11

11 CHEMISTRY

11th Standard

Chemistry

360 x 1 = 360

1) 40 ml of methane is completely burnt using 80 ml of oxygen at room temperature The volume of gas left after cooling to room temperature is _____.

(a) 40 ml CO_2 gas (b) 40 ml CO_2 gas and 80 ml H_2O gas

(c) 60 ml CO_2 gas and 60 ml H_2O gas (d) 120 ml CO_2 gas

2) An element X has the following isotopic Composition ^{200}X = 90%, ^{199}X = 8% and ^{202}X = 2%. The Weighted average atomic mass of the element X is closet to _____.

(a) 201 u (b) 202 u (c) 199 u (d) 200 u

3) Carbon forms two oxides, namely carbon monoxide and carbon dioxide. The equivalent mass of which element remains constant ?

(a) Carbon (b) Oxygen (c) Both carbon and oxygen (d) Neither carbon nor oxygen

4) The equivalent mass of a trivalent metal element is 9 g eq^{-1} the molar mass of its an hydrous oxide is _____.

(a) 102 g (b) 27 g (c) 270 g (d) 78 g

5) The number of water molecules in a drop of water weighing 0.018 g is _____.

(a) 6.022×10^{26} (b) 6.022×10^{23} (c) 6.022×10^{20} (d) 9.9×10^{22}

6) 1 g of an impure sample of magnesium carbonate (containing no thermally decomposable impurities) on complete thermal decomposition gave 0.44 g of carbon dioxide gas. The percentage of impurity in the sample is _____.

(a) 0% (b) 4.4% (c) 16% (d) 8.4%

7) When 6.3 g of sodium bicarbonate is added to 30 g of the acetic acid solution, the residual solution is found to weigh 33 g. The number of moles of carbon dioxide released in the reaction is _____.

(a) 3 (b) 0.75 (c) 0.075 (d) 0.3

8) When 22.4 litres of $H_2(g)$ is mixed with 11.2 litres of $Cl_2(g)$, each at 273 K at 1 atm the moles of HCl (g), formed is equal to _____.

(a) 2 moles of HCI (g) (b) 0.5 moles of HCI (g) (c) 1.5 moles of HCI (g) (d) 1 moles of HCI (g)

9) Hot concentrated sulphuric acid is a moderately strong oxidizing agent. Which of the following reactions does not show oxidising behaviour ?

(a) $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$ (b) $C + 2H_2 + SO_4 \rightarrow CO_2 + 2SO_2 + 2H_2O$

(c) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$ (d) None of the above

10) Choose the disproportionation reaction among the following redox reactions.

(a) $3Mg_{(s)} + N_{2(g)} \rightarrow Mg_3N_{2(s)}$ (b) $P_{4(s)} + 3NaOH + 3H_2O \rightarrow PH_{3(g)} + 3NaH_2PO_{2(aq)}$

(c) $Cl_{2(g)} + 2Kl_{(aq)} \rightarrow 2KCl_{(aq)} + I_2$ (d) $Cr_2O_{3(s)} + 2A1_{(s)} \rightarrow Al_2O_3(s) + 2Cr(s)$

11) Which one of the following represents 180 g of water ?

(a) 5 Moles of water (b) 90 moles of water (c) $\frac{6.022 \times 10^{23}}{180}$ molecules of water

(d) 6.022×10^{24}molecules of water

12) 7.5 g of a gas occupies a volume of 5.6 litres at 0° C and 1 atm pressure. The gas is _____.

(a) NO (b) N_2O (c) CO (d) CO_2

13) Total number of electrons present in 1.7 g of ammonia is _____.

(a) 6.022×10^{23} (b) $\frac{6.022 \times 10^{22}}{1.7}$ (c) $\frac{6.022 \times 10^{24}}{1.7}$ (d) $\frac{6.022 \times 10^{23}}{1.7}$

14) The correct increasing order of the oxidation state of sulphur in the anions $SO_3^{2-}, SO_3^{2-}, S_2O_4^{2-}, S_2O_6^{2-}$ is _____.

(a) $SO_3^{2-} < SO_4^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$ (b) $SO_4^{2-} < SO_4^{2-} < S_2O_6^{2-} < SO_3^{2-}$

(c) $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-} < SO_4^{2-}$ (d) $S_2O_6^{2-} < SO_4^{2-} < SO_4^{2-} < SO_3^{2-}$

15) The equivalent mass of ferrous oxalate is _____.

(a) $\frac{molar\ mass\ of\ ferrous\ oxalate}{1}$ (b) $\frac{molar\ mass\ of\ ferrous\ oxalate}{2}$ (c) $\frac{molar\ mass\ of\ ferrous\ oxalate}{3}$ (d) None of these

16) If Avogadro number were changed from 6.022×10^{23} to 6.022×10^{20}, this would change _____.

(a) the ratio of chemical species to each other in a balanced equation

(b) the ratio of elements to each other in a compound

(c) the definition of mass in units of grams (d) the mass of one mole of carbon

17) Two 22.4 litre containers A and B contains 8 g of O_2 and 8 g of SO_2 respectively at 273 K and 1 atm pressure, then _____.

(a) Number of molecules inA and B are same

(b) Number of molecules in B is more than that in A.

(c) The ratio between the number of molecules in A= to number of molecules in B is 2:1

(d) Number of molecules in B is three times greater than the number of molecules in A

18) What is the mass of precipitate formed when 50 ml of 8.5 % solution of $AgNO_3$ is mixed with 100 ml of 1.865 % potassium chloride solution ?

(a) 3.59 g (b) 7g (c) 14 g (d) 28 g

19) The mass of a gas that occupies a volume of 612.5 ml at room temperature and pressure (25^0 c and 1 atm pressure) is 1.1g. The molar mass of the gas is _____.

(a) 66.25 g mol^{-1} (b) 44 g mol^{-1} (c) 24.5 g mol^{-1} (d) 662.5 g mol^{-1}

20) Which of the following contain same number of carbon atoms as in 6 g of carbon-12 ?

(a) 7.5 g ethane (b) 8 g methane (c) both (a) and (b) (d) none of these

21) Which of the following compound(s) has /have a percentage of carbon same as that in ethylene (C_2H_4)?

(a) propene (b) ethyne (c) benzene (d) ethane

22) Which of the following is/are true with respect to carbon -12 ?

(a) relative atomic mass is 12 u

(b) the oxidation number of carbon is +4 in all its compounds.

(c) 1 mole ofcarbon-12 contain 6.022×10^{22} carbon atoms. (d) All of these

23) Which one of the following is used as a standard for atomic mass?

(a) ${}_6C^{12}$ (b) ${}_7C^{12}$ (c) ${}_6C^{13}$ (d) ${}_6C^{14}$

24) The equivalent mass of potassium permanganate in alkaline medium is:
$MnO_4^- + 2H_2O + 3e^- \rightarrow MnO_2 + 4OH^-$

(a) 31.6 (b) 52.7 (c) 79 (d) None of these

25) The energy of light of wavelength 45 nm is _____.

(a) 6.67×10^{15}J (b) 6.67×10^{11}J (c) 4.42×10^{-18}J (d) 4.42×10^{-15}J

26) The energies $E_1$and E_2 of two radiations are 25 eV and 50 eV respectively. The relation between their wavelengths ie λ_1 andλ_2 will be _____

(a) $\frac{\lambda_1}{\lambda_2} = 1$ (b) $\lambda_1 = 2\lambda_2$ (c) $\lambda_1 = \sqrt{25 \times 50\lambda_2}$ (d) $2\lambda_1 = \lambda_2$

27) Splitting of spectral lines in an electric field is called _____

(a) Zeeman effect (b) Shielding effect (c) Compton effect (d) Stark effect

28) According to the Bohr Theory, which of the following transitions in the hydrogen atom will give rise to the least energetic photon?

(a) n = 6 to n = 1 (b) n = 5 to n = 4 (c) n = S to n = 3 (d) n = 6 to n = S

29) Which of the following pairs of d-orbitals will have electron density along the axes ?

(a) d_z2, d_{xz} (b) d_{xz}, d_{yZ} (c) d_z2, $d_{x^2-y^2}$ (d) d_{xy} ,$d_{x^2-y^2}$

30) The electronic configuration of Eu (Atomic no. 63) Gd (Atomic no. 64) and Tb (Atomic no. 65) are _____

(a) $[Xe]\ 4f^6\ 5d^1\ 6s^2$, $[Xe]\ 4f^7\ Sd^1\ 6s^2$ and $[Xe]\ 4f^8\ 5d^1\ 6s^2$

(b) $[Xe]\ 4f^7$, $6s^2$, $[Xe]\ 4f^7\ 5d^1\ 6s^2$ and $[Xe]\ 4f^9\ 6s^2$

(c) $[Xe]\ 4f^7$,$6s^2$, $[Xe]\ 4f^8\ 6s^2$ and $[Xe]\ 4f^8\ 5d^1\ 6s^2$

(d) $[Xe]\ 4f^6\ 5d^1\ 6s^2$, $[Xe]\ 4f^7\ 5d^1\ 6s^2$ and $[Xe]\ 4f^9\ 6s^2$

31) Based on equation $E = -2.178 \times 10^{-18} J\left(\frac{Z^2}{n^2}\right)$ certain conclusions are written. Which of them is not correct?

(a) Equation can be used to calculate the change in energy when the electron changes orbit

(b) For n = 1, the electron has a more negative energy than it does for n = 6 which means that the electron is more loosely bound in the smallest allowed orbit

(c) The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than it would be if the electrons were at the infinite distance from the nucleus.

(d) Larger the value of n, the larger is the orbit radius.

32) Two electrons occupying the same orbital are distinguished by _____

(a) azimuthal quantum number (b) spin quantum number (c) magnetic quantum number

(d) orbital quantum number

33) The maximum number of electrons in a sub shell is given by the expression _____

(a) $2n^2$ (b) $2l + 1$ (c) $4l + 2$ (d) none of these

34) For d-electron, the orbital angular momentum is _____

(a) $\frac{\sqrt{2}h}{2\pi}$ (b) $\frac{\sqrt{2}h}{2\pi}$ (c) $\frac{\sqrt{2\times4}h}{2\pi}$ (d) $\frac{\sqrt{2\times4}h}{2\pi}$

35) What is the maximum numbers of electrons that can be associated with the following set of quantum numbers? n = 3, I = 1 and m =-1

(a) 4 (b) 6 (c) 2 (d) = 10

36) The total number of orbitals associated with the principal quantum number n = 3 is _____

(a) 9 (b) 8 (c) 5 (d) 7

37) If n = 6, the correct sequence for filling of electrons will be _____

(a) ns → (n-2)f → (n - 1)d → np (b) ns → (n - 1) d → (n - 2) f → np

(c) ns → (n-2)f → np → (n-1)d (d) none of these are correct

38) Consider the following sets of quantum numbers:

	n	1	m	s
(i)	3	0	0	$+\frac{1}{2}$
(ii)	2	2	1	$-\frac{1}{2}$
(iii)	4	3	-2	$+\frac{1}{2}$
(iv)	1	0	-1	$+\frac{1}{2}$
(v)	3	4	3	$-\frac{1}{2}$

Which of the following sets of quantum number is not possible?

(a) (i), (ii), (iii) and (iv) (b) (ii), (iv) and (v) (c) (i) and (iii) . (d) (ii), (iii) and (iv)

39) How many electrons in an atom with atomic number 105 can have (n + 1) = 8 ?

(a) 30 (b) 17 (c) 15 (d) unpredictable

40) Electron density in the yz plane of $3d_{xy}$ orbital is _____

(a) zero (b) 0.50 (c) 0.75 (d) 0.90

41) If uncertainty in position and momentum are equal, then minimum uncertainty in velocity is _____

(a) $\frac{1}{m}\sqrt{\frac{h}{\pi}}$ (b) $\sqrt{\frac{h}{\pi}}$ (c) $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$ (d) $\frac{h}{4\pi}$

42) A macroscopic particle of mass 100 g and moving at a velocity of 100 cm S^{-1} will have a de Broglie wavelength of _____

(a) 6.6×10^{-29} cm (b) 6.6×10^{-30} cm (c) 6.6×10^{-31} cm (d) 6.6×10^{-32} cm

43) The ratio of de Broglie wavelengths of a deuterium atom to that of an α - particle, when the velocity of the former is five times greater than that of later, is _____

(a) 4 (b) 0.2 (c) 2.5 (d) 0.4

44) The energy of an electron in the 3rd orbit of hydrogen atom is -E. The energy of an electron in the first orbit will be _____

(a) -3E (b) $\frac{-E}{3}$ (c) $\frac{-E}{9}$ (d) -9E

45) Time independent Schnodinger wave equation is _____

(a) $\hat{H}\psi = E\psi$ (b) $\nabla^2\psi + \frac{8\pi^2 m}{h^2}(E+V)\psi = 0$ (c) $\frac{\partial^2\psi}{\partial x^2} + \frac{\partial^2\psi}{\partial y^2} + \frac{\partial^2\psi}{\partial z^2} + \frac{2m}{h^2}(E-V)\Psi = 0$ (d) All of these

46) Which of the following does not represent the mathematical expression for the Heisenberg uncertainty principle?

(a) $\triangle x.\ \triangle p \geq \frac{h}{4\pi}$ (b) $\triangle x.\ \triangle v \geq \frac{h}{4\pi m}$ (c) $\triangle E.\ \triangle t \geq \frac{h}{4\pi}$ (d) $\triangle E.\ \triangle x \geq \frac{h}{4\pi}$

47) Assertion: The spectrum of He^+ is expected to be similar to that of hydrogen
Reason: He^+ is also one electron system.

(a) If both assertion and reason are true and reason is the correct explanation of correct explanation of assertion.

(b) If both assertion and reason are reason are true but reason is not the correct explanation of assertion

(c) If assertion is true but reason is false (d) If both assertion and reason are false

48) Assertion: Number of radial and angular nodes for 3p orbital are 1, 1 respectively.
Reason: Number of radial and angular nodes depends only on principal quantum number.

(a) both assertion and reason are true and reason is the correct explanation of assertion.

(b) both assertion and reason are true but reason is not the correct explanation of assertion.

(c) assertion is true but reason is false (d) both assertion and reason are false

49) Electronic configuration of species M^{2+} is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6$ and its atomic weight is 56. The number of neutrons in the nucleus of species M is _____

(a) 26 (b) 22 (c) 30 (d) 24

50) What would be the IUPAC name for an element with atomic number 222?

(a) bibibiium (b) bididium (c) didibium (d) bibibium

51) The electronic configuration of the elements A and Bare $1s^2$, $2s^2$,$2p^6$,$3s^2$ and $1s^2$, $2s^2$,$2p^5$ respectively. The formula of the ionic compound that can be formed between these elements is _____

(a) AB (b) AB_2 (c) A_2B (d) none of the above

52) The group of elements in which the differentiating electron enters the anti penultimate shell of atoms are called

(a) p-block elements (b) d-block elements (c) s-block elements (d) f-block elements

53) In which of the following options the order of arrangement does not agree with the variation of property indicated against it?

(a) I< Br < CI < F (increasing electron gain enthalpy)

(b) Li < Na < K < Rb (increasing metallic radius) (c) Al^{3+}< Mg^{2+} < Na^+ - (increasing ionic size)

(d) B < C < O < N (increasing first ionisation enthalpy)

54) Which of the following elements will have the highest electro negativity _____

(a) Chlorine (b) Nitrogen (c) Cesium (d) Fluorine

55) Various successive ionisation enthalpies (in kJ mol^{-1}) of an element are given below.

IE_1	IE_2	IE_3	IE_4	IE_5
577.5	1,810	2,750	11,580	14,820

The element is

(a) phosphorus (b) Sodium (c) Aluminium (d) Silicon

56) In the third period the first ionization potential is of the order.

(a) Na > Al > Mg > Si > P (b) Na < Al < Mg < Si < P (c) Mg > Na > Si > P > Al

(d) Na< Al < Mg < Si < P

57) Identify the wrong statement.

(a) Amongst the isoelectronic species, smaller the positive charge on cation, smaller is the ionic radius

(b) Amongst isoelectric species greater the negative charge on the anion, larger is the ionic radius

(c) Atomic radius of the elements increases as one moves down the first group of the periodic table

(d) Atomic radius of the elements decreases as one moves across from left to right in the 2^{nd} period of the periodic table.

58) Which one of the following arrangements represent the correct order of least negative to most negative electron gain enthalpy _____.

(a) Al < O < C < Ca < F (b) Al < Ca < O < C < F (c) C < F < O < Al < Ca

(d) Ca < Al < C < O < F

59) The correct order of electron gain enthalpy with negative sign of F, Cl, Br and I having atomic number 9, 17, 35 and 53 respectively is _____

(a) I > Br > Cl > F (b) F > Cl > Br > I (c) Cl > F > Br > I (d) Br > I > Cl > F

60) Which one of the following is the least electronegative element?

(a) Bromine (b) Chlorine (c) Iodine (d) Hydrogen

61) The element with positive electron gain enthalpy is _____

(a) Hydrogen (b) Sodium (c) Argon (d) Fluorine

62) The correct order of decreasing electronegativity values among the elements X, Y, Z and A with atomic numbers 4, 8, 7 and 12 respectively _____

(a) Y > Z > X > A (b) Z > A > Y > X (c) X > Y > Z > A (d) X > Y > A > Z

63) The electronic configuration of the atom having maximum difference in first and second ionisation energies is _____

(a) $1s^2, 2s^2, 2p^6, 3s^1$ (b) $1s^2, 2s^2, 2p^6, 3s^2$ (c) $1s^2, 2s^2, 2p^6, 3s^2, 3s^2, 3p^6, 4s^1$

(d) $1s^2, 2s^2, 2p^6, 3s^2, 3p^1$

64) Which of the following is second most electronegative element?

(a) Chlorine (b) Fluorine (c) Oxygen (d) Sulphur

65) IE_1 and IE_2 of Mg are 179 and 348 kcal mol^{-1} respectively. The energy required for the reaction $Mg \rightarrow Mg^{2+} + 2e^-$ is _____

(a) +169 kcal mol^{-1} (b) - 169 kcal mol^{-1} (c) + 527 kcal mol^{-1} (d) - 527 kcal mol^{-1}

66) In a given shell the order of screening effect is _____

(a) s > p > d > f (b) s > p > f > d (c) f > d > p > s (d) f > p > s > d

67) Which of the following orders of ionic radii is correct?

(a) $H^- > H^+ > H$ (b) $Na^+ > F^- > O^{2-}$ (c) $F > O^{2-} > Na^+$ (d) None of these

68) The First ionisation potential of Na, Mg and Si are 496, 737 and 786 kJ mol^{-1} respectively. The ionisation potential of Al will be closer to _____

(a) 760 kJ mol^{-1} (b) 575 kJ mol^{-1} (c) 801 kJ mol^{-1} (d) 419 kJ mol^{-1}

69) Which one of the following is true about metallic character when we move from left to right in a period and top to bottom in a group?

(a) Decreases in a period and increases along the group

(b) Increases in a period and decreases in a group

(c) Increases both in the period and the group

(d) Decreases both in the period and in the group

70) How does electron affinity change when we move from left to right in a period in the periodic table?

(a) Generally increases (b) Generally decreases (c) Remains unchanged

(d) First increases and then decreases

71) Which of the following pairs of elements exhibit diagonal relationship?

(a) Be and Mg (b) Li and Mg (c) Be and B (d) Be and Al

72) Which of the following statements about hydrogen is incorrect?

(a) Hydrogen ion, H_3O^+ exists freely in solution. (b) Dihydrogen acts as a reducing agent.

(c) Hydrogen has three isotopes of which tritium is the most common.

(d) Hydrogen never acts as cation in ionic salts.

73) Water gas is _____

(a) $H_2O_{(g)}$ (b) $CO + H_2O$ (c) $CO + H_2$ (d) $CO + N_2$

74) Which one of the following statements is incorrect with regard to ortho and para dihydrogen ?

(a) They are nuclear spin isomers

(b) Ortho isomer has zero nuclear spin whereas the para isomer has one nuclear spin

(c) The para isomer is favoured at low temperatures

(d) The thermal conductivity of the para isomer is 50% greater than that of the ortho isomer

75) Ionic hydrides are formed by _____

(a) halogens (b) chalogens (c) inert gases (d) group one elements

76) Tritium nucleus contains _____

(a) 1 p+0 n (b) 2 p+1 n (c) 1 p + 2 n (d) none of these

77) Non-stoichiometric hydrides are formed by _____

(a) palladium, vanadium (b) carbon, nickel (c) manganese, lithium (d) nitrogen, chlorine

78) If a body of a fish contains 1.2 g hydrogen in its total body mass, if all the hydrogen is replaced with deuterium then the increase in body weight of the fish will be _____

(a) 1.2 g (b) 2.4 g (c) 3.6 g (d) $\sqrt{4.8}$g

79) The hardness of water can be determined by volumetrically using the reagent _____

(a) sodium thio sulphate (b) potassium permanganate (c) hydrogen peroxide (d) EDTA

80) The cause of permanent hardness of water is due to _____

(a) $Ca(HCO_3)_2$ (b) $Mg(HCO_3)_2$ (c) $CaCl_2$ (d) $MgCO_3$

81) Zeolite used to soften hardness of water is hydrated _____

(a) Sodium aluminium silicate (b) Calcium aluminium silicate (c) Zinc aluminium borate

(d) Lithium aluminium hydride

82) A commercial sample of hydrogen peroxide marked as 100 volume H_2O_2, it means that _____

(a) 1 ml of H_2O_2 will give 100 ml O_2 at STP (b) 1 L of H_2O_2 will give 100 ml O_2 at STP

(c) 1 L of H_2O_2 will give 22.4 L O_2 (d) 1 ml of H_2O_2 will give 1 mole of O_2 at STP

83) When hydrogen peroxide is shaken with an acidified solution of potassium dichromate in presence of ether, the ethereal layer turns blue due to the formation of _____

(a) Cr_2O_3 (b) CrO_4^{2-} (c) $CrO(O_2)_2$ (d) none of these

84) For decolorisation of 1 mole of acidified $KMnO_4$, the moles of H_2O_2 required is _____

(a) $\frac{1}{2}$ (b) $\frac{3}{2}$ (c) $\frac{5}{2}$ (d) $\frac{7}{2}$

85) Volume strength of 1.5 N H_2O_2 is _____

(a) 1.5 (b) 4.5 (c) 16.8 (d) 8.4

86) The hybridisation of oxygen atom is H_2O and H_2O_2 are, respectively _____

(a) sp and Sp^3 (b) sp and sp (c) Sp and Sp^2 (d) $Sp^3$and Sp^3

87) The reaction $H_3PO_2 + D_2O \rightarrow H_2DPO_2 + HDO$ indicates that hypo-phosphorus acid is _____

(a) tribasic acid (b) dibasic acid (c) mono basic acid (d) none of these

88) In solid ice, oxygen atom is surrounded _____

(a) tetrahedrally by 4 hydrogen atoms (b) octahedrally by 2 oxygen and 4 hydrogen atoms

(c) tetrahedrally by 2 hydrogen and 2 oxygen atoms (d) octahedrally by 6 hydrogen atoms

89) The type of H-bonding present in ortho nitro phenol and p-nitro phenol are respectively _____

(a) inter molecular H-bonding and intra molecular H-bonding

(b) intra molecular H-bonding and inter molecular H-bonding

(c) intra molecular H - bonding and no H - bonding

(d) intra molecular H - bonding and intra molecular H - bonding

90) Heavy water is used as _____

(a) moderator in nuclear reactions (b) coolant in nuclear reactions (c) both (a) and (b)

(d) none of these

91) Water is a _____

(a) basic oxide (b) acidic oxide (c) amphoteric oxide (d) none of these

92) Assertion: Permanent hardness of water is removed by treatment with washing soda.
Reason: Washing soda reacts with soluble calcium and magnesium chlorides and sulphates in hard water to form insoluble carbonates

(a) Both assertion and reason are true and reason is the correct explanation of assertion.

(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

(c) Assertion is true but reason is false (d) Both assertion and reason are false

93) For alkali metals, which one of the following trends is incorrect ?

(a) Hydration energy: Li > Na > K > Rb (b) Ionisation energy: Li > Na > K > Rb

(c) Density: Li < Na < K < Rb (d) Atomic size: Li < Na < K < Rb

94) Which of the following statements is in correct ?

(a) Li^+ has minimum degree of hydration among alkali metal cations

(b) The oxidation state of K in KO_2 is +1 (c) Sodium is used to make Na / Pb alloy

(d) $MgSO_4$ is readily soluble in water

95) Which of the following compounds will not evolve H_2 gas on reaction with alkali metals ?

(a) ethanoic acid (b) ethanol (c) phenol (d) none of these

96) Which of the following has the highest tendency to give the reaction $M_g^+ \xrightarrow[Medium]{Aqueous} M_{aq}^+$

(a) Na (b) Li (c) Rb (d) K

97) sodium is stored in _____

(a) alcohol (b) water (c) kerosene (d) none of these

98) RbO_2 is _____

(a) superoxide and paramagnetic (b) peroxide and diamagnetic

(c) superoxide and diamagnetic (d) peroxide and paramagnetic

99) Find the wrong statement

(a) sodium metal is used in organic qualitative analysis

(b) sodium carbonate is soluble in water and it is used in inorganic qualitative analysis

(c) potassium carbonate can be prepared by solvay process

(d) potassium bicarbonate is acidic salt

100) Lithium shows diagonal relationship with _____

(a) sodium (b) magnesium (c) calcium (d) aluminium

101) In case of alkali metal halides, the ionic character increases in the order _____

(a) MF < MCI < MBr < MI (b) MI < MBr < MCI < MF (c) MI < MBr (d) none of these

102) In which process, fused sodium hydroxide is electrolysed for extraction of sodium ?

(a) Castner's process (b) Cyanide process (c) Down process (d) All of these

103) The product obtained as a result of a reaction of nitrogen with CaC_2 is _____

(a) $Ca(CN)_3$ (b) CaN_2 (c) $CaCN_2$ (d) Ca_3N_2

104) Which of the following has highest hydration energy _____

(a) $MgCl_2$ (b) $CaCl_2$ (c) $BaCl_2$ (d) $SrCI_2$

105) Match the flame colours of the alkali and alkaline earth metal salts in the bunsen burner

(P) Sodium	(1) Brick red
(q) Calcium	(2) Yellow
(r) Barium	(3) Violet
(s) Strontium	(4) Apple green
(t) Cesium	(5) Crimsonred
(u) Potassium	(6) Blue

(a) p - 2, q - 1, r - 4, s - 5, t - 6, u - 3 (b) p - 1, q - 2, r - 4, s - 5, t - 6, u - 3

(c) p - 4, q - 1, r - 2, s - 3, t - 5, u - 6 (d) p - 6, q - 1, r - 2, s - 3, t - 5, u - 4

106) Which is the correct sequence of solubility of carbonates of alkaline earth metals ?

(a) $BaCO_3 > SrCO_3 > CaCO_3 > MgCO_3$ (b) $MgCO_3 > CaCO_3 > SrCO_3 > BaCO_3$

(c) $CaCO_3 > BaCO_3 > SrCO_3 > BaCO_3$ (d) $BaCO_3 > CaCO_3 > SrCO_3 > MaCO_3$

107) In context with beryllium, which one of the following statements is incorrect ?

(a) It is rendered passive by nitric acid (b) It forms Be_2C (c) Its salts are rarely hydrolysed

(d) Its hydride is electron deficient and polymeric

108) The suspension of slaked lime in water is known as _____

(a) lime water (b) quick lime (c) milk of lime (d) aqueous solution of slaked lime

109) A colourless solid substance (A) on heating evolved CO_2 and also gave a white residue, soluble in water. Residue also gave CO_2 when treated with dilute HCI _____

(a) Na_2CO_3 (b) $NaHCO_3$ (c) $CaCO_3$ (d) $Ca(HCO_3)_2$

110) The compound (X) on heating gives a colourless gas and a residue that is dissolved in water to obtain (B). Excess of CO_2 is bubbled through aqueous solution of B, C is formed. Solid (C) on heating gives back X.(B) is _____

(a) $CaCO_3$ (b) $Ca(OH)_2$ (c) Na_2CO_3 (d) $NaHCO_3$

111) Which of the following statement is false ?

(a) Ca^{2+} ions are not important in maintaining the regular beating of the heart

(b) Mg^{2+} ions are important in the green parts of the plants

(c) Mg^{2+} ions form a complex with ATP (d) Ca^{2+} ions are important in blood clotting

112) The name 'Blue John' is given to which of the following compounds ?

(a) CaH_2 (b) CaF_2 (c) $Ca_2(PO_4)_2$ (d) CaO

113) Formula of Gypsum is _____

(a) $CaSO_4.2H_2O$ (b) $CaSO_4 \cdot 1/2\ H_2O$. (c) $3CaSO_4.H_2O$ (d) $2CaSO_4.2H_2O$

114) When CaC_2 is heated in atmospheric nitrogen in an electric furnace the compound formed is _____

(a) $Ca(CN)_2$ (b) CaNCN (c) CaC_2N_2 (d) $CaNC_2$

115) Among the following the least thermally stable is _____

(a) K_2CO_3 (b) Na_2CO_3 (c) $BaCO_3$ (d) Li_2CO_3

116) Gases deviate from ideal behavior at high pressure. Which of the following statement(s) is correct for non-ideality?

(a) at high pressure the collision between the gas molecule become enormous

(b) at high pressure the gas molecules move only in one direction

(c) at high pressure, the volume of gas become insignificant

(d) at high pressure the intermolecular interactions become significant

117) Rate of diffusion of a gas is _____

(a) directly proportional to its density (b) directly proportional to its molecular weight

(c) directly proportional to its square root of its molecular weight

(d) inversely proportional to the square root of its molecular weight

118) Which of the following is the correct expression for the equation of state of van der Waals gas?

(a) $\left(P + \frac{a}{n^2V^2}\right)(V - nb) = nRT$ (b) $\left(P + \frac{na}{n^2V^2}\right)(V - nb) = nRT$ (c) $\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT$

(d) $\left(\frac{P+n^2a^2}{V^2}\right)(V - ab) = nRT$

119) When an ideal gas undergoes unrestrained expansion, no cooling occurs because the molecules _____

(a) are above inversion temperature (b) exert no attractive forces on each other

(c) do work equal to the loss in kinetic energy (d) collide without loss of energy

120) Equal weights of methane and oxygen are mixed in an empty container at 298 K. The fraction of total pressure exerted by oxygen is _____

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{1}{3} \times 273 \times 298$

121) The temperatures 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

122) A bottle of ammonia and a bottle of HCI connected through a long tube are opened simultaneously at both ends. The white ammonium chloride ring first formed will be _____

(a) At the center of the tube (b) Near the hydrogen chloride bottle

(c) Near the ammonia bottle (d) Throughout the length of the tube

123) The value of universal gas constant depends upon _____

(a) Temperature of the gas (b) Volume of the gas (c) Number of moles of the gas

(d) units of Pressure and volume.

124) The value of the gas constant R is _____

(a) 0.082 dm^3 atm. (b) 0.987 cal $mol^{-1}K^{-1}$ (c) 8.3 J mol^{-1} K^{-1} (d) 8 erg mol^{-1} K^{-1}

125) 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

126) The table indicates the value of van der Waals constant 'a' in $(dm^3)^2$ atm. mol^{-2}.

Gas	O_2	N_2	NH_3	CH_4
a	1.360	1.390	4.170	2.253

The gas which can be most easily liquefied is _____

(a) O_2 (b) N_2 (c) NH_3 (d) CH_4

127) Consider the following statements
i) Atmospheric pressure is less at the top of a mountain than at sea level
ii) Gases are much more compressible than solids or liquids
iii) When the atmospheric pressure increases the height of the mercury column rises.
Select the correct statement

(a) I and II (b) II and III (c) I and III (d) I, II and III

128) 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

129) At identical temperature and pressure, the rate of diffusion of hydrogen gas is $3\sqrt{3}$ times that of a hydrocarbon having molecular formula C_nH_{2n-2}. What is the value of n ?

(a) 8 (b) 4 (c) 3 (d) 1

130) Equal moles of hydrogen and oxygen gases are placed in a container, with a pin-hole through which both can escape what fraction of oxygen escapes in the time required for one-half of the hydrogen to escape.

(a) $\frac{3}{8}$ (b) $\frac{1}{2}$ (c) $\frac{1}{8}$ (d) $\frac{1}{4}$

131) The variation of volume V, with temperature T, keeping pressure constant is called the coefficient of thermal expansion ie $\alpha = \frac{1}{V}\left(\frac{\partial V}{\partial T}\right)_P$ For an ideal gas a is equal to _____

(a) T (b) 1/T (c) P (d) none of these

132) Four gases P, Q, R and S have almost same values of 'b' but their 'a' values (a, b are Vander Waals Constants) are in the order Q < R < S < P. At a particular temperature, among the four gases the most easily liquefiable one is _____

(a) P (b) Q (c) R (d) S

133) Maximum deviation from ideal gas is expected from _____

(a) $CH_4(g)$ (b) NH_3 (g) (c) H_2 (g) (d) N_2 (g)

134) The units of Vander Waals constants 'b' and 'a' respectively _____

(a) mol L^{-1} and L atm^2 mol^{-1} (b) mol L and L atm mol^2 (c) mol^{-1}L and L^2 atm mol^{-2}

(d) none of these

135) Assertion: Critical temperature of CO_2 is 304K, it can be liquefied above 304K.
Reason : For a given mass of gas, volume is to directly proportional to pressure at constant temperature

(a) both assertion and reason are true and reason is the correct explanation of assertion

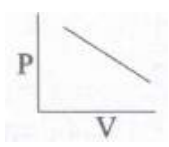
(b) both assertion and reason are true but reason is not the correct explanation of assertion

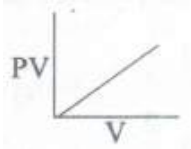
(c) assertion is true but reason is false (d) both assertion and reason are false

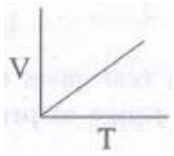
136) What is the density of N_2 gas at 227° C and 5.00 atm pressure? (R = 0.082 L atm K^{-1} mol^{-1})

(a) 1.40 g/L (b) 2.81 g/L (c) 3.41 g/L (d) 0.29 g/L

137) Which of the following diagrams correctly describes the behaviour of a fixed mass of an ideal gas? (T is measured in K)

(a) 

(b) 

(c) 

(d) All of these

138) 25g of each of the following gases are taken at 27°C and 600 mm Hg pressure. Which of these will have the least volume?

(a) HBr (b) HCI (c) HF (d) HI

139) Compressibility factor for CO_2 at 400 K and 71.0 bar is 0.8697 the molar volume of CO_2 under these conditions _____

(a) 22.04 dm^3 (b) 2.24 dm^3 (c) 0.41 dm^3 (d) 19.5 dm^3

140) In a closed room of 1000 m^3 a perfume bottle is opened up. The room develops smell. This is due to which property of gases _____

(a) Viscosity (b) Density (c) Diffusion (d) None

141) The amount of heat exchanged with surrounding at constant temperature pressure is given by the quantity _____

(a) ΔE (b) ΔH (c) ΔS (d) ΔG

142) All the naturally occurring processes proceed spontaneously in a direction which leads to _____

(a) decrease in entropy (b) increase in enthalpy (c) increase in free energy

(d) decrease in free energy

143) In an adiabatic process, which of the following is true ?

(a) q = w (b) q = 0 (c) ΔE = q (d) $P\Delta V$= 0

144) In a reversible process, the change in entropy of the universe is _____

(a) > 0 (b) > 0 (c) < 0 (d) = 0

145) In an adiabatic expansion of an ideal gas _____

(a) w = -ΔU (b) w = ΔU + ΔH (c) ΔU = O (d) w = 0

146) The intensive property among the quantities below is _____

(a) mass (b) volume (c) enthalpy (d) $\frac{mass}{volume}$

147) An ideal gas expands from the volume of 1 x 10^{-3} m^3 to 1 x 10^{-2} m^3 at 300 K against a constant pressure at 1 x 10^5 Nm^{-2}. The work done is _____

(a) - 900 J (b) 900 kJ (c) 270 kJ (d) -900 kJ

148) Heat of combustion is always _____

(a) positive (b) negative (c) zero (d) either positive or negative

149) The heat of formation of CO and CO_2 are - 26.4 kcal and - 94 kcal, respectively. Heat of combustion of carbon monoxide will be _____

(a) + 26.4 kcal (b) - 67.6 kcal (c) - 120.6 kcal (d) + 52.8 kcal

150) C(diamond)) $\longrightarrow$ C(graphite), ΔH = -ve, this indicates that _____

(a) graphite is more stable than diamond (b) graphite has more energy than diamond

(c) both are equally stable (d) stability cannot be predicted

151) The enthalpies of formation of Al_2O_3 and Cr_2O_3 are -1596 kJ and -1134 kJ, respectively. ΔH for the reaction 2AI + $Cr_2O_3 \longrightarrow 2Cr + Al_2O_3$ is _____

(a) - 1365 kJ (b) 2730 kJ (c) - 2730 kJ (d) - 462 kJ

152) Which of the following is not a thermodynamic function ?

(a) internal energy (b) enthalpy (c) entropy (d) frictional energy

153) If one mole of ammonia and one mole of hydrogen chloride are mixed in a closed container to form ammonium chloride gas, then _____

(a) $\Delta H > \Delta U$ (b) $\Delta H - \Delta U = 0$ (c) $\Delta H + \Delta U = 0$ (d) $\Delta H < \Delta U$

154) 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

155) The work done by the liberated gas when 55.85 g of iron (molar mass 55.85 g $mol^{-1)}$ reacts with hydrochloric acid in an open beaker at 25°C _____

(a) - 2.48 kJ (b) -2.22 kJ (c) +2.22 kJ (d) + 2.48 kJ

156) The value of ΔH for cooling 2 moles of an ideal monatomic gas from 125° C to 25° C at constant pressure will be [given $C_p = \frac{5}{2}R$] _____.

(a) - 250 R (b) - 500 R (c) 500 R (d) + 250 R

157) Given that $C_{(g)} + O_{2(g)} \longrightarrow CO_{2(g)} \Delta H^o = -akJ$; $2CO_{(g)} + O_{2(g)} \longrightarrow 2CO_{2(g)} \Delta H^o = -bkJ$; Calculate the AHo for the reaction $C_{(g)} + 1/2O_{2(g)} \longrightarrow CO_{(g)}$ _____

(a) $\frac{b+2a}{2}$ (b) 2a-b (c) $\frac{2a-b}{2}$ (d) $\frac{b-2a}{2}$

158) When 15.68 litres of a gas mixture of methane and propane are fully combusted at 0° C and 1 atmosphere, 32 litres of oxygen at the same temperature and pressure are consumed. The amount of heat of released from this combustion in KJ is _____ (ΔH_c (CH_4) = - 890 KJ mol^{-1} and ΔH_c (C_3H_8 = - 2220 KJ mol^{-1})

(a) - 889 $K.Jmol^{-1}$ (b) - 1390 $K.Jmol^{-1}$ (c) - 3180 $K.Jmol^{-1}$ (d) - 635.47 $K.Jmol^{-1}$

159) 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}

160) The correct thermodynamic conditions for the spontaneous reaction at all temperature is _____

(a) $\Delta H < 0$ and $\Delta S > 0$ (b) $\Delta H < 0$ and $\Delta S < 0$ (c) $\Delta H > 0$ and $\Delta S = 0$ (d) $\Delta H > 0$ and $\Delta S > 0$

161) The temperature of the system, decreases in an _____

(a) Isothermal expansion (b) Isothermal Compression (c) adiabatic expansion

(d) adiabatic compression

162) In an isothermal reversible compression of an ideal gas the sign of q, ΔS and ware respectively _____

(a) +, -, - (b) -, +, - (c) +, -, + (d) -, -, +

163) Molar heat of vapourization 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) 27° C (c) 164 K (d) 0.3 K

164) ΔS is expected to be maximum for the reaction _____

(a) $Ca_{(S)} + 1/2O_{2(g)} \longrightarrow CaO_{(S)}$ (b) $C_{(S)} + O_{2(g)} \longrightarrow CO_{2(g)}$ (c) $N_{2(g)} + O_{2(g)} \longrightarrow 2NO_{(g)}$

(d) $CaCO_{3(S)} \longrightarrow CaO_{(S)} + CO_{2(g)}$

165) The values of ΔH and ΔS for a reaction are respectively 30 kJ mol^{-1} and 100 JK^{-1} mol^{-1}. Then the temperature above which the reaction will become spontaneous is _____

(a) 300 K (b) 30 K (c) 100 K (d) 200 C

166) If K_b and K_f for a reversible reactions are 0.8×10^{-5} and 1.6×10^{-4} respectively, the value of the equilibrium constant is _____

(a) 20 (b) 0.2×10^{-4} (c) 0.05 (d) none of these

167) At a given temperature and pressure, the equilibrium constant values for the equilibria

$3A_2 + B_2 + 2C \overset{K_1}{\rightleftharpoons} 2A_3BC$ and

$A_3BC \overset{K_2}{\rightleftharpoons} 3/2\left[A_2\right] + \frac{1}{2}B_2 + C$

The relation between K_1 and K_2 is _____

(a) $K_1 = \frac{1}{\sqrt{K_2}}$ (b) $K_2 = K_1^{-1/2}$ (c) $K_1^2 = 2K_2$ (d) $\frac{K_1}{2} = K_2$

168) The equilibrium constant for a reaction at room temperature is K_1 and that at 700 K is K_2. If $K_1 > K_2$, then _____

(a) The forward reaction is exothermic (b) The forward reaction is endothermic

(c) The reaction does not attain equilibrium (d) The reverse reaction is exothermic

169) The formation of ammonia from $N_2(g)$ and $H_2(g)$ is a reversible reaction

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ + Heat

What is the effect of increase of temperature on this equilibrium reaction _____

(a) equilibrium is unaltered (b) formation of ammonia is favoured

(c) equilibrium is shifted to the left (d) reaction rate does not change

170) Solubility of carbon dioxide gas in cold water can be increased by _____

(a) increase in pressure (b) decrease in pressure (c) increase in volume (d) none of these

171) Which one of the following is incorrect statement?

(a) for a system at equilibrium, Q is always less than the equilibrium constant

(b) equilibrium can be attained from either side of the reaction

(c) presence of catalyst affects both the forward reaction and reverse reaction to the same extent

(d) Equilibrium constant varied with temperature

172) K_1 and K_2 are the equilibrium constants for the reactions respectively.

$$N_2(g) + O_2(g) \overset{K_1}{\rightleftharpoons} 2NO(g)$$

$$2NO(g) + O_2(g) \overset{K_2}{\rightleftharpoons} 2NO_2(g)$$

What is the equilibrium constant for the reaction $NO_2(g) \rightleftharpoons \frac{1}{2}N_2(g) + O_2(g)$

(a) $\frac{1}{\sqrt{K_1 K_2}}$ (b) $(K_1 = K_2)^{1/2}$ (c) $\frac{1}{2K_1K_2}$ (d) $(\frac{1}{K_1K_2})^{3/2}$

173) In the equilibrium,

$2A(g) \rightleftharpoons 2B(g) + C2(g)$

the equilibrium concentrations of A, B and C_2 at 400 K are 1×10^{-4} M, 2.0×10^{-3} M, 1.5×10^{-4} M respectively. The value of K_C for the equilibrium at 400 K is _____

(a) 0.06 (b) 0.09 (c) 0.62 (d) 3×10^{-2}

174) An equilibrium constant of 3.2×10^{-6} for a reaction means, the equilibrium is _____

(a) largely towards forward direction (b) largely towards reverse direction

(c) never established (d) none of these

175) $\frac{K_c}{K_p}$ for the reaction,

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ is _____

(a) $\frac{1}{RT}$ (b) $\sqrt{RT}$ (c) RT (d) $(RT)^2$

176) For the reaction AB (g) $\rightleftharpoons$ A(g) + B(g), at equilibrium, AB is 20% dissociated at a total pressure of P, The equilibrium constant K_P is related to the total pressure by the expression _____

(a) $P = 24\ K_P$ (b) $P = 8\ K_P$ (c) $24\ P = K_P$ (d) none of these

177) In which of the following equilibrium, K_P and K_C are not equal ?

(a) $2\ NO(g) \rightleftharpoons N_2(g) + O_2(g)$ (b) $SO_2\ (g) + NO_2 \rightleftharpoons SO_3(g) + NO(g)$ (c) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

(d) $PCl_5\ (g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

178) If x is the fraction of PCl_5 dissociated at equilibrium in the reaction
$PCl_5 \rightleftharpoons PCl_3 + Cl_2$
then starting with 0.5 mole of PCl_5, the total number of moles of reactants and products at equilibrium is _____

(a) 0.5 - x (b) x + 0.5 (c) 2x + 0.5 (d) x + 1

179) The values of K_{P1} and K_{P2} for the reactions
$X \rightleftharpoons Y + Z$
$A \rightleftharpoons 2B$ are in the ratio 9 : 1 if degree of dissociation and initial concentration of X and A be equal then total pressure at equilibrium P_1 and P_2 are in the ratio _____

(a) 36 : 1 (b) 1 : 1 (c) 3 : 1 (d) 1 : 9

180) In the reaction,
$Fe(OH)_3(s) \rightleftharpoons Fe^{3+}(aq) + 3OH^-(aq)$,
if the concentration of OH^- ions is decreased by ¼ times, then the equilibrium concentration of Fe^{3+} will

(a) not changed (b) also decreased by ¼ times (c) increase by 4 times

(d) increase by 64 times

181) Consider the reaction where $K_P = 0.5$ at a particular temperature
$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
if the three gases are mixed in a container so that the partial pressure of each gas is initially 1 atm, then which one of the following is true _____

(a) more PCl_3 will be produced (b) more Cl_2 will be produced (c) more PCl_5 will be produced

(d) none of these

182) Equimolar concentrations of H_2 and I_2 are heated to equilibrium in a 1 litre flask. What percentage of initial concentration of H_2 has reacted at equilibrium if rate constant for both forward and reverse reactions are equal _____

(a) 33% (b) 66% (c) $(33)^2$% (d) 16.5%

183) In a chemical equilibrium, the rate constant for the forward reaction is 2.5×10^2 and the equilibrium constant is 50. The rate constant for the reverse reaction is _____

(a) 11.5 (b) 5 (c) 2×10^2 (d) 2×10^{-3}

184) Which of the following is not a general characteristic of equilibrium involving physical process _____

(a) Equilibrium is possible only in a closed system at a given temperature

(b) The opposing processes occur at the same rate and there is a dynamic but stable condition

(c) All the physical processes stop at equilibrium

(d) All measurable properties of the system remains constant

185) For the formation of Two moles of $SO_3(g)$ from SO_2 and O_2, the equilibrium constant is K_1. The equilibrium constant for the dissociation of one mole of SO_3 into SO_2 and O_2 is _____

(a) $1/K_1$ (b) K_1^2 (c) $(\frac{1}{K_1})^{1/2}$ (d) $\frac{K_1}{2}$

186) Match the equilibria with the corresponding conditions,

i) Liquid ⇌ Vapour	1) melting point
ii) Solid ⇌ Liquid	2) Saturated solution
iii) Solid ⇌ Vapour	3) Boiling point
iv) Solute (s) ⇌ Solute (Solution)	4) Sublimation point
	5) Unsaturated solution

(a)

(i)	(ii)	(iii)	(iv)
1	2	3	4

(b)

(i)	(ii)	(iii)	(iv)
3	1	4	2

(c)

(i)	(ii)	(iii)	(iv)
2	1	3	4

(d)

(i)	(ii)	(iii)	(iv)
3	2	4	5

187) Consider the following reversible reaction at equilibrium, A + B ⇌ C, If the concentration of the reactants A and B are doubled, then the equilibrium constant will _____

(a) be doubled (b) become one fourth (c) be halved (d) remain the same

188) $[Co(H_2O)_6]^{2+}$ (aq) (pink) + $4Cl^-$ (aq) ⇌ $[CoCl_4]^{2-}$ (aq) (blue) + 6 H_2O (l)
In the above reaction at equilibrium, the reaction mixture is blue in colour at room temperature. On cooling this mixture, it becomes pink in colour. On the basis of this information, which one of the following is true?

(a) ΔH > 0 for the forward reaction (b) ΔH = 0 for the reverse reaction

(c) ΔH < 0 for the forward reaction

(d) Sign of the ΔH cannot be predicted based on this information

189) The equilibrium constants of the following reactions are:

$N_2 + 3H_2 \rightleftharpoons 2NH_3$: K_1
$N_2 + O_2 \rightleftharpoons 2NO$: K_2
$H_2 + ½O_2 \rightleftharpoons H_2O$: K_3

The equilibrium constant (K) for the reaction ;

$2NH_3 + 5/2O_2 \overset{K}{\rightleftharpoons} 2NO + 3H_2O$, will be

(a) $K_2^3\frac{K_3}{K_1}$ (b) $K_1\frac{K_3^3}{K_2}$ (c) $K_2\frac{K_3^3}{K_1}$ (d) $K_2\frac{K_3}{K_1}$

190) A 20 litre container at 400 K contains CO_2 (g) at pressure 0.4 atm and an excess of SrO (neglect the volume of solid SrO). The volume of the container is now decreased by moving the movable piston fitted in the container. The maximum volume of the container, when pressure of CO_2 attains its maximum value will be: Given that: $SrCO_3$ (S) ⇌ SrO (S) + CO_2(g)
KP = 1.6 atm (NEET 2017)

(a) 2 litre (b) 5 litre (c) 10 litre (d) 4 litre

191) The molality of a solution containing 1.8g of glucose dissolved in 250 g of water is _____

(a) 0.2 M (b) 0.01 M (c) 0.02 M (d) 0.04 M

192) Which of the following concentration terms is/are independent of temperature _____

(a) molality (b) molarity (c) mole fraction (d) 9a) and (c)

193) Stomach acid, a dilute solution of HCl can be neutralised by reaction with Aluminium hydroxide
Al $(OH)_3$ + 3HCl (aq) → $AlCl_3$ + 3 H_2O
How many millilitres of 0.1 M $Al(OH)_3$ solution are needed to neutralise 21 mL of 0.1 M HCl ?

(a) 14 mL (b) 7 mL (c) 21 mL (d) none of these

194) The partial pressure of nitrogen in air is 0.76 atm and its Henry's law constant is 7.6 x 10^4 atm at 300K. What is the mole fraction of nitrogen gas in the solution obtained when air is bubbled through water at 300K ?

(a) 1 x 10^{-4} (b) 1 x 10^{-6} (c) 2 x 10^{-5} (d) 1 x 10^{-5}

195) The Henry's law constant for the solubility of Nitrogen gas in water at 350 K is 8 x 10^4 atm. The mole fraction of nitrogen in air is 0.5. The number of moles of Nitrogen from air dissolved in 10 moles of water at 350K and 4 atm pressure is _____

(a) 4 x 10^{-4} (b) 4 x 10^4 (c) 2 x 10^{-2} (d) 2.5 x 10^{-4}

196) Which one of the following is incorrect for ideal solution ?

(a) $\Delta H_{mix} = 0$ (b) $\Delta U_{mix} = 0$ (c) $\Delta P = P_{observed} - P_{calculated\ by\ raoults\ law} = 0$ (d) $\Delta G_{mix} = 0$

197) Which one of the following gases has the lowest value of Henry's law constant ?

(a) N_2 (b) He (c) CO_2 (d) H_2

198) P_1 and P_2 are the vapour pressures of pure liquid components, 1 and 2 respectively of an ideal binary solution if x_1 represents the mole fraction of component 1, the total pressure of the solution formed by 1 and 2 will be _____

(a) $P_1 + x_1 (P_2 - P_1)$ (b) $P_2 - x_1 (P_2 + P_1)$ (c) $P_1 - x_2 (P_1 - P_2)$ (d) $P_1 + x_2 (P_1 - P_2)$

199) Osometic pressure (p) of a solution is given by the relation _____

(a) = nRT (b) V = nRT (c) πRT = n (d) none of these

200) Which one of the following binary liquid mixtures exhibits positive deviation from Raoults law ?

(a) Acetone + chloroform (b) Water + nitric acid (c) HCl + water (d) ethanol + water

201) The Henry's law constants for two gases A and B are x and y respectively. The ratio of mole fractions of A to B is 0.2. The ratio of mole fraction of B and A dissolved in water will be _____

(a) $\frac{2x}{y}$ (b) $\frac{y}{0.2x}$ (c) $\frac{0.2x}{y}$ (d) $\frac{5x}{y}$

202) At 100° C the vapour pressure of a solution containing 6.5g a solute in 100g water is 732mm. If K_b = 0.52, the boiling point of this solution will be _____

(a) 102°C (b) 100°C (c) 101°C (d) 100.52°C

203) According to Raoults law, the relative lowering of vapour pressure for a solution is equal to _____

(a) mole fraction of solvent (b) mole fraction of solute (c) number of moles of solute

(d) number of moles of solvent

204) At same temperature, which pair of the following solutions are isotonic ?

(a) 0.2 M $BaCl_2$ and 0.2M urea (b) 0.1 M glucose and 0.2 M urea

(c) 0.1 M NaCl and 0.1 M K_2SO_4 (d) 0.1 M Ba $(NO_3)_2$ and 0.1 M Na_2 SO_4

205) The empirical formula of a nonelectrolyte(X) is CH_2O. A solution containing six gram of X exerts the same osmotic pressure as that of 0.025 M glucose solution at the same temperature. The molecular formula of X is _____

(a) $C_2H_4O_2$ (b) $C_8H_{16}O_8$ (c) $C_4H_8O_4$ (d) CH_2O

206) The K_H for the solution of oxygen dissolved in water is 4×10^4 atm at a given temperature. If the partial pressure of oxygen in air is 0.4 atm, the mole fraction of oxygen in solution is _____

(a) 4.6×10^3 (b) 1.6×10^4 (c) 1×10^{-5} (d) 1×10^5

207) Normality of 1.25M sulphuric acid is _____

(a) 1.25 N (b) 3.75 N (c) 2.5 N (d) 2.25 N

208) Two liquids X and Y on mixing gives a warm solution. The solution is _____

(a) ideal (b) non-ideal and shows positive deviation from Raoults law

(c) ideal and shows negative deviation from Raoults Law

(d) non-ideal and shows negative deviation from Raoults Law

209) The relative lowering of vapour pressure of a sugar solution in water is 3.5×10^{-3}. The mole fraction of water in that solution is _____

(a) 0.0035 (b) 0.35 (c) 0.0035/18 (d) 0.9965

210) The mass of a non-voltaile solute (molar mass 80 g mol^{-1}) which should be dissolved in 92g of toluene to reduce its vapour pressure to 90% _____

(a) 10g (b) 20g (c) 9.2g (d) 8.89g

211) For a solution, the plot of osmotic pressure (p) verses the concentration (c in mol L^{-1}) gives a straight line with slope 310R where 'R' is the gas constant. The temperature at which osmotic pressure measured is _____

(a) 310 x 0.082 K (b) 310°C (c) 37°C (d) $\frac{310}{0.082}K$

212) 200ml of an aqueous solution of a protein contains 1.26g of protein. At 300K, the osmotic pressure of this solution is found to be 2.52 x 10^{-3} bar. The molar mass of protein will be (R = 0.083 L bar mol^{-1} K^{-1})_____

(a) 62.22 Kg mol^{-1} (b) 12444 g mol^{-1} (c) 300 g mol^{-1} (d) none of these

213) The Van't Hoff factor (i) for a dilute aqueous solution of the strong elecrolyte barium hydroxide is _____

(a) 0 (b) 1 (c) 2 (d) 3

214) What is the molality of a 10% W/W aqueous sodium hydroxide solution ?

(a) 2.778 (b) 2.5 (c) 10 (d) 0.4

215) The correct equation for the degree of an associating solute, 'n' molecules of which undergoes association in solution, is _____

(a) (b) (c) (d)

216) Which of the following aqueous solutions has the highest boiling point ?

(a) 0.1 M KNO_3 (b) 0.1 M Na_3PO_4 (c) 0.1 $BaCl_2$ (d) 0.1 M K_2SO_4

217) The freezing point depression constant for water is 1.86° K Kg mol^{-1}. If 5g Na_2SO_4 is dissolved in 45g water, the depression in freezing point is 3.64°C. The Vant Hoff factor for Na_2SO_4 is _____

(a) 2.50 (b) 2.63 (c) 3.64 (d) 5.50

218) Equimolal aqueous solutions of NaCl and KCl are prepared. If the freezing point of NaCl is –2°C, the freezing point of KCl solution is expected to be _____

(a) -2°C (b) -4°C (c) -1°C (d) 0°C

219) Phenol dimerises in benzene having van't Hoff factor 0.54. What is the degree of association ?

(a) 0.46 (b) 92 (c) 46 (d) 0.92

220) In which of the following Compounds does the central atom obey the octet rule ?

(a) XeF_4 (b) $AlCl_3$ (c) SF_6 (d) SCl_2

221) In the molecule $O_A = C = O_B$, the formal charge on O_A, C and O_B are respectively.

(a) -1, 0, +1 (b) +1, 0, -1 (c) -2, 0, +2 (d) 0, 0, 0

222) Which of the following is electron deficient ?

(a) PH_3 (b) $(CH_3)_2$ (c) BH_3 (d) NH_3

223) Which of the following molecule contain no ∧ bond ?

(a) SO_2 (b) NO_2 (c) CO_2 (d) H_2O

224) The ratio of number of sigma (σ) and pi (∧) bonds in 2- butynal is _____

(a) 8/3 (b) 5/3 (c) 8/2 (d) 9/2

225) Which one of the following is the likely bond angles of sulphur tetrafluoride molecule ?

(a) 120°,80° (b) 109°,28 (c) 90° (d) 89°,117°

226) According to Valence bond theory, a bond between two atoms is formed when _____

(a) fully filled atomic orbitals overlap (b) half filled atomic orbitals overlap

(c) non- bonding atomic orbitals overlap (d) empty atomic orbitals overlap

227) In ClF_3, NF_3 and BF_3 molecules the chlorine, nitrogen and boron atoms are _____

(a) sp^3 hybridised (b) sp^3 ,sp^3 and sp^2 respectively (c) sp^2 hybridised

(d) sp^3d, sp^3 and sp hybridised respectively

228) When one s and three p orbitals hybridise,

(a) four equvivalent orbitals at 90^o to each other will be formed

(b) four equvivalent orbitals at 109^o 28' to each other will be formed

(c) four equivalent orbitals, that are lying the same plane will be formed (d) none of these

229) Which of these represents the correct order of their increasing bond order _____

(a) $C_2 < C_2^{2-} < O_2^{2-} < O_2$ (b) $C_2^{2-} < C_2^{+} < O_2 < O_2^{2-}$ (c) $O_2^{2-} < O_2 < C_2^{2-} < C^{2+}$

(d) $O_2^{2-} < C_2^{+} < O_2 < C_2^{2-}$

230) Hybridisation of central atom in PCl_5 involves the mixing of orbitals _____

(a) s, p_x, p_y, d_{x2} , $d_{x^2-y^2}$ (b) s, p_x . p_y, p_{xy} . $d_{x^2-y^2}$ (c) s, p_x, p_y, p_z, $d_{x^2-y^2}$ (d) s, p_x, p_y, d_{xy}, $d_{x^2-y^2}$

231) The correct order of O-O bond length in hydrogen peroxide, ozone and oxygen is _____

(a) $H_2O_2 > O_3 > O_2$ (b) $O_2 > O_3 > H_2O_2$ (c) $O_2 > H_2O_2 > O_3$ (d) $O_3 > O_2 > H_2O_2$

232) Which one of the following is diamagnetic ?

(a) O_2 (b) O_2^{2-} (c) O_2^{+} (d) None of these

233) Bond order of a species is 2.5 and the number of electons in its bonding molecular orbital is formd to be 8 The no. of electons in its antibonding molecular orbital _____

(a) three (b) four (c) Zero (d) cannot be calculated form the given unformation

234) Shape and hybridisation of IF_5 are _____

(a) Trigonal bipyramidal, Sp^3d^2 (b) Trigonal bipyramidal, Sp^3d (c) Square pyramidal, Sp^3d^2

(d) Octahedral, Sp^3d^2

235) Pick out the incorrect statement from the following.

(a) Sp^3 hybrid orbitals are equivalent and are at an angle of 109^o 28' with each other

(b) dsp^2 hybrid orbitals are equivalent and bond angle between any two of them is 90^o

(c) All five sp^3d hybrid orbitals are not equivalent out of these five sp^3d hybrid orbitals, three are at an angle of 120^o, remainir two are perpendicular to the plane containing the other three

(d) none of these

236) The molecules having same hybridisation, shape and number of lone pairs of electons are _____

(a) SeF_4, XeO_2F_2 (b) SF_4, XeF_2 (c) $XeOF_4$, TeF_4 (d) $SeCl_4$, XeF_4

237) In which of the following molecules /ions BF_3, NO_2^-, H_2O the central atom is sp^2 hybridised?

(a) NH_2^- and H_2O (b) NO_2^- and H_2O (c) BF_3 and NO_2^- (d) BF_3 and NH_2^-

238) Some of the following properties of two species, NO_3^- and H_3O^+ are described below. which one of them is correct?

(a) dissimilar in hybridisation for the central atom with different structure

(b) isostructural with same hybridisation for the Central atom

(c) different hybridiration for the central atom with same structure (d) none of these

239) The types of hybridiration on the five carbon atom from right to left in the, 2,3 pentadiene.

(a) sp^3, sp^2, sp, sp^2, sp^3 (b) sp^3, sp, sp, sp, sp^3 (c) sp^2, sp, sp^2,sp^2, sp^3

(d) sp^3, sp^3, sp^2, sp^3, sp^3

240) Xe F_2 is isostructural with _____

(a) $SbCl_2$ (b) $BaCl_2$ (c) TeF_2 (d) ICI_2^-

241) Of the following molecules, which have shape similar to carbondixide?

(a) $SnCl_2$ (b) NO_2 (c) C_2H_2 (d) All of these

242) According to VSEPR theory, the repulsion between different parts of electrons obey the order.

(a) l.p – l.p > b.p – b.p > l.p – b.p (b) b.p–b.p > b.p–l.p > l.p–b.p (c) l.p–l.p > b.p–l.p > b.p–b.p

(d) b.p–b.p > l.p–l.p > b.p–l.p

243) Shape of ClF_3 is _____

(a) Planar triangular (b) Pyramidal (c) 'T' Shaped (d) none of these

244) Non- Zero dipole moment is shown by _____

(a) CO_2 (b) p-dichlorobenzene (c) carbontetrachloride (d) water

245) Which of the following conditions is not correct for resonating structures?

(a) the contributing structure must have the same number of unpaired electrons

(b) the contributing structures should have similar energies

(c) the resonance hybrid should have higher energy than any of the contributing structure

(d) none of these

246) Among the following, the compound that contains, ionic, covalent and Coordinate linkage is _____

(a) NH_4Cl (b) NH_3 (c) NaCl (d) none of these

247) CaO and NaCl have the same crystal structure and approximately the same radii. It U is the lattice energy of NaCl, the approximate lattice energy of CaO is _____

(a) U (b) 2U (c) U/2 (d) 4U

248) The percentage of s-character of the hybrid orbitals in methane, ethane, ethene and ethyne are respectively _____

(a) 25, 25, 33, 3, 50 (b) 50, 50, 33, 3, 25 (c) 50, 25, 33, 3, 50 (d) 50, 25, 25, 50

249) Select the molecule which has only one π bond.

(a) $CH_3– CH = CH – CH_3$ (b) $CH_3– CH = CH – CHO$ (c) $CH_3– CH = CH – COOH$

(d) All of these

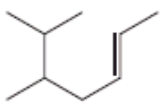
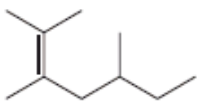
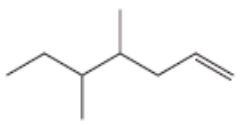
250) In the hydrocarbo $\overset{7}{C}H_3 - \overset{6}{C}H_2 - \overset{5}{C}H = \overset{4}{C}H - \overset{3}{C}H_2 - \overset{2}{C} = \overset{1}{C}H$ the state of hybridisation of carbon 1,2,3,4 and 7 are in the following sequence.

(a) sp, sp, sp^3, sp^2, sp^3 (b) sp^2, sp, sp^3, sp^2, sp^3 (c) sp, sp, sp^2, sp, sp^3 (d) none of these

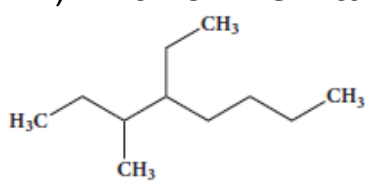
251) The general formula for alkadiene is _____

(a) C_nH_{2n} (b) C_nH_{2n-1} (c) C_nH_{2n-2} (d) C_nH_{n-2}

252) Structure of the compound whose IUPAC name is 5,6 - dimethylhept - 2 - ene is _____

(a)  (b)  (c)  (d) None of these

253) The IUPAC name of the Compound is _____



(a) 2,3 - Diemethylheptane (b) 3- Methyl -4- ethyloctane (c) 5-ethyl -6-methyloctane

(d) 4-Ethyl -3 - methyloctane

254) Which one of the following names does not fit a real name?

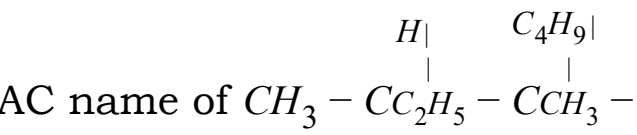
(a) 3 – Methyl –3–hexanone (b) 4–Methyl –3– hexanone (c) 3– Methyl –3– hexanol

(d) 2– Methyl cyclo hexanone

255) The IUPAC name of the compound $CH_3 – CH = CH – C \equiv CH$ is _____

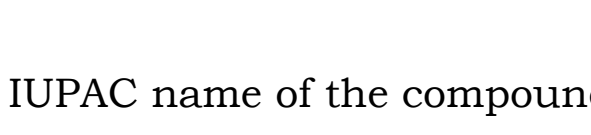
(a) Pent - 4 - yn-2-ene (b) Pent -3-en-l-yne (c) pent – 2– en – 4 – yne

(d) Pent – 1 – yn –3 –ene

256) IUPAC name of  is _____

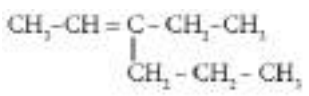
(a) 3, 4, 4 – Trimethylheptane (b) 2 – Ethyl –3, 3– dimethyl heptane

(c) 3, 4, 4 – Trimethyloctane (d) 2 – Butyl -2 –methyl – 3 – ethyl-butane

257) The IUPAC name of the compound  is _____

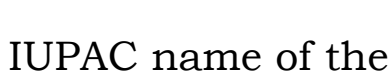
(a) 2,4,4 – Trimethylpent -2-ene (b) 2,4,4 – Trimethylpent -3-ene

(c) 2,2,4 – Trimethylpent -3-ene (d) 2,2,4 – Trimethylpent -2-ene

258) The IUPAC name of the compound  is _____

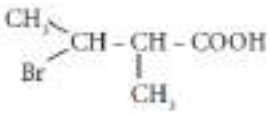
(a) 3 – Ethyl -2– hexene (b) 3 – Propyl -3– hexene (c) 4 – Ethyl – 4 – hexene

(d) 3 – Propyl -2-hexene

259) The IUPAC name of the compound  is _____

(a) 2 – Hydroxypropionic acid (b) 2 – Hydroxy Propanoic acid (c) Propan – 2– ol –1 – oic acid

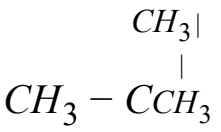
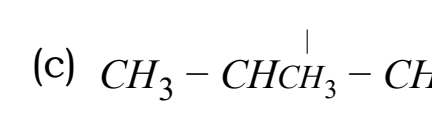
(d) 1 – Carboxyethanol

260) The IUPAC name of  is _____

(a) 2 – Bromo -3 – methyl butanoic acid (b) 2 - methyl - 3- bromobutanoic acid

(c) 3 - Bromo - 2 - methylbutanoic acid (d) 3 - Bromo - 2, 3 - dimethyl propanoic acid

261) The structure of isobutyl group in an organic compound is_____

(a) $CH_3 - CH_2 - CH_2 - CH_2 -$ (b)  (c) 

(d)

262) The number of stereoisomers of 1, 2 – dihydroxy cyclopentane _____

(a) 1 (b) 2 (c) 3 (d) 4

263) Which of the following is optically active?

(a) 3 – Chloropentane (b) 2 Chloro propane (c) Meso – tartaric acid (d) Glucose

264) The isomer of ethanol is _____

(a) acetaldehyde (b) dimethylether (c) acetone (d) methyl carbinol

265) How many cyclic and acyclic isomers are possible for the molecular formula C_3H_6O?

(a) 4 (b) 5 (c) 9 (d) 10

266) Which one of the following shows functional isomerism?

(a) ethylene (b) Propane (c) ethanol (d) CH_2Cl_2

267)  are _____

(a) resonating structure (b) tautomers (c) Optical isomers (d) Conformers

268) Nitrogen detection in an organic compound is carried out by Lassaigne's test. The blue colour formed is due to the formation of _____

(a) $Fe_3[Fe(CN)_6]_2$ (b) $Fe_4[Fe(CN)_6]_3$ (c) $Fe_4[Fe(CN)_6]_2$ (d) $Fe_3\,[Fe(CN)_6]_3$

269) Lassaigne's test for the detection of nitrogen fails in _____

(a) $H_2N - CO - NH.NH_2.HCl$ (b) $NH_2 - NH_2.\,HCl$ (c) $C_6H_5 - NH - NH_2.\,HCl$ (d) $C_6H_5\,CONH_2$

270) Connect pair of compounds which give blue colouration / precipitate and white precipitate respectively, when their Lassaigne's test is separately done.

(a) $NH_2\ NH_2\ HCl$ and $ClCH_2 - CHO$ (b) $NH_2\ CS\ NH_2$ and $CH_3 - CH_2Cl$

(c) $NH_2\ CH_2\ COOH$ and $NH_2\ CONH_2$ (d) $C_6H_5NH_2$ and $ClCH_2 - CHO$

271) Sodium nitropruside reacts with sulphide ion to give a purple colour due to the formation of _____

(a) $[Fe(CN)_5\ NO]^{3-}$ (b) $[Fe(NO)_5\ CN]^{+}$ (c) $[Fe(CN)_5NOS]^{4-}$ (d) $[Fe\ (CN)_5\ NOS]^{3-}$

272) An organic Compound weighing 0.15g gave on carius estimation, 0.12g of silver bromide. The percentage of bromine in the Compound will be close to _____

(a) 46% (b) 34% (c) 3.4% (d) 4.6%

273) A sample of 0.5g of an organic compound was treated according to Kjeldahl's method. The ammonia evolved was absorbed in 50mL of 0.5M H_2SO_4. The remaining acid after neutralisation by ammonia consumed 80mL of 0.5 MNaOH, The percentage of nitrogen in the organic compound is _____

(a) 14% (b) 28% (c) 42% (d) 56%

274) In an organic compound, phosphorus is estimated as _____

(a) $Mg_2P_2O_7$ (b) $Mg_3(PO_4)_2$ (c) H_3PO_4 (d) P_2O_5

275) Ortho and para-nitro phenol can be separated by _____

(a) azeotropic distillation (b) destructive distillation (c) steam distillation

(d) cannot be separated

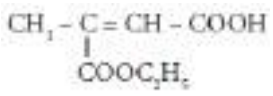
276) The purity of an organic compound is determined by _____

(a) Chromatography (b) Crystallisation (c) melting or boiling point (d) both (a) and (c)

277) A liquid which decomposes at its boiling point can be purified by _____

(a) distillation at atmospheric pressure (b) distillation under reduced pressure

(c) fractional distillation (d) steam distillation

278) Assertion:  is 3– carbethoxy -2- butenoicacid

Reason: The principal functional group gets lowest number followed by double bond (or) triple bond.

(a) both the assertion and reason are true and the reason is the correct explanation of assertion

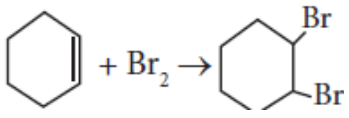
(b) both assertion and reason are true and the reason is not the correct explanation of assertion

(c) assertion is true but reason is false (d) both the assertion and reason are false

279) For the following reactions

(A) $CH_3CH_2CH_2Br + KOH \rightarrow CH_2 = CH_2 + KBr + H_2O$

(B) $(CH_3)_3CBr + KOH \rightarrow (CH_3)_3\ COH + KBr$

(C) 

Which of the following statement is correct ?

(a) (A) is elimination, (B) and (C) are substitution

(b) (A) is substitution, (B) and (C) are elimination

(c) (A) and (B) are elimination and (C) is addition reaction

(d) (A) is elimination, B is substitution and (C) is addition reaction

280) What is the hybridisation state of benzyl carbonium ion ?

(a) sp^2 (b) spd^2 (c) sp^3 (d) sp^2d

281) Decreasing order of nucleophilicity is _____.

(a) $OH^- > NH_2^- > -OCH_3 > RNH_2$ (b) $NH_2^- > OH^- > -OCH_3 > RNH_2$

(c) $NH_2^- > CH_3O^- > OH^- > RNH_2$ (d) $CH_3O^- > NH_2^- > OH^- > RNH_2$

282) Which of the following species is not electrophilic in nature ?

(a) Cl^+ (b) BH_3 (c) H_3O^+ (d) $^+NO_2$

283) Homolytic fission of covalent bond leads to the formation of _____.

(a) electrophile (b) nucleophile (c) Carbo cation (d) free radical

284) Hyper Conjugation is also known as _____.

(a) no bond resonance (b) Baker - nathan effect (c) both (a)and (b) (d) none of these

285) Which of the group has highest +I effect ?

(a) CH_3^- (b) $CH_3 - CH_2 -$ (c) $(CH_3)_2 - CH-$ (d) $(CH_3)_3 - C-$

286) Which of the following species does not exert a resonance effect ?

(a) C_6H_5OH (b) C_6H_5Cl (c) $C_6H_5NH_2$ (d) $C_6H_5\overset{+}{N}H_3$

287) -I effect is shown by _____.

(a) -Cl (b) -Br (c) both (a) and (b) (d) $-CH_3$

288) Which of the following carbocation will be most stable ?

(a) Ph_3C_-+ (b) $CH_3-\overset{+}{C}H_2$ (c) $(CH_3)_2-\overset{+}{C}H$ (d) $CH_2=CH-\overset{+}{C}H_2$

289) Heterolytic fission of C-C bond results in the formation of _____.

(a) free radical (b) Carbanion (c) Carbocation (d) Carbanion and Carbocation

290) Which of the following represent a set of nuclephiles ?

(a) BF_3, H_2O, NH^{2-} (b) $AlCl_3$, BF_3, NH_3 (c) CN^-, RCH_2^-, ROH (d) H^+, RNH_3^+, $:CCl_2$

291) Which of the following species does not acts as a nucleophile ?

(a) ROH (b) ROR (c) PCl_3 (d) BF_3

292) The geometrical shape of carbocation is _____.

(a) Linear (b) tetrahedral (c) Planar (d) Pyramidal

293) The correct statement regarding the comparison of staggered and eclipsed conformations of ethane is (NEET)_____

(a) the eclipsed conformation of ethane is more stable than staggered conformation even though the eclipsed conformation has torsional strain

(b) the staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain

(c) the staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has torsional strain

(d) the staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has no torsional strain

294) $C_2H_5Br + 2Na \xrightarrow{dry\ \ ether} C_4H_{10} + 2NaBr$ The above reaction is an example of which of the following

(a) Reimer Tiemann reaction (b) Wurtz reaction (c) Aldol condensation

(d) Hoffmann reaction

295) An alkyl bromide (A) reacts with sodium in ether to form 4, 5– diethyloctane, the compound (A) is _____

(a) $CH_3\ (CH_2)_3\ Br$ (b) $CH_3(CH_2)_5\ Br$ (c) $CH_3(CH_2)_3\ CH(Br)CH_3$

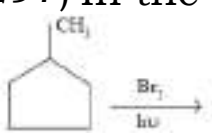
(d) $CH_3-(CH_2)_3-CH(Br)-CH_3\overset{|}{C}H_3$

296) The C – H bond and C – C bond in ethane are formed by which of the following types of overlap _____

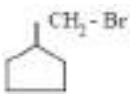
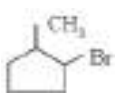
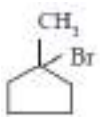
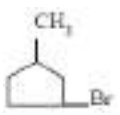
(a) sp^3 – s and sp^3 – sp^3 (b) sp^2 – s and sp^2 – Sp^2 (c) sp – sp and sp – sp

(d) p – s and p – p

297) In the following reaction,



The major product obtained is _____

(a)  (b)  (c)  (d) 

298) Which of the following is optically active _____

(a) 2 – methyl pentane (b) citric acid (c) Glycerol (d) none of these

299) The compounds formed at anode in the electrolysis of an aquous solution of potassium acetate are _____

(a) CH_4 and H_2 (b) CH_4 and CO_2 (c) C_2H_6 and CO_2 (d) C_2H_4 and Cl_2

300) The general formula for cyclo alkanes _____

(a) C_nH_n (b) C_nH_{2n} (c) $C_n\ H_{2n-2}$ (d) $C_n\ H_{2n+2}$

301) The compound that will react most readily with gaseous bromine has the formula (NEET)_____

(a) C_3H_6 (b) C_2H_2 (c) C_4H_{10} (d) C_2H_4

302) Which of the following compounds shall not produce propene by reaction with HBr followed by elemination (or) only direct elimination reaction (NEET)_____

(a) ▽ (b) $CH_3 – CH_2 – CH_2 – OH$ (c) $H_2C = C = 0$ (d) $CH_3 – CH_2 – CH_2Br$

303) Which among the following alkenes on reductive ozonolysis produces only propanone?

(a) 2 – Methyl propene (b) 2 – Methyl but – 2 - ene (c) 2, 3 – Dimethyl but – 1 – ene

(d) 2, 3 – Dimethyl but – 2 – ene

304) The major product formed when 2 – bromo – 2 – methyl butane is refluxed with ethanolic KOH is _____

(a) 2 – methylbut – 2 – ene (b) 2 – methyl butan – 1 – ol (c) 2 – methyl but – 1 – ene

(d) 2 – methyl butan – 2 – ol

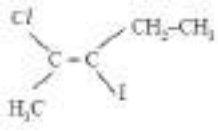
305) Major product of the below mentioned reaction is _____

$$\left(CH_3\right)_2C = CH_2 \xrightarrow{ICl}$$

(a) 2–chloro –1– iodo – 2 – methyl propane (b) 1–chloro–2–iodo–2–methylpropane

(c) 1,2 – dichloro – 2 – methyl propane (d) 1, 2 – diiodo – 2 – methyl propane

306) The IUPAC name of the following compound is _____



(a) trans–2–chloro–3–iodo – 2 – pentane (b) cis–3 – iodo – 4 – chloro – 3 – pentane

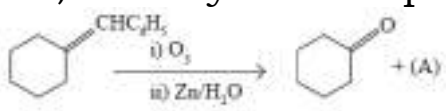
(c) trans–3–iodo–4–chloro – 3 – pentene (d) cis–2 – chloro – 3 – iodo – 2 – pentene

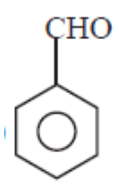
307) Cis – 2 – butene and trans – 2 – butene are _____

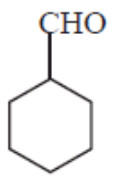
(a) conformational isomers (b) structural isomers (c) configurational isomers

(d) optical isomers

308) Identify the compound (A) in the following reaction _____



(a) 

(b) 

(c) 

(d) 

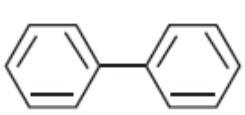
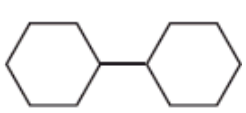
309) $CH_2Br - CH_2Br \xrightarrow{(A)} CH \equiv CH,$ where A is _____

(a) Zn (b) Conc H_2SO_4 (c) alc. KOH (d) dil H_2SO_4

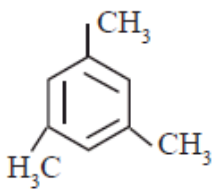
310) Consider the nitration of benzene using mixed con H_2SO_4 and HNO_3 if a large quantity of $KHSO_4$ is added to the mixture, the rate of nitration will be _____

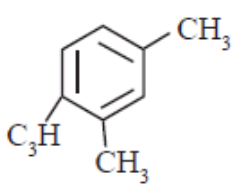
(a) unchanged (b) doubled (c) faster (d) slower

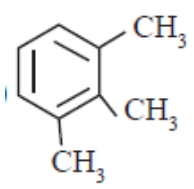
311) In which of the following molecules, all atoms are co-planar _____

(a)  (b)  (c)  (d) both (a) and (b)

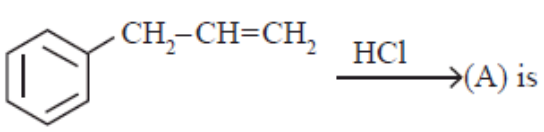
312) Propyne on passing through red hot iron tube gives _____

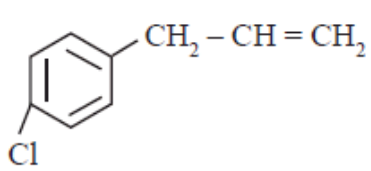
(a) 

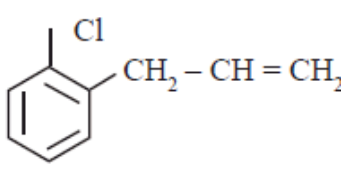
(b) 

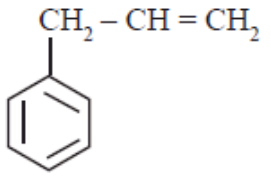
(c) 

(d) none of these

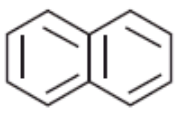
313) 

(a) 

(b) 

(c) both (a) and (b) (d) 

314) Which one of the following is non aromatic?

(a)  (b)  (c) 

(d) 

315) Which of the following compounds will not undergo Friedal – crafts reaction easily?(NEET)

(a) Nitro benzene (b) Toluene (c) Cumene (d) Xylene

316) Some meta-directing substituents in aromatic substitution are given. Which one is most deactivating?

(a) – COOH (b) $-NO_2$ (c) $-C \equiv N$ (d) $-SO_3H$

317) Which of the following can be used as the halide component for friedal - crafts reaction?

(a) Chloro benzene (b) Bromo benzene (c) chloro ethene (d) isopropyl chloride

318) An alkane is obtained by decarboxylation of sodium propionate. Same alkane can be prepared by _____

(a) Catalytic hydrogenation of propene (b) action of sodium metal on iodomethane

(c) reduction of 1 – chloro propane (d) reduction of bromomethane

319) Which of the following is aliphatic saturated hydrocarbon?

(a) C_8H_{18} (b) C_9H_{18} (c) C_8H_{14} (d) All of these

320) Identify the compound 'Z' in the following reaction

$$C_2H_6O \xrightarrow[623]{Al_2O_3} KX \xrightarrow{O_3} Y \xrightarrow{Zn/H_2O} (Z)$$

(a) Formaldehyde (b) Acetaldehyde (c) Formic acid (d) none of these

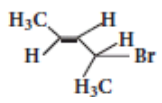
321) Peroxide effect (Kharasch effect) can be studied in case of _____

(a) Oct – 4 – ene (b) hex – 3 – ene (c) pent – 1 – ene (d) but – 2 – ene

322) 2 – butyne on chlorination gives _____

(a) 1 – chloro butane (b) 1, 2 – dichloro butane (c) 1, 1, 2, 2 – tetrachlorobutane

(d) 2, 2, 3, 3 – tetra chloro butane

323) The IUPAC name of  is _____

(a) 2-Bromo pent – 3 – ene (b) 4-Bromo pent – 2 – ene (c) 2-Bromo pent – 4 – ene

(d) 4-Bromo pent – 1 – ene

324) Of the following compounds, which has the highest boiling point?

(a) n-Butyl chloride (b) Isobutyl chloride (c) t-Butyl chloride (d) n-propyl chloride

325) Arrange the following compounds in increasing order of their density

A) CCl_4

B) $CHCl_3$

C) CH_2Cl_2

D) CH_3Cl

(a) D < C < B < A (b) C > B > A > D (c) A < B < C < D (d) C > A > B > D

326) With respect to the position of – Cl in the compound $CH_3 – CH = CH – CH_2 – Cl$, it is classified as _____

(a) Vinyl (b) Allyl (c) Secondary (d) Aralkyl

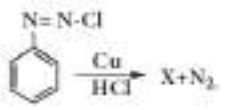
327) What should be the correct IUPAC name of diethyl chloromethane?

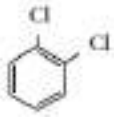
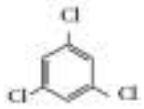
(a) 3 – Chloro pentane (b) 1-Chloropentane (c) 1-Chloro-1, 1, diethyl methane

(d) 1 –Chloro-1-ethyl propane

328) C -X bond is strongest in _____

(a) Chloromethane (b) Iodomethane (c) Bromomethane (d) Fluoromethane

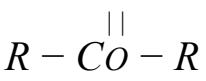
329) In the reaction  X is _____.

(a)  (b)  (c)  (d) 

330) Which of the following compounds will give racemic mixture on nucleophilic substitution by OH- ion?

(a) (i) (b) (ii) and (iii) (c) (iii) (d) (i) and (ii)

331) The treatment of ethyl formate with excess of RMgX gives _____

(a)  (b)  (c) R- CHO (d) R- O- R

332) Benzene reacts with Cl_2 in the presence of $FeCl_3$ and in absence of sunlight to form _____

(a) Chlorobenzene (b) Benzyl chloride (c) Benzal chloride (d) Benzene hexachloride

333) The name of $C_2F_4Cl_2$ is _____

(a) Freon – 112 (b) Freon – 113 (c) Freon – 114 (d) Freon – 115

334) Which of the following reagent is helpful to differentiate ethylene dichloride and ethylidene chloride?

(a) Zn / methanol (b) KOH / ethanol (c) aqueous KOH (d) $ZnCl_2$ / Con HCl

335) Match the compounds given in Column I with suitable items given in Column II

COLUMN I (COMPOUND)	COLUMN II (USES)
A. Iodoform	1. Fire extinguisher
B. Carbontetra chloride	2. Insecticide
C. CFC	3. Antiseptic
D. DDT	4. Refrigerants

(a) A → 2 B → 4 C →1 D →3 (b) A → 3 B → 2 C → 4 D → 1 (c) A → 1 B → 2 C →3 D → 4

(d) A → 3 B → 1 C →4 D → 2

336) Consider the reaction,

$CH_3CH_2CH_2Br + NaCN \rightarrow CH_3CH_2CH_2CN + NaBr$

This reaction will be the fastest in _____

(a) ethanol (b) methanol (c) DMF (N, N' – dimethyl formanide) (d) water

337) Freon-12 is manufactured from tetrachloro methane by _____

(a) Wurtz reaction (b) Swarts reaction (c) Haloform reaction (d) Gattermann reaction

338) The most easily hydrolysed molecule under SN1 condition is _____

(a) allyl chloride (b) ethyl chloride (c) ispropylchloride (d) benzyl chloride

339) The carbo cation formed in SN^1 reaction of al kyl halide in the slow step is _____

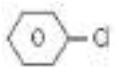
(a) sp^3 hybridised (b) sp^2 hybridised (c) sp hybridised (d) none of these

340) The major products obtained when chlorobenzene is nitrated with HNO_3 and con H_2SO_4.

(a) 1-chloro-4-nitrobenzene (b) 1-chloro-2-nitrobenzene (c) 1-chloro-3-nitrobenzene

(d) 1-chloro-1-nitrobenzene

341) Which one of the following is most reactive towards nucleophilic substitution reaction?

(a)  (b)  (c)  (d) 

342) Ethylidene chloride on treatment with aqueous KOH gives _____

(a) acetaldehyde (b) ehtyleneglycol (c) formaldehyde (d) glycoxal

343) The raw material for Rasching process _____

(a) chloro benzene (b) phenol (c) benzene (d) anisole

344) Chloroform reacts with nitric acid to produce _____

(a) nitro toluene (b) nitro glycerine (c) chloropicrin (d) chloropicric acid

345) acetone $\xrightarrow[ii)H_2O/H^{-1}]{i)CH_3MgI} X$, X is _____

(a) 2-propanol (b) 2-methyl-2-propanol (c) 1-propanol (d) acetonol

346) Silverpropionate when refluxed with Bromine in carbontetrachloride gives _____

(a) propionic acid (b) chloro ethane (c) bromo ethane (d) chloro propane

347) The gaseous envelope around the earth is known as atmosphere. The region lying between an altitudes of 11 - 50 km is _____.

(a) Troposphere (b) Mesosphere (c) Thermosphere (d) stratosphere

348) Which of the following is natural and human disturbance in ecology ?

(a) Forest fire (b) Floods (c) Acid rain (d) Green house effect

349) Bhopal Gas Tragedy is a case of _____.

(a) thermal pollution (b) air pollution (c) nuclear pollution (d) land pollution

350) Haemoglobin of the blood forms carboxy haemoglobin with _____.

(a) Carbon dioxide (b) Carbon tetra chloride (c) Carbon monoxide (d) Carbonic acid

351) Which sequence for green house gases is based on GWP ?

(a) $CFC > N_2O > CO_2 > CH_4$ (b) $CFC > CO_2 > N_2O > CH_4$ (c) $CFC > N_2O > CH_4 > CO_2$

(d) $CFC > CH_4 > N_2O > CO_2$

352) Photo chemical smog formed in congested metropolitan cities mainly consists of _____

(a) Ozone, SO_2 and hydrocarbons (b) Ozone, PAN and NO_2 (c) PAN, smoke and SO_2

(d) Hydrocarbons, SO_2 and CO_2

353) The pH of normal rain water is _____

(a) 6.5 (b) 7.5 (c) 5.6 (d) 4.6

354) Ozone depletion will cause _____.

(a) forest fires (b) eutrophication (c) bio magnification (d) global warming

355) Identify the wrong statement in the following _____.

(a) The clean water would have a BOD value of more than 5 ppm

(b) Greenhouse effect is also called as Global warming

(c) Minute solid particles in air is known as particulate pollutants

(d) Biosphere is the protective blanket of gases surrounding the earth

356) Release of oxides of nitrogen and hydrocarbons into the atmosphere by motor vehicles is prevented by using _____.

(a) grit chamber (b) scrubbers (c) trickling filters (d) catalytic convertors

357) Biochemical oxygen Demand value less than 5 ppm indicates a water sample to be _____.

(a) highly polluted (b) poor in dissolved oxygen (c) rich in dissolved oxygen (d) low COD

358) Match the List I with List II and select the correct answer using the code given below the lists.

LIST I	**LIST II**
A. Depletion of ozone layer	1. CO_2
B. Acid rain	2. NO
C. Photochemical smog	3. SO_2
D. Green house effect	4. CFC

(a)

A	B	C	D
3	4	1	2

(b)

A	B	C	D
2	1	4	3

(c)

A	B	C	D
4	3	2	1

(d)

A	B	C	D
2	4	1	3

359) Match the List I with List II and select the correct answer using the code given below the lists

LIST I	**LIST II**
A. Stone leprosy	1. CO
B. Biological magnification	2. Green house gases
C. Global warming	3. Acid rain
D. Combination with haemoglobin	4. DDT

(a)

A	B	C	D
1	2	3	4

(b)

A	B	C	D
3	4	2	1

(c)

A	B	C	D
2	3	4	1

(d)

A	B	C	D
4	2	1	3

360) Living in the atmosphere of CO is dangerous because it

(a) Combines with O_2 present inside to form CO_2 (b) Reduces organic matter of tissues

(c) Combines with haemoglobin and makes it incapable to absorb oxygen

(d) Diluted the blood

158 x 2 = 316

361) Define relative atomic mass.

362) What do you understand by the term mole ?

363) Define equivalent mass.

364) What do you understand by the term oxidation number ?

365) Calculate the molar mass of the following compounds.
urea [$CO(NH_2)_2$]

366) Calculate the number of moles present in 9 grams of ethane.

367) Calculate the number of molecules of oxygen gas that occupies a volume of 224 m /at 273 K and 3 atm pressure.

368) Calculate the molar mass of the following.
Potassium dichromate ($K_2Cr_2O_7$)

369) Calculate the molar mass of the following.
Sucrose ($C_{12}H_{22}O_{11}$)

370) By applying the knowledge of chemical classification, classify each of the following into elements, compounds or mixtures
Sea water

371) By applying the knowledge of chemical classification, classify each of the following into elements, compounds or mixtures
copper wire

372) By applying the knowledge of chemical classification, classify each of the following into elements, compounds or mixtures
Naphthalene balls

373) Write Birch reduction.

374) If an automobile engine burns petrol at a temperature of 1089K and if the surrounding temperature is 294K, calculate its maximum efficiency.

375) Write industrial preparation of ethyne.

376) Find out the products.

377) The stabilisation of a half filled d - orbital is more pronounced than that of the p-orbital why?

378) How many orbitals are possible for n = 4?

379) How many radial nodes for 2s, 4p, 5d and 4f orbitals exhibit? How many angular nodes

380) Which quantum number reveal information about the shape, energy, orientation and size of orbitals?

381) Calculate the uncertainty in the position of an electron, if the uncertainty in its velocity is 5.7×10^5 ms^{-1}.

382) How many orbitals are possible in the 4^{th} energy level? (n = 4)

383) Which ion has the stable electronic configuration? Ni^{2+} or Fe^{3+}.

384) What are isoelectronic ions? Give examples.

385) What is effective nuclear charge?

386) Is the definition given below for ionisation enthalpy correct?
"Ionisation enthalpy is defined as the energy required to remove the most loosely bound electron from the valence shell of an atom.

387) Magnesium loses electrons successively to form Mg^+, Mg^{2+} and Mg^{3+} ions. Which step will have the highest ionisation energy and why?

388) Define electro negativity.

389) How would you explain the fact that the second ionisation potential is always higher than first ionisation potential?

390) Give the general electronic configuration of lanthanides and actinides.

391) What is the basic difference in approach between Mendeleev's periodic table and modern periodic table?

392) The element with atomic number 120 has not been discovered so far. What would be the IUPAC name and the symbol for this element? Predict the possible electronic configuration of this element.

393) Predict the position of the element in periodic table satisfying the electronic configuration $(n-1)d^2$, ns^2 where n =5

394) Define modern periodic law.

395) Discuss the three types of Covalent hydrides.

396) Write the expected formulas for the hydrides of 4^{th} period elements. What is the trend in the formulas? In what way the first two numbers of the series different from the others?

397) Do you think that heavy water can be used for drinking purposes?

398) Give the systematic names for the following
Milk of magnesia

399) Write balanced chemical equation for the following processes
Heating calcium in oxygen

400) Why sodium hydroxide is much more water soluble than chloride ?

401) Write the chemical equations for the reactions involved in solvay process of preparation of sodium carbonate.

402) Give the systematic names for the following.
washing soda

403) Give the systematic names for the following.
soda ash

404) Give the systematic names for the following.
trona

405) Write balanced chemical equation for the following processes
Heating calcium carbonate

406) Write balanced chemical equation for the following processes
Evaporating a solution of calcium hydrogen carbonate.

407) Write balanced chemical equation for the following processes
Heating calcium oxide with carbon.

408) Give the mathematical expression that relates gas volume and moles.

409) Can a Van der Waals gas with a = 0 be liquefied? explain

410) Give suitable explanation for the following facts about gases.
Gases don't settle at the bottom of a container.

411) Explain whether a gas approaches ideal behavior or deviates from ideal behaviour if it is compressed to a smaller volume at constant temperature.

412) Sulphur hexafluoride is a colourless, odourless gas; calculate the pressure exerted by 1.82 moles of the gas in a steel vessel of volume 5.43 dm^3 at 69.5°C, assuming ideal gas behaviour.

413) A sample of gas has a volume of 3.8 dm^3 at an unknown temperature. When the sample is submerged in ice water at 0 °C, its volume gets reduced to 2.27 dm^3. What is its initial temperature?

414) Give suitable explanation for the following facts about gases.
Gases diffuse through all the space available to them

415) Explain whether a gas approaches ideal behavior or deviates from ideal behaviour if the temperature is raised while keeping the volume constant

416) Explain whether a gas approaches ideal behavior or deviates from ideal behaviour if more gas is introduced into the same volume and at the same temperature

417) State the first law of thermodynamics.

418) Define Hess's law of constant heat summation.

419) Explain intensive properties with two examples

420) What is the usual definition of entropy? What is the unit of entropy?

421) Predict the feasibility of a reaction when
(i) both ΔH and ΔS positive
(ii) both ΔH and ΔS negative
(iii) ΔH decreases but ΔS increases

422) Define Gibb's free energy.

423) Define molar heat capacity. Give its unit

424) Define the calorific value of food. What is the unit of calorific value?

425) Define enthalpy of neutralization

426) What is lattice energy?

427) Give Kelvin statement of second law of thermodynamics.

428) State the third law of thermodynamics.

429) Identify the state and path function out of the following:
a) Enthalpy
b) Entropy
c) Heat
d) Temperature
e) Work
f) Free energy.

430) Calculate ΔH_r^0 for the reaction $CO_2(g) + H_2(g) \rightarrow CO(g) + H_2O(g)$ given that ΔH^f_0 for CO_2 (g), CO (g) and H_2O (g) are - 393.5, - 111.31 and - 242 kJ mol^{-1} respectively.

431) If there is no change in concentration, why is the equilibrium state considered dynamic?

432) For a given reaction at a particular temperature, the equilibrium constant has constant value. Is the value of Q also constant? Explain.

433) Consider the following reactions,
$H_2(g) + I_2(g) \rightleftharpoons 2\ HI$
In each of the above reaction find out whether you have to increase (or) decrease the volume to increase the yield of the product.

434) State law of mass action.

435) Consider the following reaction
$CaCO_3\ (s) \rightleftharpoons CaO\ (s) + CO_2(g)$
In the above reaction find out whether you have to increase (or) decrease the volume to increase the yield of the product.

436) Consider the following reactions,
$CaCO_3\ (s) \rightleftharpoons CaO\ (s) + CO_2(g)$
In the above reaction find out whether you have to increase (or) decrease the volume to increase the yield of the product.

437) Consider the following reactions,
$S(s) + 3F_2\ (g) \rightleftharpoons SF_6\ (g)$
In the above reaction find out whether you have to increase (or) decrease the volume to increase the yield of the product.

438) 2.82 g of glucose is dissolved in 30 g of water. Calculate the mole fraction of glucose and water.

439) 0.2 m aqueous solution of KCl freezes at -0.68°C calculate van't Hoff factor. k_f for water is 1.86 K kg mol^{-1}.

440) Define molality

441) What is osmosis ?

442) Define the term 'isotonic solution'.

443) A sample of 12 M Concentrated hydrochloric acid has a density 1.2 gL^{-1} Calculate the molality.

444) How much volume of 6 M solution of NaOH is required to prepare 500 mL of 0.250 M NaOH solution ?

445) Define Normality

446) Define the following
Bond order

447) What is a pi bond ?

448) Define bond energy.

449) Define the following
σ- bond

450) Define the following
Hybridisation

451) Write the resonance structures for N_2O.

452) Draw the lewis structure for
Sulphur trioxide (SO_3)

453) Draw the lewis structure for
Phosphoric acid

454) Calculate the formal charge on each atom of carbonyl chloride($COCl_2$).

455) Draw the lewis structure for
Nitrous acid (HNO_2)

456) Write the resonance structures for
Ozone molecule

457) Draw the MO diagram for acetylide ion C_2^{2-} and calculate its bond order.

458) Write structural formula for the following compounds
m - dinitrobenzene

459) What is meant by a functional group ? Identify the functional group in the following compounds.
Acetaldehyde

460) Give the general formula for the following classes of organic compounds
Aliphatic monohydric alcohol

461) Give a brief description of the principles of
Fractional distillation

462) Write structural formula for the following compounds
Cyclohexa-1,4-diene

463) Give two examples for each of the following type of organic compounds.
non-benzonoid aromatic

464) Give two examples for each of the following type of organic compounds.
aromatic heterocyclic

465) Give two examples for each of the following type of organic compounds.
alicyclic

466) Give two examples for each of the following type of organic compounds.
aliphatic open chain.

467) What is meant by a functional group ? Identify the functional group in the following compounds.
oxalic acid.

468) What is meant by a functional group ? Identify the functional group in the following compounds.
Di methyl ether

469) What is meant by a functional group ? Identify the functional group in the following compounds.
Methylamine

470) Give the general formula for the following classes of organic compounds
Aliphatic ketones.

471) Give the general formula for the following classes of organic compounds
Aliphatic amines.

472) Give a brief description of the principles of
Column Chromatography.

473) Write short notes on Resonance.

474) Write short notes on Hyperconjucation.

475) Give IUPAC names for the following compounds
$CH_3 – CH = CH – CH = CH – C \equiv C – CH_3$

476) How will you convert ethyl chloride in to
i) ethane
ii) n – butane

477) Write the chemical equations for combustion of propane.

478) Explain Markow nikoff's rule with suitable example.

479) What happens when ethylene is passed through cold dilute alkaline potassium permanganate.

480) Write the structures of folowing alkanes.
1) 2, 3 – Dimethyl – 6 – (2 – methyl propyl) decane
2) 5 – (2 – Ethyl butyl) – 3, 3 – dimethyldecane
3) 5 – (1, 2 – Dimethyl propyl) – 2 – methylnonane.

481) How will you distinguish 1 – butyne and 2 – butyne?

482) Draw the structural formula for 4,5 -diethyl -3,4,5- trimethyl octane

483) Water destroys Grignard reagents why?

484) Write down the combustion reaction of propane whose ΔH° = -2220 kJ

485) Draw the structures for the following alkenes.
6 – Bromo – 2,3 – dimethyl – 2 – hexene

486) Draw the structure and write down the IUPAC name for the isomerism exhibited by the molecular formulae:
C_5H_{10} – Pentene (3 isomers).

487) Prepare propyne from its corresponding alkene.

488) write all possible isomers for a monosubstituted aromatic benzenoid compound having the molecular formula C_9H_{12}

489) Give IUPAC names for the following compound
$(CH_3)_3\ C – C \equiv C – CH\ (CH_3)_2$

490) Give IUPAC names for the following compound
ethyl isopropyl acetylene

491) Give IUPAC names for the following compound
$CH \equiv C – C \equiv C – C \equiv CH$

492) Write the IUPAC names for the following alkenes.

493) Draw the structures for the following alkenes.
5 – Bromo – 4 – chloro – 1 – heptene

494) Draw the structures for the following alkenes.
4 – Methyl – 2 pentene

495) Draw the structure and write down the IUPAC name for the isomerism exhibited by the molecular formulae:
C_6H_{12} – Hexene (5 isomers)

496) Why chlorination of methane is not possible in dark?

497) Give reasons for polarity of C-X bond in halo alkane.

498) Why is it necessary to avoid even traces of moisture during the use of Grignard reagent?

499) Mention any three methods of preparation of haloalkanes from alcohols.

500) Compare S_N1 and S_N2 reaction mechanisms.

501) Discuss the aromatic nucleophilic substitutions reaction of chlorobenzene.

502) Account for the following
(i) t-butyl chloride reacts with aqueous KOH by S_N1 mechanism while n-butyl chloride reacts with S_N2 mechanism.
(ii) p-dichloro benzene has higher melting point than those of o-and m-dichloro benzene.

503) In an experiment ethyliodide in ether is allowed to stand over magnesium pieces. Magnesium dissolves and product is formed
a) Name the product and write the equation for the reaction.
b) Why all the reagents used in the reaction should be dry? Explain
c) How is acetone prepared from the product obtained in the experiment.

504) Write a chemical reaction useful to prepare the following:
i) Freon-12 from Carbon tetrachloride
ii) Carbon tetrachloride from carbon disulphide

505) What are Freons? Discuss their uses and environmental effects

506) Predict the products when bromoethane is treated with the following
i) KNO_2
ii) $AgNO_2$

507) Explain the mechanism of S_N1 reaction by highlighting the stereochemistry behind it

508) Write short notes on the the following
i) Raschig process
ii) Dows Process
iii) Darzens process

509) Starting from CH_3MgI, How will you prepare the following?
i) Acetic acid
ii) Acetone
iii) Ethyl acetate
iv) Iso propyl alcohol
v) Methyl cyanide.

510) neo-pentyl bromide undergoes nucleophilic substitution reactions very slowly - justify.

511) Chloroform is kept with a little ethyl alcohol in a dark coloured bottle why?

512) Define smog.

513) Which is considered to be earth's protective umbrella ? Why ?

514) What are degradable and nondegradable pollutants ?

515) From where does ozone come in the photo chemical smog ?

516) What is green chemistry ?

517) How does classical smog differ from photochemical smog ?

518) What are particulate pollutants ? Explain any three.

200 x 3 = 600

519) Distinguish between oxidation and reduction.

520) The density of carbon dioxide is equal to 1.965 kgm^{-3} at 273 K and 1 atm pressure. calculate the molar mass of CO_2.

521) In a reaction $x + y + z_2 \longrightarrow xyz_2$ identify the Limiting reagent if any, in the following reaction mixtures.
200 atoms of x + 200 atoms of y + 50 molecules of z_2

522) What is the difference between molecular mass and molar mass ? Calculate the molecular mass and molar mass for carbon monoxide.

523) How many moles of ethane is required to produce 44 g of $CO_{2(g)}$ after combustion.

524) Hydrogen peroxide is an oxidising agent. It oxidises ferrous ion to ferric ion and reduced itself to water. Write a balanced equation.

525) By applying the knowledge of chemical classification, classify each of the following into elements, compounds or mixtures
Sugar

526) Calculate the amount of water produced by the combustion of 32 g of methane.

527) How many moles of hydrogen is required to produce 10 moles of ammonia ?

528) How much volume of carbon dioxide is produced when 50 g of calcium carbonate is heated completely under standard conditions ?

529) How much volume of chlorine is required to form 11.2 L of HCI at 273 K and 1 atm pressure?

530) An acid found in tamarinds on analysis shows the following percentage composition : 32% Carbon; 4% Hydrogen ; 64% Oxygen Find the empirical formula of the compound.

531) Calculate the equivalent mass of potassium dichromate. The reduction half - reaction in acid medium is, $Cr_2 O_7^{2-} + 14 H^+ + 6e^- \rightarrow 2 Cr^{3+} + 7 H_20$

532) In a reaction $x + y + z_2 \longrightarrow xyz_2$ identify the Limiting reagent if any, in the following reaction mixtures.
2.5 mol of x + 5 mol of y + 5 mol of z_2

533) Explain briefly the time independent schrodinger wave equation?

534) Give the electronic configuration of Mn^{2+} and Cr^{3+}

535) Show that the circumference of the Bohr orbit for the hydrogen atom is an integral multiple of the de Broglie wave length associated with the electron revolving arround the nucleus.

536) Determine the values of all the four quantum numbers of the 8^{th} electron in O- atom and 15^{th} electron in Cl atom.

537) An ion with mass number 37 possesses unit negative charge. If the ion contains 11.1% more neutrons than electrons, Find the symbol of the ion.

538) The Li^{2+} ion is a hydrogen like ion that can be described by the Bohr model. Calculate the Bohr radius of the third orbit and calculate the energy of an electron in 4^{th} orbit.

539) Protons can be accelerated in particle accelerators. Calculate the wavelength (in Å) of such accelerated proton moving at 2.85×10^8 ms^{-1} (the mass of proton is 1.673×10^{-27} Kg).

540) Show that if the measurement of the uncertainty in the location of the particle is equal to its de Broglie wavelength, the minimum uncertainty in its velocity is equal to its velocity $1/4\pi$ of its velocity (V).

541) Calculate the de-Broglie wavelength of an electron that has been accelerated from rest through a potential difference of 1 keV.

542) Energy of an electron in hydrogen atom in ground state is -13.6 eV. What is the energy of the electron in the second excited state?

543) How many unpaired electrons are present in the ground state of Fe^{3+} (z = 26), Mn^{2+}(z = 25) and argon (z = 18)?

544) Explain the meaning of the symbol $4f^2$. Write all the four quantum numbers for these electrons.

545) Calculate the total number of angular nodes and radial nodes present in 3d and 4f orbitals.

546) Energy of an electron in the ground state of the hydrogen atom is -2.8×10^{-18} J. Calculate the ionisation enthalpy of atomic hydrogen in terms of kJ mol^{-1}.

547) The electronic configuration of atom is one of the important factor which affects the value of ionisation potential and electron gain enthalpy. Explain.

548) In what period and group will an element with Z = 118 will be present?

549) Justify that the fifth period of the periodic table should have 18 elements on the basis of quantum numbers.

550) Why halogens act as oxidising agents?

551) Mention any two anomalous properties of second period elements.

552) A student reported the ionic radii of isoelectronic species X^{3+},Y^{2+} and Z^- as 136 pm,64 pm and 49 pm respectively.Is that oreder correct?Comment

553) Explain why hydrogen is not placed with the halogen in the periodic table.

554) Predict which of the following hydrides is a gas on a solid
(a) BCI
(b) NaH
Give your reason.

555) Write chemical equation for the following reactions.
i) reaction of hydrogen with tungsten (VI) oxide on heating.
(ii) hydrogen gas and chlorine gas.

556) Why interstitial hydrides have a lower density than the parent metal.

557) Hydrogen peroxide can function as an oxidising agent as well as reducing agent. substantiate this statement with suitable examples.

558) What is water-gas shift reaction?

559) What are isotopes? Write the names of isotopes of hydrogen.

560) Give the uses of heavy water?

561) Explain the exchange reactions of deuterium.

562) Mention the uses of deuterium.

563) How do you expect the metallic hydrides to be useful for hydrogen storage?

564) Justify the position of hydrogen in the periodic table?

565) Explain preparation of hydrogen using electrolysis.

566) Write balanced chemical equation for each of the following chemical reactions.
Lithium metal with nitrogen gas.

567) Substantiate lithium fluoride has the lowest solubility among group one metal fluorides.

568) Mention the uses of plaster of paris

569) Beryllium halides are Covalent whereas magnesium halides are ionic why ?

570) How is plaster of paris prepared ?

571) Give the uses of gypsum.

572) An alkali metal (x) forms a hydrated sulphate, $X_2SO_4 \bullet 10\ H_2O$. Is the metal more likely to be sodium (or) potassium.

573) Why alkaline earth metals are harder than alkali metals.

574) Write balanced chemical equation for each of the following chemical reactions.
Heating solid sodium bicarbonate

575) Write balanced chemical equation for each of the following chemical reactions.
Rubidum with oxgen gas

576) Write balanced chemical equation for each of the following chemical reactions.
solid potassium hydroxide with CO_2

577) Write balanced chemical equation for each of the following chemical reactions.
Heating calcium carbonate

578) Write balanced chemical equation for each of the following chemical reactions.
Heating calcium with oxygen

579) State Boyle's law.

580) Name two items that can serve as a model for Gay Lusaac's law and explain.

581) What are ideal gases? In what way real gases differ from ideal gases.

582) Explain the following observation
Aerated water bottles are kept under water during summer

583) Suggest why there is no hydrogen (H_2) in our atmosphere. Why does the moon have no atmosphere?

584) Aerosol cans carry clear warning of heating of the can. Why?

585) Would it be easier to drink water with a straw on the top of Mount Everest?

586) When ammonia combines with HCI, NH_4CI is formed as white dense fumes. Why do more fumes appear near HCI ?

587) A sample of gas at 15°C at 1 atm. has a volume of 2.58 dm^3. When the temperature is raised to 38°C at 1 atm does the volume of the gas increase? If so, calculate the final volume.

588) It takes 192 sec for an unknown gas to diffuse through a porous wall and 84 sec for N_2 gas to effuse at the same temperature and pressure. What is the molar mass of the unknown gas ?

589) A combustible gas is stored in a metal tank at a pressure of 2.98 atm at 25°C. The tank can withstand a maximum pressure of 12 atm after which it will explode. The building in which the tank has been stored catches fire. Now predict whether the tank will blow up first or start melting? (Melting point of the metal = 1100 K).

590) Freon-12, the compound widely used in the refrigerator system as coolant causes depletion of ozone layer. Now it has been replaced by eco friendly compounds. Consider 1.5 dm^3 sample of gaseous Freon at a pressure of 0.3 atm. If the pressure is changed to 1.2 atm. at a constant temperature, what will be the volume of the gas increased or decreased?

591) Inside a certain automobile engine, the volume of air in a cylinder is 0.375 dm^3, when the pressure is 1.05 atm. When the gas is compressed to a volume of 0.125 dm^3 at the same temperature, what is the pressure of the compressed air?

592) An athlete in a kinesiology research study has his lung volume of 7.05 dm^3 during a deep inhalation. At this volume, the lungs contain 0.312 mole of air. During exhalation, the volume of his lung decreases to 2.35 dm^3. How many moles of air does the athlete exhale during exhalation? (assume pressure and temperature remain constant).

593) An unknown gas diffuses at a rate of 0.5 time that of nitrogen at the same temperature and pressure. Calculate the molar mass of the unknown gas.

594) Explain the following observation
Liquid ammonia bottle is cooled before opening the seal

595) Explain the following observation
The tyre of an automobile is inflated to slightly lesser pressure in summer than in winter

596) What are state and path functions? Give two examples

597) The equilibrium constant of a reaction is 10, what will be the sign of ΔG? Will this reaction be spontaneous?

598) Enthalpy of neutralization is always a constant when a strong acid is neutralized by a strong base: account for the statement

599) What are spontaneous reactions? What are the conditions for the spontaneity of a process

600) State the various statements of second law of thermodynamics.

601) 1 mole of an ideal gas, maintained at 4.1 atm and at a certain temperature, absorbs heat 3710 J and expands to 2 litres. Calculate the entropy change in expansion process.

602) Calculate the enthalpy of hydrogenation of ethylene from the following data. Bond energies of C - H, C - C , C = C and H - H are 414, 347, 618 and 435 kJ mol^{-1}

603) The standard enthalpies of formation of SO_2 and SO_3 are -297 kJ mol^{-1} and -396 kJ mol^{-1} respectively. Calculate the standard enthalpy of reaction for the reaction: $SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$

604) Calculate the entropy change when 1 mole of ethanol is evaporated at 351 K The molar heat of vaporisation of ethanol is 39.84 kJ mol^{-1}.

605) Calculate the amount of heat necessary to raise 180 g of water from 25°C to 100°C. Molar heat capacity of water is 75.3 J $mol^{-1}K^{-1}$.

606) An engine operating between 127°C and 47°C takes some specified amount of heat from a high temperature reservoir. Assuming that there are no frictional losses, calculate the percentage efficiency of an engine.

607) Urea on hydrolysis produces ammonia and carbon dioxide. The standard entropies of urea, H_2O, CO_2, NH_3 are 173.8, 70, 213.5 and 192.5 J $mole^{-1}K^{-1}$ respectively. Calculate the entropy change for this reaction.

608) Calculate the value of ΔU and ΔH on heating 128 g of oxygen from O°C to 100°C. C_v and C_p on an average are 21 and 29 J mol^{-1} K^{-1}. (The difference is 8 J mol^{-1} K^{-1} which is approximately equal to R)

609) Calculate the enthalpy of combustion of ethylene at 300 K at constant pressure, if its heat of combustion at constant volume (ΔU) is -1406 kJ .

610) The value of K_c for the following reaction at 717 K is 48.

611) One mole of H_2 and one mole of I_2 are allowed to attain equilibrium in 1 lit container. If the equilibrium mixture contains 0.4 mole of HI. Calculate the equilibrium constant.

612) For an equilibrium reaction K_p = 0.0260 at 25° C ΔH= 32.4 kJmol^{-1}, calculate Kp at 37° C

613) 1 mol of PCl_5, kept in a closed container of volume 1 dm^3 and was allowed to attain equilibrium at 423 K. Calculate the equilibrium composition of reaction mixture. (The K_c value for PCl_5 dissociation at 423 K is 2)

614) What is the relation between K_P and K_C. Give one example for which K_P is equal to K_C.

615) For a gaseous homogeneous reaction at equilibrium, number of moles of products are greater than the number of moles of reactants. Is K_C is larger or smaller than K_P.

616) When the numerical value of the reaction quotient (Q) is greater than the equilibrium constant (K), in which direction does the reaction proceed to reach equilibrium?

617) State Le-Chatelier principle.

618) Explain how will you predict the direction of a equilibrium reaction.

619) What is the effect of added inert gas on the reaction at equilibrium at constant volume.

620) One mole of PCl_5 is heated in one litre closed container. If 0.6 mole of chlorine is found at equilibrium, calculate the value of equilibrium constant.

621) 1 mol of CH_4, 1 mole of CS_2 and 2 mol of H_2S are 2 mol of H_2 are mixed in a 500 ml flask. The equilibrium constant for the reaction $K_C = 4 \times 10^{-2}$ mol^2 lit^{-2}. In which direction will the reaction proceed to reach equilibrium ?

622) Deduce the Vant Hoff equation.

623) The partial pressure of carbon dioxide in the reaction $CaCO_3$ (s) ⇌ CaO (s) + CO_2(g) is 1.017×10^{-3} atm at 500^0C. Calculate K_p at 600^0C for the reaction. ΔH for the reaction is 181 KJ mol^{-1} and does not change in the given range of temperature.

624) The antiseptic solution of iodopovidone for the use of external application contains 10 % w/v of iodopovidone. Calculate the amount of iodopovidone present in a typical dose of 1.5 mL.

625) A litre of sea water weighing about 1.05 kg contains 5 mg of dissolved oxygen (O_2). Express the concentration of dissolved oxygen in ppm.

626) What volume of 4M HCl and 2M HCl should be mixed to get 500 mL of 2.5 M HCl ?

627) Describe how would you prepare the following solution from pure solute and solvent
(a) 1 L of aqueous solution of 1.5 M $CoCl_2$.
(b) 500 mL of 6.0% (V/V) aqueous methanol solution.

628) 0.24 g of a gas dissolves in 1 L of water at 1.5 atm pressure. Calculate the amount of dissolved gas when the pressure is raised to 6.0 atm at constant temperature.

629) Explain why the aquatic species are more comfortable in cold water during winter season rather than warm water during the summer.

630) Calculate the mole fractions of benzene and naphthalene in the vapour phase when an ideal liquid solution is formed by mixing 128 g of naphthalene with 39 g of benzene. It is given that the vapour pressure of pure benzene is 50.71 mm Hg and the vapour pressure of pure naphthalene is 32.06 mmHg at 300 K.

631) Vapour pressure of a pure liquid A is 10.0 torr at 27°C. The vapour pressure is lowered to 9.0 torr on dissolving one gram of B in 20 g of A. If the molar mass of A is 200 then calculate the molar mass of B.

632) An aqueous solution of 2% nonvolatile solute exerts a pressure of 1.004 bar at the boiling point of the solvent. What is the molar mass of the solute when P_A is 1.013 bar ?

633) 0.75 g of an unknown substance is dissolved in 200 g water. If the elevation of boiling point is 0.15 K and molal elevation constant is 7.5 K Kg mol^{-1} then, calculate the molar mass of unknown substance

634) The depression in freezing point is 0.24K obtained by dissolving 1g NaCl in 200g water. Calculate van't-Hoff factor. The molal depression constant is 1.86 K Kg mol^{-1}.

635) What is a vapour pressure of liquid ?
What is relative lowering of vapour pressure ?

636) State Raoult law and obtain expression for lowering of vapour pressure when nonvolatile solute is dissolved in solvent.

637) What is molal depression constant ? Does it depend on nature of the solute ?

638) You are provided with a solid 'A' and three solutions of A dissolved in water - one saturated, one unsaturated, and one super saturated. How would you determine which solution is which ?

639) A 0.25 M glucose solution at 370.28 K has approximately the pressure as blood does what is the osmotic pressure of blood ?

640) Calculate the molality of a solution containing 7.5 g of glycine (NH_2 - CH_2 - COOH) dissolved in 500 g of water.

641) Which solution has the lower freening point ? 10 g of methanol (CH_3OH) in 100 g of water (or) 20 g of ethanol (C_2H_5OH) in 200 g of water.

642) How many moles of solute particles are present in one litre of 10^{-4} M potassium sulphate ?

643) In CH_4, NH_3 and H_2O, the central atom undergoes sp^3 hybridisation - yet their bond angles are different. why ?

644) Draw the M.O diagram for oxygen molecule calculate its bond order and show that O_2 is paramagnetic.

645) Draw MO diagram of CO and calculate its bond order.

646) What do you understand by Linear combination of atomic orbitals in MO theory.

647) What is dipole moment ?

648) Linear form of carbondioxide molecule has two polar bonds. yet the molecule has Zero dipolement why ?

649) Which bond is stronger σ or π ? Why ?

650) Hydrogen gas is diatomic where as inert gases are monoatomic – explain on the basis of MO theory.

651) What is Polar Covalent bond ? explain with example.

652) Arrange the following in the decreasing order of Bond angle
C_2H_2, BF_3, CCl_4

653) Bond angle in PH^+_4 is higher than in PH_3. Why ?

654) Explain the ionic bond formation in a) MgO and b) CaF_2

655) The observed bond length of N_2^+ is larger than N_2 while the bond length in NO^+ is less than in NO. Why ?

656) Write structural formula for the following compounds
(i) Cyclohexa-1, 4-diene
(ii) Ethynyl cyclohexane.

657) Write all the possible isomers of molecular formula $C_4H_{10}O$ and identify the isomerisms found in them.

658) 0.16 g of an organic compound was heated in a carius tube and H_2SO_4 acid formed was precipitated with $BaCl_2$. The mass of $BaSO_4$ was 0.35g. Find the percentage of sulphur [30.04]

659) 0.185 g of an organic compound when treated with Conc. HNO_3 and silver nitrate gave 0.320 g of silver bromide. Calculate the % of bromine in the compound. (Ag =108, Br = 80)

660) Give the general characteristics of organic compounds?

661) Write the molecular formula of the first six members of homologous series of nitro alkanes.

662) Give the IUPAC names of the following compounds.
$(CH_3)_2CH - CH_2 - CH(CH_3) - CH(CH_3)_2$

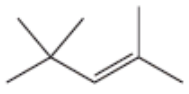
663) Describe optical isomerism with suitable example.

664) 0.3 g of an organic compound on kjeldahl's analysis gave enough ammonia to just neutralize 30 mL of 0.1N H_2SO_4. Calculate the percentage of nitrogen in the compound.

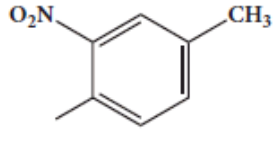
665) Give the IUPAC names of the following compounds.

$CH_2 - CH_2 - \underset{|}{CHOH} - CHO$

666) Give the IUPAC names of the following compounds.



667) Give the IUPAC names of the following compounds.



668) Give the structure for the following compound.
1,3,5- Trimethyl cyclohex - 1 -ene

669) Give the structure for the following compound.
Tertiary butyl iodide

670) Give the structure for the following compound.
3 - Chlorobutanal

671) Give the structure for the following compound.
3 - Chlorobutanol

672) Give the structure for the following compound.
2 - Chloro - 2- methyl propane

673) Give the structure for the following compound.
1, 3- Dimethylcyclohexane

674) Give the structure for the following compound.
3-Chlorobut - 1 - ene

675) What are electrophiles and nucleophiles ? Give suitable examples for each.

676) Show the heterolysis of covalent bond by using curved arrow notation and complete the following equations.
Identify the nucleophile is each case.
CH_3 - Br + KOH →

677) Explain electromeric effect.

678) Give examples for the following types of organic reactions
β - elimination.

679) Show the heterolysis of covalent bond by using curved arrow notation and complete the following equations.
Identify the nucleophile is each case.
CH_3 - OCH_3 + HI →

680) Give examples for the following types of organic reactions.
Electrophilic substitution.

681) Describe the mechanism of Nitration of benzene.

682) How does Huckel rule help to decide the aromatic character of a compound.

683) Suggest the route for the preparation of the following from benzene.
3 – chloro nitrobenzene

684) Suggest a simple chemical test to distinguish propane and propene.

685) What happens when isobutylene is treated with acidified potassium permanganate?

686) Write the structural formula and carbon skeleton formula for all possible chain isomers of C_6H_{14} (Hexane)

687) Is it possible to prepare methane by Kolbe's Electrolytic method

688) How toluene can be prepared by this method ?

689) Why ethane is produced in chlorination of methane ?

690) An organic compund (A) C_2H_4 decolourises bromine water. (A) on reaction with chlorine gives (B) A reacts with HBr to give (C).identify (A),(B),(C), Explain the reactions

691) Calculate the number of rings present in $C_{18}H_{12}$.

692) write all possible isomers for an aromatic benzenoid compound having the molecular formula C_8H_{10}

693) How benzene can be prepared by Grignard Reagent

694) Why benzene undergoes electrophilic substitution reaction whereas alkenes undergoes addition reaction ?

695) Convert Ethyne to Benzene and name the process.

696) Toluene undergoes nitration easily than benzene.Why?

697) Write short notes on ortho, para directors in aromatic electrophilic substitution reactions.

698) Suggest the route for the preparation of the following from benzene.
m - dinitro benzene.

699) How will you prepare n propyl iodide from n-propyl bromide?

700) How does chlorobenzene react with sodium in the presence of ether? What is the name of the reaction?

701) What happens when acetyl chloride is treated with excess of CH_3MgI?

702) Arrange the following alkyl halide in increasing order of bond enthalpy of RX
CH_3Br, CH_3F, CH_3Cl, CH_3I

703) What happens when chloroform reacts with oxygen in the presence of sunlight?

704) Write down the possible isomers of $C_5H_{11}Br$ and give their IUPAC and common names.

705) An organic compound (A) with molecular formula C_2H_5Cl reacts with KOH gives compounds (B) and with alcoholic KOH gives compound (C). Identify (A),(B), and (C)

706) Two isomers (A) and (B) have the same molecular formula $C_2H_4Cl_2$. Compound (A) reacts with aqueous KOH gives compound (C) of molecular formula C_2H_4O. Compound (B) reacts with aqueous KOH gives compound(D) of molecular formula $C_2H_6O_2$. Identify (A), (B), (C) and (D).

707) Write all possible chain isomers with molecular formula $C_5H_{11}Cl$

708) Why Grignard reagent should be prepared in anhydrous condition?

709) Haloalkanes undergo nucleophilic substitution reaction whereas haloarenes undergo electrophilic substitution reaction. comment.

710) What is the IUPAC name of the insecticide DDT? Why is their use banned in most of the countries?

711) Write the structure of the following compound
1,4 – Dichlorobut – 2 – ene

712) Dissolved oxygen in water is responsible for aquatic life. What processes are responsible for the reduction in dissolved oxygen in water ?

713) What would happen, if the greenhouse gases were totally missing in the earth's atmosphere ?

714) A person was using water supplied by corporation. Due to shortage of water he started using underground water. He felt laxative effect. What could be the cause ?

715) Explain how does greenhouse effect cause global warming.

716) Mention the standards prescribed by BIS for quality of drinking water.

717) Even though the use of pesticides increases the crop production, they adversely affect the living organisms. Explain the function and the adverse effects of the pesticides.

718) On the basis of chemical reactions involved, explain how do CFC's cause depletion of ozone layer in stratosphere ?

103 x 5 = 515

719) Mass of one atom of an element is 6.645×10^{-23}g. How many moles of element are there in 0.320 kg.

720) What is the empirical formula of the following?
i) Fructose ($C_6H_{12}O_6$) Found in honey
ii) Caffeine ($C_8H_{10}N_4O_2$) a substance found in tea and Coffee

721) Calculate the empirical and molecular formula of a compound containing 76.6% carbon, 6.38 % hydrogen and rest oxygen its vapour density is 47.

722) Balance the following equations by ion electron method.
$KMnO_4 + SnCl_2 + HCI \longrightarrow MnCI_2 + SnCI_4 + H_2O + KCI$

723) Balance the following equations by oxidation number method
$K_2Cr_2O_7 + KI + H_2SO_4 \longrightarrow K_2SO_4 + Cr_2(SO_4) + I_2 + H_2O$

724) Experimental analysis of a compound containing the elements x,y,z on analysis gave the following data.
x = 32 %, y = 24 %, z = 44 %. The relative number of atoms of x, y and z are 2, 1 and 0.5, respectively. (Molecular mass of the compound is 400 g) Find out.
i) The atomic masses of the element x,y,z.
ii) Empirical formula of the compound and
iii) Molecular formula of the compound.

725) The balanced equation for a reaction is given below $2x + 3y \rightarrow 41 + m$
When 8 moles of x react with 15 moles of y, then
i) Which is the limiting reagent ?
ii) Calculate the amount of products formed.
iii) Calculate the amount of excess reactant left at the end of the reaction

726) A Compound on analysis gave the following percentage composition C = 54.55%, H = 9.09%, O = 36.36%. Determine the empirical formula of the compound.

727) Calculate the percentage composition of the elements present in magnesium carbonate. How many kilogram of CO_2 can be obtained by heating 1 kg of 90 % pure magnesium carbonate.

728) Balance the following equation using oxidation number method
$As_2S_3 + HNO_3 + H_2O \rightarrow H_3AsO_4 + H_2SO_4 + NO$

729) What are the rules of assigning oxidation number to an element ? Explain with examples ?

730) Balance the following equations by oxidation number method

$$Cu + HNO_3 \longrightarrow Cu\left(No_3\right)_2 + No_2 + H_2O$$

731) i) What is effective nuclear charge?

732) State and explain pauli exclusion principle.

733) Define orbital ? what are the n and 1 values for $3p_x$ and $4d_{x^2-y^2}$ electron ?

734) Describe the Aufbau principle

735) What is the de Broglie wavelength (in cm) of a 160 g cricket ball travelling at 140 Km hr^{-1}.

736) What is the de Broglie wave length of an electron, which is accelerated from the rest, through a potential difference of 100 V ?

737) An atom of an element contains 35 electrons and 45 neutrons. Deduce
(i) the number of protons
(ii) the electronic configuration for the element
(iii) All the four quantum numbers for the last electron

738) i) Describe the Aufbau principle.
ii) What is effective nuclear charge ?

739) Explain the pauling method for the determination of ionic radius.

740) Explain the periodic trend of ionisation potential.

741) Explain the diagonal relationship.

742) Why the first ionisation enthalpy of sodium is lower than that of magnesium while its second ionisation enthalpy is higher than that of magnesium.

743) By using paulings method calculate the ionic radii of K^+ and Cl^- ions in the potassium chloride crystal. Given that $dk^+\text{-}cl^-$=3.14 Å.

744) Explain the following, give appropriate reasons.
(i) Ionisation potential of N is greater than that of O.
(ii) First ionisation potential of C-atom is greater than that of B atom, where as the reverse is true is for second ionisation potential.
(iii) The electron affinity values of Be, Mg and noble gases are zero and those of N (0.02 eV) and P (0.80 eV) are very low.
(iv) The formation of F-(g) from F(g) is exothermic while that of O^{2-}(g) from O (g) is endothermic.

745) What is screening effect? Briefly give the basis for pauling's scale of electronegativity.

746) State the trends in the variation of electronegativity in group and periods.

747) Using Slater's rule calculate the effective nuclear charge on a 3p electron in aluminium and chlorine. Explain how these results relate to the atomic radius of the two atoms.

748) NH_3 has exceptionally high melting point and boiling point as compared to those of the hydrides of the remaining element of group 15. Explain.

749) How do you convert para hydrogen into ortho hydrogen?

750) A group-1 metal (A) which is present in common salt reacts with (B) to give compound (C) in which hydrogen is present in –1 oxidation state. (B) on reaction with a gas (C) to give universal solvent (D). The compound (D) on reacts with (A) to give (E), a strong base. Identify A, B, C, D and E. Explain the reactions.

751) Compare the structures of H_2O and H_2O_2 .

752) Which would you expect to have a higher melting point magnesium oxide or magnesium fluoride ? Explain your reasoning.

753) Discuss briefly the similarities between beryllium and aluminium.

754) Alkaline earth metal (A), belongs to 3rd period reacts with oxygen and nitrogen to form compound (B) and (C) respectively. It undergo metal displacement reaction with $AgNO_3$ solution to form compound (D).

755) Explain the important common features of Group 2 elements.

756) Describe briefly the biological Importance of Calcium and magnesium.

757) Distinguish between diffusion and effusion.

758) Write the Van der Waals equation for a real gas. Explain the correction term for pressure and volume.

759) Derive the values of critical constants in terms of van der Waals constants.

760) Why do astronauts have to wear protective suits when they are on the surface of moon?

761) A mixture of He and O_2 were used in the 'air' tanks of underwater divers for deep dives. For a particular dive 12 dm^3 of O_2 at 298 K, 1 atm. and 46 dm^3 of He, at 298 K, 1 atm. were both pumped into a 5 dm^3 tank. Calculate the partial pressure of each gas and the total pressure in the tank at 298K

762) A flammable hydrocarbon gas of particular volume is found to diffuse through a small hole in 1.5 minutes. Under the same conditions of temperature and pressure an equal volume of bromine vapour takes 4.73 min to diffuse through the same hole. Calculate the molar mass of the unknown gas and suggest what this gas might be, (Given that molar mass of bromine = 159.8 g/mole).

763) Define the following terms
(a) isothermal process (b) adiabatic process
(c) isobaric process (d) isochoric process

764) Write down the Born-Haber cycle for the formation of $CaCl_2$

765) List the characteristics of internal energy.

766) Explain how heat absorbed at constant volume is measured using bomb calorimeter with a neat diagram.

767) Calculate the work involved in expansion and compression process.

768) Derive the relation between ΔH and ΔU for an ideal gas. Explain each term involved in the equation.

769) Suggest and explain an indirect method to calculate lattice enthalpy of sodium chloride crystal

770) List the characteristics of Gibbs free energy

771) Calculate the work done when 2 moles of an ideal gas expands reversibly and isothermally from a volume of 500 ml to a volume of 2 L at 25°C and normal pressure.

772) Calculate the standard heat of formation of propane, if its heat of combustion is -2220.2 kJ mol^{-1}. the heats of formation of $CO_{2(g)}$ and $H_2O(l)$ are -393.5 and -285.8 kJ mol^{-1} respectively

773) For the reaction $Ag_2O_{(s)} \rightarrow 2Ag_{(s)} + \frac{1}{2}O_{2(g)}$: ΔH =30.56 kJ mol^{-1} and AS = 6.66JK^{-1} mol^{-1} (at 1 atm). Calculate the temperature at which ΔG is equal to zero. Also predict the direction of the reaction (i) at this temperature and (ii) below this temperature.

774) When I-pentyne (A) is treated with 4N alcoholic KOH at 175°C, it is converted slowly into an equilibrium mixture of 1.3% I-pentyne(A) , 95.2% 2-pentyne(B) and 3.5% of 1,2 pentadiene (C) the equilibrium was maintained at 175°C, calculate $\Delta G0$ for the following equilibria.
B $\rightleftharpoons$ AGIO?
B $\rightleftharpoons$ CG20?

775) A gas mixture of 3.67 lit of ethylene and methane on complete combustion at 25°C and at 1 atm pressure produce 6.11 lit of carbondioxide. Find out the amount of heat evolved in kJ, during this combustion. ($\Delta H_c(CH_4)$= - 890 kJ mol^{-1} and ($\Delta H_c(C_2H_4)$ = -1423 kJ mol^{-1}

776) If an automobile engine burns petrol at a temperature of 816° C and if the surrounding temperature is 21° C, calculate its maximum possible efficiency

777) Calculate the standard entropy change for the following reaction (Δs_f^0), given the standard entropies of $CO_{2(g)}$, $C_{(s)}$ '$O_{2(g)}$ as 213.6, 5.740, and 205 JK^{-1} respectively.

778) Calculate the entropy change during the melting of one mole of ice into water at 0°C and 1 atm pressure. Enthalpy of fusion of ice is 6008 J mol^{-1}.

779) Calculate AG^0 for conversion of oxygen to ozone $\frac{3}{2}O_2(g) \rightarrow O_{3(g)}$ at 298 K, if K_p for this conversion is 2.47 x 10^{-29} in standard pressure units.

780) When a mole of magnesium bromide is prepared from 1 mole of magnesium and 1 mele of liquid bromine, 524 kJ of energy is released.
The heat of sublimation of Mg meta) is 148 kJ mol^{-1}, The heat of dissociation of bromine gas into atoms is 193 kJ mol^{-1}. The heat of vapourisation of liquid bromine is 31 kJ mol^{-1}. The ionisation energy of magnesium is 2187 kJ mol^{-1} and the electron affinity of bromine is - 662 kJ mol^{-1}. Calculate the lattice energy of magnesium bromide.

781) The equilibrium constant at 298 K for a reaction is 100.
A + B $\rightleftharpoons$ C + D
If the initial concentration of all the four species is 1 M, the equilibrium concentration of D (in mol lit^{-1}) will be

782) Derive a general expression for the equilibrium constant K_P and K_C for the reaction $3H_2(g) + N_2(g) \rightleftharpoons 2NH_3(g)$.

783) Derive the relation between K_P and K_C.

784) 28 g of Nitrogen and 6 g of hydrogen were mixed in a 1 litre closed container. At equilibrium 17 g NH_3 was produced. Calculate the weight of nitrogen, hydrogen at equilibrium.

785) A sealed container was filled with 1 mol of A_2 (g), 1 mol B_2 (g) at 800 K and total pressure 1.00 bar. Calculate the amounts of the components in the mixture at equilibrium given that K = 1 for the reaction
A_2 (g) + B_2 (g) $\rightleftharpoons$ 2AB (g)

786) State and explain Henry's law.

787) Explain the effect of pressure on the solubility.

788) Henry's law constant for solubility of methane in benzene is 4.2 x 10^{-5} mm Hg at a particular constant temperature At this temperature.
Calculate the solubility of methane at
i) 750 mm Hg
ii) 840 mm Hg

789) The observed depression in freezing point of water for a particular solution is 0.093° C. Calculate the concentration of the solution in molality. Given that molal depression constant for water is 1.86 K Kg mol^{-1}.

790) The vapour pressure of pure benzene (C_6H_6) at a given temperature is 640 mm Hg. 2.2 g of non-volatile solute is added to 40 g of benzene. The vapour pressure of the solution is 600 mm Hg. Calculate the molar mass of the solute ?

791) Explain Sp^2 hybridisation in BF_3.

792) Discuss the formation of N_2 molecule using MO Theory

793) Explain the bond formation in $BeCl_2$ and $MgCl_2$.

794) Explain resonance with reference to carbonate ion ?

795) Explain the bond formation in ethylene and acetylene.

796) What type of hybridisations are possible in the following geometeries ?
a) octahedral
b) tetrahedral
c) square planer

797) Explain VSEPR theory. Applying this theory to predict the shapes of IF_7, and SF_6.

798) Explain the covalent character in ionic bond.

799) Describe fajan's rule.

800) Of the two molecules OCS and CS_2 which one has higher dipole moment value ? Why ?

801) 0.26g of an organic compound gave 0.039 g of water and 0.245 g of carbon dioxide on combustion. Calculate the percentage of C & H.

802) Describe the classification of organic compounds based on their structure.

803) Write a note on homologous series.

804) Give the structure for the following compound.
3- ethyl - 2 methyl -1-pentene

805) Describe the reactions involved in the detection of nitrogen in an organic compound by Lassaigne method.

806) Give the principle involved in the estimation of halogen in an organic compound by carius method.

807) Explain paper chromatography.

808) Explain varions types of constitutional isomerism (structural isomerism) in organic compounds

809) Briefly explain geometrical isomerism in alkene by considering 2- butene as an example.

810) 0.30 g of a substance gives 0.88 g of carbon dioxide and 0.54 g of water calculate the percentage of carbon and hydrogen in it.

811) The ammonia evolved form 0.20 g of an organic compound by kjeldahl method neutralised 15ml of N/20 sulphare acid solution. Calculate the percentage of Nitrogen.

812) In the estimation of nitrogen present in an organic compound by Dumas method 0.35 g yielded 20.7 mL of nitrogen at 150 C and 760 mm pressure. Calculate the percentage of nitrogen in the compound.

813) 0.6 g of an organic compound was Kjeldalised and NH_3 evolved was absorbed into 50 mL of semi-normal solution of H_2SO_4. The residual acid solution was diluted with distilled water and the volume made up to 150 mL. 20 mL of this diluted solution required 35 mL of N/20 NaOH solution for complete neutralization. Calculate the % of N in the compound.

814) Explain inductive effect with suitable example.

815) How is propyne prepared from an alkyene dihalide?

816) How propene is prepared form 1, 2-dichloro propane?

817) How ozone reacts with 2-methyl propene ?

818) How is acid rain formed ? Explain its effect

819) Differentiate the following
(i) BOD and COD
(ii) Viable and non-viable particulate pollutants

820) Explain how oxygen deficiency is caused by carbon monoxide in our blood ? Give its effect

821) What are the various methods you suggest to protect our environment from pollution ?

****