of sodium chloride			B	18% solution of glucose		
C	6 % solution of urea			D	All have the same boiling point		
114. Freezing point of equimolar aqueous solutions will be minimum for							
A	Glucose	B	Fructose	C	NH ₄ Cl	D	Urea
115. Which one of the following substance when dissolved in water give acidic solution?							
A	NaCl	B	Na ₂ SO ₄	C	NH ₄ Cl	D	CH ₃ COONH ₄
116. The molal boiling point constant depends upon:							
A	Nature of solvent	B	Nature of solute	C	Temperature of solution	D	Vapor pressure of solution
117. Chemical used to protect a car by preventing the liquid in the radiator from freezing is:							
A	Phenol	B	Ethylene Glycol	C	KNO ₃	D	Methanol
118. 18 g glucose is dissolved in 90 g of water. The relative lowering of vapor pressure is equal to:							
A	1/5	B	5.1	C	1/ 51	D	6
119. The molal boiling point constant is the ratio of the elevation in boiling point to:							
A	Molality	B	Molarity	C	Mole fraction of solvent	D	Mole fraction of solute
120. Oxidation no. of oxygen is -1 in:							
A	Na ₂ O	B	F ₂ O	C	Na ₂ O ₂	D	Cl ₂ O

121. Sulphur has highest oxidation state in:

A	SO ₂	B	SO ₃	C	H ₂ S	D	H ₂ SO ₄
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122. In conversion of Br₂ to BrO₃⁻¹ oxidation state of bromine changes from

A	1 to 5	B	0 to 5	C	0 to -2	D	2 to -3
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123. In the reaction 2Fe + 3Cl₂ → 2FeCl₃

A	Iron is reduced	B	Iron is oxidized
C	Chlorine is oxidized	D	Neither of the elements is oxidized

124. Which one of the following cells is used for the extraction of Na metal?

A	Nelson's Cell	B	Galvanic Cell	C	Down's Cell	D	All of these cells
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125. The cathodic reaction in the electrolysis of dil. H₂SO₄ with Fe electrode is:

A	Reduction	B	Oxidation	C	Both oxidation and reduction	D	Neither oxidation or reduction
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126. Cathode in NICAD:

A	Ag ₂ O	B	NiO ₂	C	Cd	D	Zn
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127. The rate of reaction is:

A	Increases as the reaction proceeds	B	Decreases as the reaction proceeds
C	Remains the same as reaction proceeds	D	May increase or decrease as reaction proceeds

128. The true representative for unit of rate constant for 1st order reaction:

A	Sec ⁻¹	B	mol dm ³ s ⁻¹	C	mol ² dm ³ s ⁻¹	D	mol dm ³ s
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129. Photosynthesis is:

A	First order	B	Second order	C	Zero order	D	Third order
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130. If 75 % of any given amount of radioactive element disintegrates in 60 minutes, the half-life of radioactive is

A	20 minutes	B	30 minutes	C	45 minutes	D	25 minutes
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131. NO catalyzes the oxidation of Sulphur dioxide to Sulphur trioxide. This is an example of:

A	Homogeneous Catalysis	B	Heterogeneous Catalysis	C	Neutralization Reaction	D	None of these
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132. The catalyst used for the reaction, HCOOH → H₂ + CO₂ is

A	Copper	B	Alumina	C	Silica	D	Iron
---	--------	---	---------	---	--------	---	------

133. The energy of activated complex is:

A	Greater than reactants and products	B	Less than the reactants and products
C	Equal to the products	D	Equal to the reactants

134. Molecular Formula = n(empirical formula). Value of n for Sugar is:

A	0	B	1	C	2	D	0.5
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135. 1 a.m.u =

A	1.661x10 ⁻²⁷ kg	B	1.661x10 ⁻²⁴ ug	C	1.661x10 ⁻²¹ ng	D	All of these
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TOP 113 SHORT QUESTIONS

Chapter# 1

1. How N_2 and CO have same number of electrons, protons and neutrons?
2. No individual neon atom in the sample of the element has a mass of 20.18 amu. Justify.
3. Atomic masses are in fractions. Justify.
4. How limiting reactant controls the amount of product formed?
5. 32 g of O_2 28 g of N_2 and 16 g of CH_4 have different masses but same volume. Why?
6. Why actual yield is always lesser than theoretical yield?
7. Law of conservation of mass has to be obeyed during stoichiometric calculations. Explain.
8. One mole of H_2SO_4 should completely react with two moles of NaOH. How does Avogadro's Number helps us too explain it.
9. Calculate the mass of 5.136 moles Ag_2CO_3 .
10. What are molecular ions. How they are formed. Give their applications.
11. How the efficiency of a chemical reaction is determined?

Chapter # 2

12. Why NaCl cannot be purified by crystallization?
13. How crystals are dried? Vacuum Desiccator is safe and reliable method of drying the crystals.
14. How coloured impurities are removed from crystals during crystallization.
15. Give uses of chromatography.
16. Differentiate between adsorption and partition chromatography.
17. Define 'Sublimation' with an example.
18. Why concentrated HCl and $KMnO_4$ cannot be filtered by Gooch crucible?
19. Repeated extractions using small portions of solvent are more efficient than using a single extraction. Why?

Chapter # 3

20. Gases behave ideally at low pressure and high temperature. Explain.
21. Calculate value of 'R' SI units.
22. Water vapours do not behave at 273K. Why?

23. What is the significance of Van der Waals constants?
24. Differentiate between diffusion and effusion.
25. Do you think that some of the postulates of kinetic molecular theory are faulty? Point out these postulates.
26. Differentiate between natural and artificial plasma.
27. How plasma is formed?
28. Explain the application of Dalton's Law in respiration.

Chapter # 4

29. Why there is a big difference in the physical states of halogens as we move from fluorine to iodine?
30. Food is cooked quickly in pressure cooker. Why?
31. Why one feel sense of cooling under the fan after bath?
32. Boiling needs a constant supply of heat. Explain.
33. Diamond is hard and electrical insulator. Explain.
34. Why Graphite is conductor parallel to its layers not perpendicular?
35. Cleavage itself is an isotropic property. How?
36. Why ionic crystals are highly brittle?

Chapter # 5

37. Why positive rays are also called 'Canal rays'.
38. How do you come to know that velocities of electrons in orbits closer to the nucleus are higher than those in higher orbits?
39. Differentiate between atomic emission and atomic absorption spectrum.
40. What is 'Zeeman effect'?
41. What is Stark effect?
42. Why the e/m value of cathode rays is just equal to electrons?
43. State Pauli's exclusion principle.
44. Differentiate between atomic emission and atomic absorption spectrum.
45. Differentiate between continuous spectrum and line spectrum.
46. Justify that distance gaps between different orbits go on increasing from the lower to higher orbits.
47. Write two properties of neutrons.

Chapter # 6

48. Bond distance is the compromise distance between two atoms. Justify.
49. Why 2nd ionization energy is always greater than first ionization energy.
50. No Bond in chemistry is 100% ionic.
51. Why the energy of bonding molecular orbitals is lesser than anti-bonding molecular orbitals?
52. Ionic bonds are non-directional. Justify.
53. Define dipole moment.
54. What is the limitation of VSEPR theory.
55. The ionization energy of group II-A is higher than group III-A. Why?

56. Why oxygen is paramagnetic in nature?
57. Sigma bond is stronger than pi bond. Explain.
58. Pi-bonds are more diffused than sigma bonds. Explain.
59. Define dipole moment.
60. The dipole moment of CO_2 and CS_2 are zero, but that of SO_2 is 1.61 D. Why?

Chapter # 7

61. Explain that burning of candle is spontaneous process.
62. Define enthalpy of neutralization with an example.
63. State first law of thermodynamics.
64. Volume is a state function. Justify.
65. Define enthalpy of atomization with an example.
66. Define enthalpy of solution.
67. Differentiate between spontaneous and non-spontaneous reactions.
68. State Born Haber Cycle.

Chapter # 8

69. The solubility of glucose in water is increased by increasing temperature. Explain.
70. How the direction of reaction is predicted by equilibrium constant.
71. Define pH and pOH.
72. What is ionic product of water.
73. Solubilities are depressed by the addition of common ions.
74. State Le-Chatelier's Principle.
75. What is solubility product? What is solubility product expression for PbCl_2 .
76. Define buffer capacity.
77. High pressure favours the reaction in which there is decrease in volume (reactants to products)
78. What are acidic buffers? Give an example.

Chapter # 9

79. One molal solution is more dilute than one molar solution. Justify.
80. Define parts per million.
81. The sum of mole fractions of all components is unity. Justify.
82. Why the vapor pressure of solution is less than that of pure solvent?
83. State Raoult's Law.
84. NaCl and KCl are used to lower the melting point of ice. Justify.
85. Molality is independent of temperature but molarity depends on temperature. Why?
86. What are Zeotropes? Give example.
87. Define the Colligative properties. Name any two Colligative properties.
88. Beckmann's thermometer is used to note the depression in freezing point. Why?

Chapter # 10

89. What is the function of salt bridge in voltaic cell?
90. How sodium metal is prepared by Down's cell?
91. Calculate the oxidation number of chromium

(a) CrCl_3 (b) $\text{K}_2\text{Cr}_2\text{O}_7$

92. How impure copper can be purified by electrolysis.
93. A salt bridge maintains the electrical neutrality. Explain. /What is the function of salt bridge in voltaic cell?
94. How electrochemical series can help us to determine whether a reaction is feasible or not?
95. Na and K can displace hydrogen from acids but Pt, Pd and Cu cannot. Why?
96. Lead accumulator is rechargeable. Justify.
97. Write down the reactions happening in fuel cell.
98. Write down the advantages of fuel cell over other batteries.

Chapter # 11

99. Define reaction kinetics.
100. Rate of a reaction is an ever-changing parameter. Justify
101. The radioactive decay is always first order reaction. Justify.
102. Photochemical reactions are usually zero order reactions. Justify.
103. How half-life of a chemical reaction is related with initial concentration of reactants.
104. How order is determined by the method of large excess?
105. How surface area affects the rate of a chemical reaction. Give one example.
106. How rate is affected by light?
107. Differentiate between homogeneous and heterogeneous catalysis.
108. A catalyst does not affect the equilibrium constant. Justify.
109. A catalyst is specific in nature justify.
110. Define catalytic poisoning.
111. What is negative catalyst? Give example.
112. What is auto-catalyst. Give example.
113. Give two characteristics of enzyme catalysis.

IMPORTANT LONG QUESTIONS

Chemistry Part -1

Most Important = "A" category

Less Important = "B" category

Least Important = "C" category

Chapter# 1

1. Define yield. Give its types. Explain why actual yield is lesser than theoretical yield? (A)
2. Define limiting reactant. Explain with two examples. (A)
3. Define stoichiometry. Give its assumptions. Mentions two laws which help us to perform stoichiometric calculations. (A)
4. What is an electrometer. How it is used to determine the percentage abundance and atomic masses of elements. (A)
5. Define combustion analysis. How percentage composition of each element in an organic compound is determined? (B)
6. Write down four steps to determine empirical formula of a compound. (B)
7. Explain isotopes with their relative abundance. (C)

Chapter # 4

8. Define vapour pressure. How vapour pressure of a liquid is determined by manometric method? (A)
9. Define liquid crystal. Give its types. Give their use in daily life. (A)
10. What are molecular solids? Give examples and explain their properties. (A)
11. Explain electron pool theory of gases. Also give three properties of metallic solids. (A)
12. Define hydrogen bonding. Explain hydrogen bonding in biological molecules. (A)
13. What are covalent solids. Discuss the structure of diamond. (B)
14. Discuss the factors affecting London dispersion forces. (B)
15. Define evaporation. Give three factors on which evaporation depend upon. (C)

Chapter # 5

16. Give defects of Bohr's atomic model. (A)
17. Write down Millikan's oil drop method for the measurement of charge on electron. (A)
18. Explain magnetic, azimuthal and spin quantum number. (A)
19. Derive an expression to calculate of radius of revolving electron in n^{th} orbit by Bohr's model of atom. (A)

20. Write down main postulates of Bohr's atomic model. (A)
21. What are X-rays. Discuss its origin. Explain Moseley study. (B)
22. Write down four properties of cathode rays. (B)
23. How e/m value ratio was determined experimentally. (C)

Chapter # 6

24. Explain the bonding in oxygen according to molecular orbital theory and explain its paramagnetic property. (A)
25. Give the postulates of VSEPR theory. Explain the structure of ammonia on the basis of this theory. (A)
26. Define dipole moment. Give its units. How is it used to determine the geometry of molecules? (A)
27. Discuss the energetics of bond formation by giving an example of H₂ molecule. (A)
28. Define ionization energy. Give example. Discuss its trend in groups and periods. (B)
29. Describe sp² hybridization to explain the structure of ethene. (B)
30. Define sp³ hybridization. Discuss the structure of water and methane on its basis. (C)
31. Define electron affinity. Name the factors affecting it. Discuss its trend. (C)



Chapter # 7

32. How enthalpy of food is determined by bomb calorimeter? (A)
33. Explain glass calorimeter is used to determine the enthalpy of a reaction? (A)
34. State and explain with two example, the Hess's law of constant heat summation. (A)
35. State first law of thermodynamics. Prove that: $\Delta E = q_v$ and $\Delta H = q_p$ (A)
36. Define the terms: system, surroundings, boundary, state function. (B)
37. Differentiate between spontaneous and non-spontaneous reactions. (C)

Chapter # 9

38. Describe the Beckmann method to determine the freezing point depression. (A)
39. Explain the Landsberger method to calculate the elevation of boiling point. (A)
40. Explain the Raoult's law when both components in the solution and volatile. (A)
41. How lowering of vapour pressure as colligative property is used to calculate molar mass of solute. (A)
42. Discuss phenol water system and explain the term upper consolute temperature. (A)
43. Define the terms: molality, molarity, mole fraction, parts per million. (B)
44. Define hydration and hydrolysis with examples. (C)
45. Explain fractional distillation. How zeotropic mixture is purified by this method. (C)

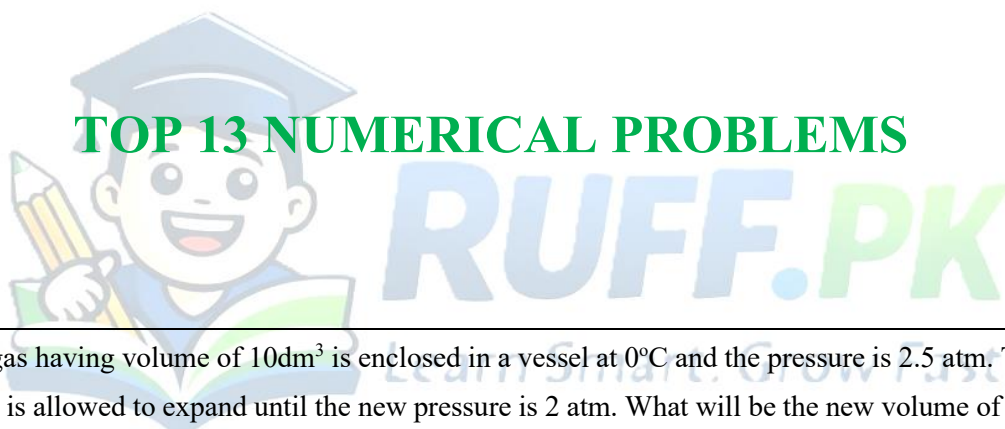
Chapter # 10

46. Explain the construction and working of fuel cells. Give their advantages. (A)
47. What is standard hydrogen electrode (SHE). How it is used to measure the electrode potential of zinc. (A)
48. Give two industrial applications of electrolysis./ How can you prepare sodium metal and caustic soda by electrolysis./ Describe the electrolysis of molten (fused) NaCl and aqueous solution of NaCl. (A)

49. Explain charging and discharging of lead accumulator. (B)
 50. Define electrochemical series. Give its two applications. (C)
 51. Explain construction and working of galvanic cell. Discuss why salt bridge is necessary in this cell. (C)

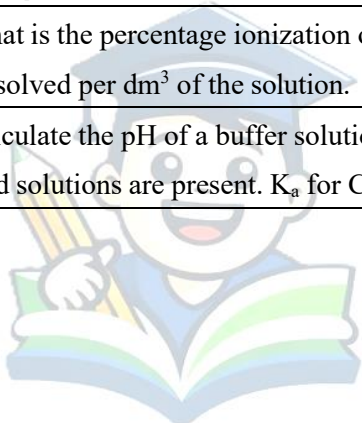
Chapter # 11

52. Give four characteristics of a catalyst. (A)
 53. Define enzyme catalysis. Give its four characteristics. (A)
 54. How does Arrhenius equation help us to calculate energy of activation of a reaction? (A)
 55. What is order of reaction. Name five method to calculate order of a reaction. Explain two methods to find the order of a reaction. (A)
 56. Explain the effect of temperature on rate of reaction. (B)
 57. How light and surface area affects rate of a chemical reaction. (B)
 58. Discuss chemical method to determine the rate of a chemical reaction. (C)



1.	A gas having volume of 10dm^3 is enclosed in a vessel at 0°C and the pressure is 2.5 atm. This gas is allowed to expand until the new pressure is 2 atm. What will be the new volume of this gas, if temperature maintained at 273 K.
2.	Calculate the mass of 1dm^3 of NH_3 gas at 30°C and 1000 mm Hg pressure, considering that NH_3 is behaving ideally.
3.	250 cm^3 of a sample of hydrogen effuses four times as rapidly as 250 cm^3 of an unknown gas. Calculate the molar mass of unknown gas.
4.	The solubility of PbF_2 at 25°C is 0.64 g dm^{-3} . Calculate K_{sp} of PbF_2
5.	$\text{Ca}(\text{OH})_2$ is a sparingly soluble compound. Its solubility product is 6.5×10^{-6} . Calculate the solubility of $\text{Ca}(\text{OH})_2$.
6.	Calculate the density of CH_4 (g) at 0°C and 1 atm pressure. What will happen to the density if (a) temperature is increased to 27°C , (b) the pressure is increased to 2 atm at 0°C .
7.	The solubility of CaF_2 in water at 25°C is found to be $2.05 \times 10^{-4}\text{ moldm}^{-3}$. What is the

	value of K_{sp} at this temperature?
8.	There is a mixture of hydrogen, helium and methane occupying a vessel of volume 13 dm^3 at 37°C and pressure 1 atm . The masses of H_2 and He are 0.8 g and 0.12 g respectively. Calculate the partial pressure in torr of each gas in mixture.
9.	Working at a vacuum line, a chemist isolated a gas in a weighing bulb with a volume of 255 cm^3 , at a temperature of 25°C and under a pressure in the bulb of 10.0 torr . The gas weighed 12.1 mg . What is the molecular mass of this gas?
10.	The relative densities of two gases A and B are $1:1.5$. Find out the volume of B which will diffuse in the same time in which 150 dm^3 of A will diffuse?
11.	N_2 and H_2 combine to give NH_3 . The value of K_c in this reaction at 500°C is 6.0×10^{-2} . Calculate the K_p of this reaction.
12.	What is the percentage ionization of acetic acid in a solution in which 0.1 moles of it has been dissolved per dm^3 of the solution.
13.	Calculate the pH of a buffer solution in which 0.11 molar CH_3COONa and 0.09 molar acetic acid solutions are present. K_a for CH_3COOH is 1.85×10^{-5} .



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