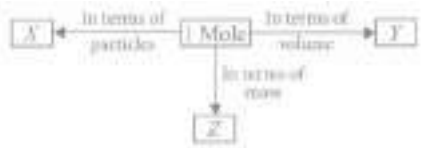
1. Boron has two stable isotopes, ^{10}B (19%) and ^{11}B (81%). Average atomic weight for boron in the periodic table is:
   a) 10.8 b) 10.2 c) 11.2 d) 10.0
2. Choose the molecular formula of an oxide of iron in which the mass per cent of iron and oxygen are 69.9 and 30.1 respectively and its molecular mass is 160.
   a) FeO b) Fe_3O_4 c) Fe_2O_3 d) FeO_2
3. Volume occupied by one molecule of water (density = 1 g cm-3) is :
   a) $9.0 \times 10^{-23} cm^3$ b) $6.023 \times 10^{-23} cm^3$ c) $3.0 \times 10^{-23} cm^3$ d) $5.5 \times 10^{-23} cm^3$
4. The total number of valence electrons in 4.2 g of $N3^-$ ion is (N_A is the Avogadro's number)
   a) $2.1N_A$ b) $4.2\ N_A$ c) $1.6\ N_A$ d) $3.2\ N_A$
5. Specific volume of cylindrical virus particle is 6.02×10^{-2} cc/gm, whose radius and length are 7 Å and 10 Å respectively. If $N_A = 6.02 \times 10^{23}$, find molecular weight of virus:
   a) 1.54 kg/mol b) 1.54×10^4 kg/mol c) 3.08×10^4 kg/mol d) 3.08×10^3 kg/mol
6. Which mode of concentration does not change with temperature?
   a) Molarity b) Normality c) Molality d) All of these
7. 1 g of Mg is burnt in a closed vessel containing 0.5 g of O_2.Which reactant is limiting reagent and how much of the excess reactant will be left?
   a) 0_2 is a limiting reagent and Mg is in excess by 0.25 g. b) Mg is a limiting reagent and is in excess by 0.5 g.
   c) 0_2 is a limiting reagent and is in excess by 0.25 g. d) 0_2 is a limiting reagent and Mg is in excess by 0.75 g.
8. **Assertion:** Solids have definite volume and shape.
   Reason: In solids, the constituent particles are very close to each other and there is not much freedom of movement
   a) If both assertion and reason are true and reason is the correct explanation of assertion.
   b) If both assertion and 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.
9. Packing of Na^+ and Cl^- ions in sodium chloride is depicted by the given figure. Choose the correct option regarding formula mass of sodium chloride.

   a) In the solid state, sodium chloride does not exist as a single entity. b) Formula mass of NaCl is 68.0 u
   c) Formula mass of NaCl is the sum of atomic masses of Na and Cl. d) Both (a) and (c)
10. Fill in the blanks by choosing the correct options.



a)

X	Y	Z
6.023 x 10^{23} molecules	22.4 L at any pressure	Gram Molecular mass

b)

X	Y	Z
6.023 x 10^{23} atoms/molecules	22.4 L at NTP	Gram atomic mass

c)

X	Y	Z
6.023 x 10^{23} atoms	22.4 L at any temperature	1 gram

d)

X	Y	Z
6.023 x 10^{23} particles	11.2 L at NTP	Molar volume

11. If the concentration of glucose ($C_6H_{12}O_6$) in blood is 0.9 g L^{-l}, what will be the molarity of glucose in blood?
    a) 5 M b) 50 M c) 0.005 M d) 0.5 M
12. How many grams of concentrated nitric acid solution should be used to prepare 250 mL of 2.0 M HNO_3? The concentrated acid is 70% HNO_3.
    a) 45.0 g conc. HNO_3 b) 90.0 g conc. HNO_3 c) 70.0 g conc. HNO_3 d) 540 g conc. HNO_3
13. Hydrogen gas is prepared in the laboratory by reacting dilute HCl with granulated zinc. Following reaction takes place:
    $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
    What would be the volume of hydrogen gas liberated at STP when 32.65 g of zinc reacts with HCl?
    a) 10.03 L b) 11.35 L c) 11.57 L d) 9.53 L
14. Ratio of C_p and C_v - of a gas 'X' C is 1: 4- The number of atoms of the gas 'X' present in 11.2 L of it at NTP will be
    a) 6.02 x 10^{23} b) 1.2 x 10^{23} c) 3.01 x 10^{23} d) 2.01 x 10^{23}
15. If Avogadro number N_A, is changed from 6.022 x 10^{23} mol^{-1} to 6.022 x 10^{20} mol^{-1} this would change:
    a) the definition of mass in units of grams. b) the mass of one mole of carbon.
    c) the ratio of chemical species to each other in balanced equation.
    d) the ratio of elements to each other in a compound.
16. Which of the following is the most accurate measurement?
    a) 9 m b) 9.0 m c) 9.00 m d) 9.000 m
17. Two elements 'P' and 'Q' combine to form a compound. Atomic mass of 'P' is 12 and 'Q' is 16. Percentage of 'P' in the compound is 27.3. What will be the empirical formula of the compound?
    a) P_2Q_2 b) PQ c) P_2Q d) PQ_2
18. **Assertion:** In laboratory, a solution of a desired concentration is prepared by diluting a stock solution.
    Reason : Stock solution is the solution of higher concentration.
    a) If both assertion and reason are true and reason is the correct explanation of assertion.
    b) If both assertion and 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.
19. A solution is prepared by adding 5 g of a solute 'X' to 45 g of solvent 'Y. What is the mass per cent of the solute 'X'?
    a) 10% b) 11.1% c) 90% d) 75%
20. 10 g of hydrogen and 64 g of oxygen were filled in a steel vessel and exploded. Amount of water produced in this reaction will be :
    a) 2 moles b) 3 moles c) 4 moles d) 1 moles
21. Which set of figures will be obtained after rounding up the following up to three significant figures?
    34.216,0.04597, 10.4107
    a) 34.3,0.0461,10.4 b) 34.2, 0.0460, 10.4 c) 34.20,0.460,10.40 d) 34.21,4.597, 1.04
22. How many number of aluminium ions are present in 0.051 g of aluminium oxide?
    a) 6.023 x 10^{20} ions b) 3 ions c) 6.023 x 10^{23} ions d) 9 ions
23. Which of the following statements is correct about the reaction given below? $4Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3(g)$
    a) The total mass of reactants = Total mass of the products. It follows the law of conservation of mass.
    b) Total mass of reactants = total mass of product; therefore, law of multiple proportions is followed.

c) Amount of Fe_2O_3 can be increased by taking anyone of the reactants (iron or oxygen) in excess.

d)

Amount of Fe_2O_3 produced will decrease if the amount of anyone of the reactants (iron or oxygen) is taken in excess.

24. 1.4 moles of phosphorus trichloride are present in a sample. How many atoms are there in the sample?
a) 5.6 b) 34 c) 2.4×10^{23} d) 3.372×10^{24}

25. A compound contains two elements 'X' and 'Y' in the ratio of 50% each. Atomic mass of 'X' is 20 and 'Y' is 40. What can be its simplest formula?
a) XY b) X_2Y c) XY_2 d) X_2Y_3

26. 45.4 L of dinitrogen reacted with 22.7 L of dioxygen and 45.4 L of nitrous oxide was formed. The reaction is given below:
$2N_2(g) + O_2(g) \rightarrow 2N_2O(g)$
Which law is being obeyed in this experiment?
a) Gay Lussac's law b) Law of definite proportion c) Law of multiple proportion d) Avogadro's law

27. At NTP, 1 L of O_2 reacts with 3 L of carbon monoxide. What will be the volume of CO and CO_2 after the reaction?
a) 1 L CO_2, 1 L CO b) 2 L CO_2, 2 L CO c) 1 LCO_2,2 LCO d) 2 L CO_2, 1 L CO

28. Atomic masses of elements are usually fractional because:
a) they are mixtures of isotopes b) they contain impurities of other atoms c) they are mixtures of isobars
d) atomic masses cannot be weighed accurately

29. Which will make basic buffer?
a) 100 mL of 0.1 MCH_3COOH+ 100ml of 0.l MNaOH b) 100 mL of 0.1 M HCl + 200 mL of 0.1 MNH_4OH
c) 100 mL of 0.1 MHCl + 100ml of 0.l MNaOH d) 50 mL of 0. 1 MNaOH + 25 mL of 0. l MCH_3COOH

30. What mass of sodium chloride would be decomposed by 9.8 g of sulphuric acid if 12 g of sodium bisulphate and 2.75 g of hydrogen chloride were produced in a reaction?
a) 14.75 g b) 3.8 g c) 4.95 g d) 2.2 g

31. The energy absorbed by each molecule (A_2) of a substance is 4.4×10^{-19}J and bond energy per molecule is 4.0×10^{-19}J. The kinetic energy of the molecule per atom will be :
a) 2.0×10^{-20}J b) 2.2×10^{-19}J c) 2.0×10^{-19}J d) 4.0×10^{-20}J

32. If n = 6, the correct sequence for filling of electrons will be:
a) $ns \rightarrow (n-1)f \rightarrow (n-1)d \rightarrow np$ b) $ns \rightarrow (n-1)f \rightarrow (n-2)d \rightarrow np$ c) $ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$
d) $ns \rightarrow np(n-1)d \rightarrow (n-2)f$

33. Kinetic energy of photoelectrons is independence _____of incident radiation
a) Wavelength b) Wave number c) Frequency d) Intensity

34. Assertion: The characteristics of cathode rays do not depend upon the material of electrodes and the nature of the gas present in the cathode ray tube.
Reason: Cathode rays consist of negatively charged particles, called electrons.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and 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

35. If the radius of first Bohr orbit is x pm, then the radius of the third orbit would be
a) (3 × x) pm b) (6 × x) pm c) $\left(\frac{1}{2} \times x\right)$pm d) (9 × x) pm

36. For a 3s-orbital $\Psi(3s) = \frac{1}{9\sqrt{3}}\left(\frac{1}{a_0}\right)^{3/2}(6-6\sigma+\sigma^2)e^{-\sigma/2}$; where $\sigma=\frac{2r.Z}{3a_0}$ what is the maximum radial distance of node from nucleus?
a) $\frac{(3+\sqrt{3})a_0}{z}$ b) $\frac{a_0}{Z}$ c) $\frac{3}{2}\frac{(3+\sqrt{3})a_0}{z}$ d) $\frac{2a_0}{Z}$

37. The energy absorbed by the electron is
a) 8.5 eV b) 3.4 eV c) 68 eV d) 3.78 eV

38. The orbital angular momentum of a p-electron is given as
a) $\sqrt{\frac{h}{\sqrt{2\pi}}}$ b) $\sqrt{3}\frac{h}{\sqrt{2\pi}}$ c) $\sqrt{\frac{3}{2}}\frac{h}{2\pi}$ d) $\sqrt{6}\cdot\frac{h}{2\pi}$

39. Three energy levels P. Q, R of a certain atom are such that $E_p < E_Q < E_R$. If λ_1, $\lambda_2$and λ_3 are the wave length or radiation corresponding to transition R → Q ; Q → P and R → P respectively. The correct relationship between λ_1, λ_2 and λ_3 is
a) $\lambda_1+\lambda_2=\lambda_3$ b) $\frac{1}{\lambda_3}=\frac{1}{\lambda_1}+\frac{1}{\lambda_2}$ c) $\lambda_3=\sqrt{\lambda_1\lambda_2}$ d) $\frac{2}{\lambda_3}=\frac{1}{\lambda_1}+\frac{1}{\lambda_2}$

40. A proton and an α-particle are accelerated through the same potential difference. The ratio of their De Broglie wavelength is:
a) $\sqrt{2}$ b) $\frac{1}{\sqrt{2}}$ c) $2\sqrt{2}$ d) 2

41. Uncertainty in position of a minute particle of mass 25g in space is 10^{-5}m. What is the uncertainty in its velocity (in ms^{-1})?(h = 6.6 x 10^{-34} Js)
a) 2.1 x 10^{-34} b) 0.5 x 19^{-34} c) 2.1 x 10^{-28} d) 0.5 x 10^{-23}

42. The change in velocity when electron jumps from the first orbit to the second orbit is
a) Half its original velocity b) Twice its original velocity c) One fourth its original velocity
d) Equal to its original velocity

43. The work function of a metal is 4.2 eV. If radiations of $2000A^0$ fall on the metal. then the kinetic energy of the fastest photoelectron is
a) 1.6 x 10^{-19} J b) 16 x 10^{10} J c) 6.4 x 10^{-10} J d) 3.2 x 10^{-19} J

44. What will be the uncertainty in velocity of a bullet with a mass of 10 g whose position is known with ± 0.01 mm?
a) 5.275 x 10^{-33} m s^{-1} b) 5.275 x 10^{-25} m s^{-1} c) 5.275 x 10^{-5} m s^{-1} d) 5.275 x 10^{-28} ms^{-1}

45. The hydrogen-like species Li^{2+} is in a spherically symmetric state S_1 with one radial node. Upon absorbing light the ion undergoes transition to a state S_2 The state S_2 has one radial node and its energy is equal to the ground state energy of the hydrogen atom. Energy of the state s_1 in units of the hydrogen atom ground state energy is
a) 0.75 b) 1.50 c) 2.25 d) 4.50

46. The density of electron cloud of the orbital d_{xy} in yz plane is
a) Zero b) Maximum c) Not determined d) Infinite

47. In the photoelectron emission, the energy of the emitted electron is
a) greater than the incident photon b) same as that of the incident photon
c) smaller than the incident photon d) proportional to the intensity of incident photon

48. The value of e/m for an element is
a) 1.78x10^8 c/g b) 1.6724x10^{-24} c/g c) 0.005486 c/g d) 1.00866 c/g

49. Match the following.

List-I	List-II
a) n = 2, l= 1, m = -1	p) $2p_x$ or $2p_y$
b) n = 4, l = 2, m = 0	q) $4dz^2$
c) n=3,l=1,m=±1	r) $3P_x$ or $3p_y$
d) n = 4, l= 0, m = 0	s) 4s
e) n = 3, l= 2, m = ±2	t) $3dx^2 - y^2$ or 3dxy

a) a-q , b-r , c-p ,d-s e-t b) a-t,b-r, c-s, d-p, e-t c) a-p,b-q, c-r, d-s, e-t d) a-s,b-t,c-r,d-s, e-p

50. The value of Planck's constant is 6.63 x 10^{-34} Js. The velocity of light is 3.0 x 10^8 ms^{-1}, Which value is closest to the wavelength in nanometers of a quantum of light with frequency of 8 x 10^{15} S^{-1}?
a) 4 x 10^1 b) 3 x 10^7 c) 2 x 10^{-25} d) 5 x 10^{-18}

51. The configuration $1s^2 2S^2 2p^5 3s^1$ shows

a) Ground state of fluorine b) Excited state of fluorine c) Exited state of neon atom
d) Excited state of argon

52. The correct set of four quantum numbers for the valence electron of rubidium atom (Z=37) is:
a) 5, 1 + 1/2 b) 6, 0, 0 + 1/2 c) 5, 0, 0 + 1/2 d) 5, 1, 0 + 1/2

53. In a hydrogen atom, energy of first excited state is -3.4 eV. Find out KE of the same orbit of hydrogen atom
a) +3.4 eV b) +6.8 eV c) -13.6 eV d) +13.6 eV

54. Maximum number of electrons in a subshell of an atom is determined by the following:
a) 2l + 1 b) 4l - 2 c) $2n^2$ d) 4l + 2

55. Assertion: When an iron rod is heated in a furnace, the radiation emitted goes from a lower frequency to a higher frequency as the temperature increases.
Reason: The energy of a quantum of radiation is proportional to its frequency.
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and 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

56. Atomic number of element in 4th period and 5th column will be
a) 89 b) 71 c) 73 d) 75

57. The number of photons of light wave number 'x' in 10 J of energy source is:
a) 10 hcx b) $\frac{hc}{10x}$ c) $\frac{10}{hcx}$ d) $\frac{hcx}{10}$

58. Which of the following designation is impossible?
a) 4f b) 5g c) 2d d) 6p

59. The kinetic energy of the electron is:
a) 3.4 eV b) 5.1 eV c) 13.6 eV d) 10.2 eV

60. Radius of 3rd Bohr orbit of hydrogen atom is:
a) 6.529A° b) 2.116A° c) 4.761A° d) 8.464A°

61. Which electron is configuration of an element has abnormally high difference between second and third ionization energy?
a) $1s^2, 2s^2, 2p^2, 3s^1$ b) $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^1$ c) $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^2$ d) $1s^2, 2s^2\ 2p^6, 3s^2$

62. Which of the following elements shown as pairs with their atomic numbers belong to the same period?
a) Z = 19 and Z = 38 b) Z = 12 and Z = 17 c) Z = 11 and Z = 21 d) Z = 16 and Z = 35

63. Ionisation energy values of an atom are 495, 767, 1250 and 4540 kJ $mole^{-1}$ the formula of its sulphate is
a) MSO_4 b) M_2SO_4 c) $M_2(SO_4)_3$ d) $M(SO_4)_2$

64. Assertion: In the present form of periodic table, the period number corresponds to the highest principal quantum number of the elements in the period.
Reason: Elements having similar outer electronic configurations in their atoms belong to same period.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and 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.

65. The electronic configuration of four elements are given below. Which element does not belong to the same family as others
a) [xe] $4f^{14},5d^{10},6s^2$ b) [Kr] $4d^{10},5s^2$ c) [Ne] $3s^2,3p^5$ d) [Ar] $3d^{10},4s^2$

66. A sudden large jump between the values of second and third ionization energies of an element would be associated with which of the following electronic configuration?
a) $1s^2\ 2s^2\ 2p^6\ 3s^1\ 3p^2$ b) $1s^2\ 2s^2\ 2p^6\ 3s^1\ 3p^1$ c) $1s^2\ 2s^2\ 2p^6\ 3s^1$ d) $1s^2\ 2s^2\ 2p^6\ 3s^2$

67. An ion M^{3+} has electronic configuration $[Ar]3d^{10}4s^2$, Element M belongs to:
a) s-block b) p-block c) d-block d) f-block

68. Beryllium has higher ionisation enthalpy than boron. This can be explained as,
a) ionisation energy increases in a period.
b) beryllium has higher size than boron hence its ionisation enthalpy is higher

c) penetration of 2p-electrons to the nucleus is more than the 2s-electrons

d)

it is easier to remove electron from 2porbital as compared to 2s-orbital due to more penetration of s-electrons

69. Mercury is the only metal which is liquid at 0°c. This is due to its:

a) high ionisation energy and weak metallic bond b) Low ionisation potential and high electrogativity

c) High atomic mass and small size d) High electronegativity and low ionisation potential

70. The starting element of fifth period is:

a) K b) Rb c) Kr d) Xe

71. Predict the formulae of the binary compounds formed by combination of the following pairs of elements:

(i) Magnesium and nitrogen

(ii) Silicon and oxygen

a) MgN_2, SiO_2 b) Mg_3N_2,SiO_2 c) Mg_2N_3, Si_2O_3 d) MgN, SiO_2

72. The statement that is false for the long form of the periodic table is

a) It reflects the sequence of filling the electrons in the order of sub energy levels s,p,d and f

b) It helps to predict the stable valency states of the element

c) It reflects trends in physical and chemical properties of the elements

d) It helps to predict the relative ionicity of the bond between any two elements

73. The correct order of atomic radii in group 13 elements is :

a) B < Al < In < Ga < Tl b) B < Al < Ga < In < Tl c) B < Ga < Al < Tl < In d) B < Ga < Al < In < Tl

74. Incorrect statement is

a) Fluorine has the highest electron affinity b) Greater the nuclear charge, greater is the electron affinity

c) The electron affinity of Nitrogen is positive (energy is absorbed) d) Chlorine has highest electron affinity

75. Few elements are matched with their successive ionisation energies. Identify the elements.

Element	IE_1 (kJ/mol)	IE_2 (kJ/mol)
X	2372	5251
Y	520	7297
Z	900	1758

a)

X	Y	Z
A noble gas	Alkali metal	Alkaline earth metal

b)

X	Y	Z
Alkali metal	A noble gas	Alkaline earth metal

c)

X	Y	Z
Alkaline earth metal	Alkali metal	A noble gas

d)

X	Y	Z
Alkali metal	Alkaline earth metal	A noble gas

76. In which of the following options the order of arrangement does not agree with the variation of properties indicated against it?

a) B < C < N < 0 (increasing first ionisation enthalpy) b) I < Br < Cl < F (increasing electron gain enthalpy)

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

77. An element has the electronic configuration

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^8\ 4s^2$

What will be its position in the periodic table?

a) Period 4, Group 10 b) Period 2, Group 2 c) Period 4, Group 2 d) Period 2, Group 8

78. The characteristic properties of transition elements are due to

a) Unpaired electrons in d-sub shell b) d-orbitals have five fold degeneracy

c) Presence of 2 nodal planes for d-orbital d) Because they belong to d-block

79. Match the atomic numbers given in column I with the block in which the element is placed in column II and mark the appropriate choice.

Column I (Atomic number)		Column II (Block)	
(A)	62	(i)	d - block
(B)	47	(ii)	p - block

(C)	56	(iii)	f - block
(D)	53	(iv)	s - block

a) (A) ⟶ (iii), (B) ⟶ (i), (C) ⟶ (iv), (D) ⟶ (ii) b) (A) ⟶ (i), (B) ⟶ (ii), (C) ⟶ (iii), (D) ⟶ (iv)
c) (A) ⟶ (ii), (B) ⟶ (iv), (C) ⟶ (i), (D) ⟶ (iii) d) (A) ⟶ (iv), (B) ⟶ (i), (C) ⟶ (ii), (D) ⟶ (iii)

80. Which of the following statements is correct?
a) Elements of 3d and 4d-series are kept separately in periodic table.
b) Elements of 4f and Sf-series are kept separately in periodic table
c) Elements of 5p and 6p-series are kept separately in periodic table d) All statements are correct.

81. A, B and C are hydroxy-compounds of the elements X, Y and Z respectively. X, Y and Z are the same period of the periodic table. A gives an aqueous solution of pH less than seven, B reacts with both strong acids and strong alkalis. C gives an aqueous solution which is strongly alkaline.
Which of the following statements is/are true?
I: The three elements are metals.
II: The electronegativities decrease form X to Y to Z
III: The atomic radius decreases in the order X, Y and Z.
IV: X, Y and Z could be phosphorus, aluminium and sodium respectively.
a) 1, II, III only correct b) I, III only correct c) II, IV only correct d) II, III, IV only correct

82. The general electronic configuration of f-block elements is
a) $(n - 2)f^{1-14}(n - 1)d^{0-1}ns^2$ b) ns^2 $(n-l)d^{0-1}$ $(n-2)f^{l-14}$ c) ns^2 nd^{0-1} nf^{l-14} d) ns^2 $(n-l)d^{0-1}$ $(n-l)f^{1-14}$

83. Which is the most electropositive element?
a) Na b) Cu c) Cs d) Ca

84. Assertion: Electronegativity is not a measurable quantity.
Reason: The electronegativity of any given element is not constant, it varies depending on the element to which it bound.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and 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.

85. IP_1 and IP_2 of Mg are 178 and 348 kcal $mole^{-1}$. The energy required for the reaction. $Mg \longrightarrow Mg^{2+} + 2e^-$ is :
a) + 170 kcal/mol b) +526 kcal/mol c) -170 kcal/mol d) -526 kcal/mol

86. Set of elements with the following atomic numbers belong to the same group
a) 9, 16, 35, 3 b) 12, 20, 4, 38 c) 11, 19, 27, 5 d) 24, 47, 42, 55

87. Choose the incorrect statement
a)
Chemical reactivity tends to be high in group 1 metals, lower in elements in middle and increases to maximum in the group 17.
b) Halogens have very high negative electron gain enthalpy.
c) Noble gases have large positive electron gain enthalpy
d) Decrease in electronegativities across a period is accompanied by an increase in non-metallic properties.

88. Amongst the elements with following electronic configurations which one of them may have the highest ionization energy
a) $[Ne]3s^23p^1$ b) $[Ne]3s^23p^3$ c) $[Ne]3s^23p^2$ d) $[Ar]3d^{10}4s^24p^3$

89. Atomic numbers of few elements are given below. Which of the pairs belongs to s-block?
a) 7, 14 b) 3, 20 c) 8, 15 d) 9, 17

90. Identify the wrong statement in the following :
a) Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius.
b) Amongst isoelectronic 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.

91. **Assertion:** Among alkaline earth metals, Be predominantly forms covalent bond.
Reason: Be is smaller in size and hence has greater polarising power.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and 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.

92. The type of hybridisation of boron in diborane is :
a) sp hybridisation b) sp^2 hybridisation c) sp^3 hybridisation d) sp^3d^2 hybridisation

93. Arrange the following in order of increasing dipole moment: H_2O, H_2S, BF_3.
a) $BF_3 < H_2S < H_2O$ b) $H_2S < BF_3 < H_2O$ c) $H_2O < H_2S < BF_3$ d) $BF_3 < H_2O < H_2S$

94. Which of the following pairs of compounds is isoelectronic and isostructural?
a) TeI_2, XeF_2 b) IBr_2, XeF_2 c) IF_3, XeF_2 d) $BeCl_2$, XeF_2

95. Which pair is isostructural and possesses same number of lone pair of electron on central atom?
a) XeF_5 and $XeOF_4$ b) NH_3 and ClO_4^- c) $SnCl_4$ and ClO_4^- d) $AIC1_3$and SO_2

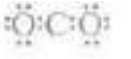
96. Sodium chloride has a crystalline structure made up of Na^+ and Cl^- ions. Why does NaCl not conduct electricity in solid state?
a) Solids do not conduct electricity.
b) The ions of NaCl become mobile only in molten state and are not free to move in solid state.
c) The crystalline structure does not have ions.
d) When a bond is formed between ions they lose their charges.

97. Oxygen molecule is formed by
a) one axial s-s overlap and one p-p axial overlap b) two p-p axial overlaps c) two p-p sidewise overlaps
d) one p-p axial and one p-p sidewise overlap.

98. A pair of electrons present between two identical non-metals
a) is shifted to one of the atoms b) is shared equally between them c) undergoes addition reactions
d) have same spin.

99. Statement 1: Trimethyl amine is more basic than trisilyl amine.
Statement 2: Silicon in trisilyl amine is more electronegative than carbon of trimethyl amine.
a) Statement 1 is True, statement 2 is True, statement 2 is a correct explanation of statement 1
b) Statement 1 is True, statement 2 is True, statement 2 is not a correct explanation of statement 1
c) Statement 1 is true, statement 2 is False d) Statement 1 is False, Statement 2 is True

100. $NaCl_{(aq)}$ gives a white precipitate with $AgNO_3$ solution but CCl_4 or $CHCl_3$ does not, because:
a) NaCl is a covalent compound and forms AgCl as white ppt
b) NaCl is an ionic compound and forms AgCl as white ppt. c) CCl_4 and $CHCl_3$ are ionic compound.
d) none of these.

101. Which of the following shows the Lewis dot formula for CO_2?
a)  b)  c)  d) 

102. If the electronic configuration of an element is $1s^22s^22p^63s^23p^63d^24s^2$, the four electrons involved in chemical bond formation will be _____.
a) $3p^6$ b) $3p^6$, $4s^2$ c) $3p^6$, $3d^2$ d) $3d^2$, $4s^2$

103. **Assertion:** The dipole moment in case of BeF2 is zero.
Reason: The two equal bond dipoles point in opposite directions and cancel the effect of each other.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and 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.

104. Which of the following pairs of species have the same bond order
a) O_2,NO^+ b) CN^-,CO c) N_2, O_2^- d) CO,NO

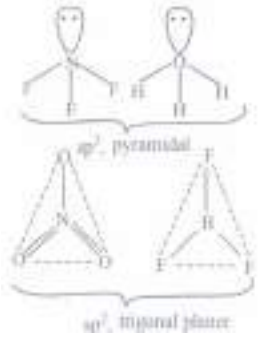
105. Which one is not paramagnetic among the following? [Atomic number of Be = 4, Ne = 10, As = 33, Cl = 17]
a) Cl^- b) Be^+ c) Ne^{2+} d) As^+

106. H_2O has a net dipole moment while BeF_2 has zero dipole moment because :

a) H_2O molecule is linear while BeF_2 is bent b) BeF_2 molecule is linear while H_2O is bent
c) Fluorine has more electronegativity than oxygen d) Beryllium has more electronegativity than oxygen.

107. Which of the following pairs of ions is isoelectronic and isostructural?
a) CO_3^{2-}, NO_3^- b) ClO_3^-, CO_3^{2-} c) SO_3^{2-}, NO_3^- d) ClO_3^-, SO_3^{2-}

108. (A): 1_3^- ion is linear.
(R)' : It is not in sp hybridized state .



a) Both (A) and (R) are true and (R) is the correct explanation of (A)
b) Both (A) and (R) are true and (R) is not the correct explanation of (A) c) (A) is true but (R) is false
d) (A) is false but (R) is true

109. Identify a molecule which does not exist
a) O_2 b) He_2 c) Li_2 d) C_2

110. Which of the two ions from the list given below, have the geometry that is explained by the same hybridisation of orbitals.
NO_2^-, NO_3^-, NH_2^-, NH_4^+, SCN^-?
a) NH_4^+ and NO_3^- b) SCN^- and NH_2^- c) NO_2^- and NH_2^- d) NO_2^- and NO_3^-

111. What is the hybrid state of carbon in ethyne, graphite and diamond?
a) sp^2, sp, Sp^3 b) sp,sp^2,Sp^3 c) Sp^3,sp^2, sp d) sp^2,Sp^3, sp

112. The canonical or resonating structures of a molecule required to describe the structure of a molecule follow which of the following rules?
a) The relative position of all atoms can differ.
b) The same number of unpaired and paired electrons in all structures.
c) The energy of each structure is different. d) Like charges are present on adjacent atoms.

113. Which of the following statements is true about hydrogen bonding?
a) Cl and N have comparable electronegativities yet there is no H-bonding in HCl because size of Cl is large
b) Intermolecular H -bonding results in decrease in m.p. and b.p.
c) Ice has maximum density at O°C due to H-bonding.
d) KHCl2(HCl_2^-) exists but KHF_2(HF_2^-) does not exist due to lack of H-bonding in HCl.

114. Which of the following facts regarding bond order is not valid?
a) Bond order is given by the number of bonds between the two atoms in a molecule.
b) With increase in bond order, bond enthalpy of the molecule decreases.
c) Isoelectronic molecules and ions have identical bond orders.
d) With increase in bond order, bond length decreases.

115. In compound of the type ECl_3 where E = B, P, As (or) Bi, the angles Cl - E - Cl for different elements E are in the order:
a) B > P = As = Bi b) B > P > As > Bi c) B < P = As = Bi d) B < P < As < Bi

116. How many sigma and pi bonds are present in toluene?
a) l0σ and 3π bonds b) 12σ and 3π bonds c) l5σ and 3π bonds d) 6σ and 3π bonds

117. In the formation of SF_6 molecule, the sulphur atom is in
a) first excited state b) second excited state c) third excited state d) fourth excited state

118. When the hybridization state of carbon atom changes from sp^3 to sp^2 and finally to sp, the angle between the hybridized orbitals :
a) Decreases gradually b) Decreases considerably c) Is not affected d) Increases progressively

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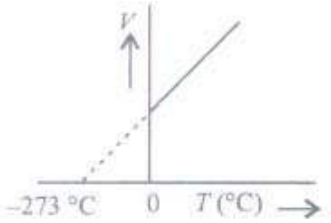
119. Which of the following molecules does not show any resonating structures?
a) NH_3 b) CO_3^{2-} c) O_3 d) SO_3

120. Which of the following pairs will have same bond order?
a) F_2 and O_2^{2-} b) N_2 and CO_2 c) O_2 and O_2^- d) N_2 and N_2^+

121. Assertion: Liquids and solids are hard to compress.
Reason: Magnitude of the repulsive forces between the molecules rises very rapidly as the distance separating the molecules decreases.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and 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

122. The rms speed of N_2 molecules in a gas is u. If the temperature is doubled and the nitrogen molecules dissociate into nitrogen atoms, the rms speed becomes:
a) u/2 b) 2u c) 4u d) 14u

123. If we plot volume of a certain mass of a gas against temperature at constant pressure, we get a straight line intersecting on the negative side at -273°C which explains about absolute zero. This graph is known as



a) isochor b) isotherm c) isotone d) isobar

124. Which assumption of kinetic theory is not followed when a real gas shows non-ideal behaviour?
a) Gas molecules move at random with no attractive forces between them
b) The velocity of gas molecules is dependent on temperature
c) Amount of space occupied by a gas is much greater than that by actual gas molecules
d) During collisions with the walls of the container or with another molecules, energy is conserved

125. In a closed flask of 5 L, 1.0 g of H_2 is heated from 300 to 600 K. Which statement is not correct?
a) Pressure of the gas increases b) The rate of collision increases
c) The number of moles of gas increases d) The energy of gaseous molecules increases

126. An open flask has Helium gas at 2 atm and 327^o C. The flask is heated to 527^{o}C the same pressure. The fraction of original gas remaining in the flask is:
a) 3/4 b) 1/4 c) 1/2 d) 2/5

127. Ideal gas equation is also called equation of states because:
a) it depends on states of matter b) it is a relation between four variables and describes the state of any gas
c) it is combination of various gas laws and any variable can be calculated
d) it is applicable to only ideal gases under STP conditions.

128. The ability of a substance to assume in two or more crystalline structure is called
a) isomerism b) polymorphism c) isomorphism d) amorphism

129. 180ml of hydrocarbon having a molecular weight 16 diffuses in 1.5 min. Under similar conditions time taken by 120ml of SO_2 to diffuse is
a) 2 min b) 1.5 min c) 1 min d) 1.75 min

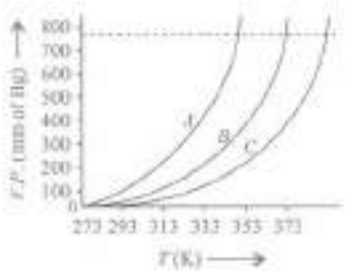
130. At what temperature 28 g of N_2 will occupy a volume of 20 litres at 2 atm?
a) 300.0 K b) 487.2 K c) 289.6 K d) 283.8 K

131. Which of the following does not express the properties of gases?
a) Gases are highly compressible. b) Gases exert pressure equally in all directions
c) Gases have much higher density than liquids and solids.
d) Gases mix evenly and completely in all proportions.

132. In ion-dipole forces, the magnitude of the interaction energy (E)

a) $E = \frac{Z^2\mu}{r^2}$ b) $E = \frac{Z\mu}{r}$ c) $E = \frac{Z\mu^2}{r^2}$ d) $E = \frac{Z\mu}{r^2}$

133. A graph between vapour pressure and temperature of few liquids is given below. Study the graph and answer the following question:



Which of the following statements is true?

a)

Boiling point of a liquid is the temperature at which its vapour pressure becomes equal to atmospheric pressure.

b) Boiling point of water can be increased by increasing the pressure above the atmospheric pressure.

c) Liquid C has higher boiling point than B due to higher intermolecular forces. d) All of these.

134. Equal masses of H_2, O_2 and methane have been taken in a container of volume V at temperature 27°C in identical conditions. The ratio of the volumes of gases H_2 : O_2: CH_4 would be

a) 8 : 16 : 1 b) 16 : 8 : 1 c) 16 : 1 : 2 d) 8 : 1 : 2

135. 34.05 mL of phosphorus vapour weighs 0.0625 g at 546°C and 1 bar pressure. What is the molar mass of phosphorus?

a) 124.77 g mol^{-1} b) 124.75 g mol^{-1} c) 12.47 g mol^{-1} d) 30 g mol^{-1}

136. If 10gm of a gas at atmospheric pressure is cooled from 273°C to 0°C keeping the volume constant, its pressure would become

a) 2 atm b) 273 atm c) 1/273 atm d) 1/2 atm

137. There is a standard value of temperature and pressure at which the molar volume of a gas is 22.4 L. The correct values are

a) 273 K, 1 atm b) 300 K, 760 mm c) 25°C, 760 mm d) 373 K, 1 atm

138. For real gases van der Waals equation is written as: $\left(p + \frac{an^2}{V^2}\right)(V - nb) = nRT$ where 'a' and 'b' are van der Waals constants. Two sets of gases are:

(I) O_2, CO_2, H_2 and He

(II) CH_2, O_2, and H_2

The gases given in set-I in increasing order of,b, and gases given in set-II decreasing order of 'a', are arranged below. Select the correct order from the following:

a) $(I)He < H_2 < CO_2 < O_2 (II) CH_4 > H_2 > O_2$ b) $(I) O_2 < He < H_2 < CO_2 (II) H_2 > O_2 > CH_4$

c) $(I) H_2 < He < O_2 < CO_2 (II) CH_4 > O_2 > H_2$ d) $(I) H_2 < O_2 < He < CO_2 (II) O_2 > CH_4 > H_2$

139. Read the following statements and identify the incorrect statement

a) Volume of one mole of a gas at critical temperature is called molar volume

b) Pressure of a gas at critical temperature is called critical pressure

c) The critical temperature, pressure and volume are called critical constants

d)

Critical temperature is the highest temperature at which a gas can exist as liquid, above this temperature it is a gas.

140. CO_2 and CH_4 have critical temperatures of 304 K and 190 K, respectively. P_c for CO_2 = 72 atm and P_c for CH_4 = 45 atm. The ratio bco_2: bCH_4 is

a) 2 : 3 b) 1 : 1 c) 2 : 1 d) 3 : 2

141. What will be the volume of 2.8 g of carbon monoxide at 27°C and 0.821 atmospheric pressure?

a) 2.5L b) 4L c) 3.5L d) 3L

142. At a given temperature the ratio of RMS and average velocities is
a) 1.086: 1 b) 1: 1.086 c) 2: 1.086 d) 1.086:2

143. Assuming N_2 molecule of spherical shape with radius 2 x 10^{-9}cm, the percentage of empty space in one mole of N_2 gas taken at STP is:
a) 0.1% b) 99.9% c) 90% d) 10%

144. If volume occupied by CO_2 molecules is negligible then what will be the pressure $\left(\frac{P}{5.277}\right)$exerted by one mole of CO_2 gas at 300 K? (a = 3.592 atm L^2 mol^{-2})
a) 7 b) 8 c) 9 d) 3

145. Which of the following is not a correct expression regarding the units of coefficient of viscosity?
a) dyne cm^{-2} s b) dyne cm^2 S^{-1} c) N m^{-2} s d) Pa s

146. A mixture contains 16g of oxygen. 2Rg or nitrogen and 8g of methane. Total pressure of the mixture is 740mm. What is the partial pressure of nitrogen in mm?
a) 185 mm b) 370 mm c) 555 mm d) 740 mm

147. Viscosity of ethanol is 12.0 millpoise. Viscosity of ethanol in S.I system is
a) 1.2 b) 1.2 x 10^{-3} c) 1.2 x 10^{-2} d) 1.2 x 10^{-1}

148. The main reason for deviation of gases from ideal behaviour is few assumptions of kinetic theory. These are
(i) There is no force of attraction between the molecules of a gas
(ii) Volume of the molecules of a gas is negligibly small in comparison to the volume of the gas
(iii) Particles of a gas are always in constant random motion
a) (i) and (ii) b) (ii) and (iii) c) (i), (ii) and (iii) d) (iii) only

149. What is the density of CO_2 at 27°C and 2.5 atm pressure?
a) 5.2gL^{-1} b) 6.2gL^{-1} c) 7.3gL^{-1} d) 4.46gL^{-1}

150. A gas occupies a volume of 300 cm^3 at 27°C and 620 mmHg pressure. The volume of gas at 47°C and 640 mmHg pressure is:
a) 400 c.c. b) 510 c.c. c) 310 c.c. d) 350 c.c.

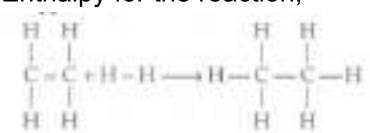
151. Enthalpy change for the process,
$H_2O(ice) \rightleftharpoons H_2O(water)$ is 6.01 kJ mol^{-1} . The entropy change of I mole of ice at its melting point will be
a) 12 J k^{-1} mol^{-1} b) 22 J $k^{-1}mol^{-1}$ c) 100 J $k^{-1}mol^{-1}$ d) 30 J k^{-1} mol^{-1}

152. The enthalpy of formation of ammonia when calculated from the following bond energy data is (B.E. of N - H, H - H, N≡N is 389 kJ mort, 435 kJ mol^{-1}, 945.36 kJ mol^{-1} respectively)
a) 41.82 kJ mol^{-1} b) + 83.64 kJ mol^{-1} c) - 945.36 kJ mol^{-1} d) - 833 kJ mol^{-1}

153. If the bond energies of H-H, Br-Br and H-Br are 433,192 and 364 kJ mol^{-1} respectively, then ΔH^0 for the reaction $H_{2(g)} + Br_{2(g)} \longrightarrow 2HBr_{(g)}$ is:
a) -261 kJ b) +103 kJ c) +261 kJ d) -103 kJ

154. 200 joules of heat was supplied to a system at constant volume. It resulted in the increase in temperature of the system from 298 to 323 K. What is the change in internal energy of the system?
a) 400 J b) 200 J c) 50 J d) 150 J

155. From the following bond energies
H-H bond energy: 431.37 kJ mol^{-1}
C=C bond energy: 606.10 kJ mol^{-1}
C-C bond energy: 336.49 kJ mol^{-1}
C-H bond energy: 410.50 kJ mol^{-1}
Enthalpy for the reaction,



will be :

a) 1523.6 kJ mol^{-1} b) - 243.6 kJ mol^{-1} c) -120.0 kJ mol^{-1} d) 553.0 kJ mol^{-1}

156. The enthalpies of elements in their standard states are taken as zero. The enthalpy of formation of a compounds
a) may be positive or negative b) is never negative. c) is always negative d) is always positive

157. The equilibrium constant for a reaction is 10. What will be the value of $\triangle G^{\theta}$?
R = 8.314 JK^{-1} mol^{-1}T = 300K.
a) -5.744 kJ b) -574 kJ c) + 11.48 kJ d) + 5.74 kJ

158. In the reaction : S + 3/2 $O_2 \longrightarrow SO_3$ + 2x kcal and SO_2 + 1/2$O_2 \longrightarrow SO_3$ + Y kcal, heat of formation of SO_2 is
a) (x + y) b) (x-y) c) (2x +y) d) (2x - y)

159. Standard enthalpy of vaporisation $\Delta_{vap} H^{\circ}$ for water at 100°C is 40.66 kJ mol^{-l}. The internal energy change of vaporisation of water at 100°C (in kJ mol^{-1}) is:
a) +37.55 b) -43.76 c) +43 .76 d) +40.66

160. Enthalpy change for the reaction
$4H_{(g)} \rightarrow 2H_{2(g)} \Delta h - 869.6\ kJ$
The dissociation energy of H_H
a) -434.8kJ b) -869.6kJ c) +434.8kJ d) +217.4kJ

161. Which of the following is correct option for free expansion of an ideal gas under adiabatic condition?
a) q = 0; ΔT = 0; w = 0 b) $q \neq 0, \Delta T = 0, w = 0$ c) $q = 0, \Delta T \neq 0, w = 0$ d) $q = 0, \Delta T < 0, w \neq 0$

162. Enthalpy of $CH_4 + \frac{1}{2}O_2 \rightarrow CH_3OH$ is negative. If enthalpy of combustion of CH_4 and CH_3OH are x and y respectively, then which relation is correct
a) $x > y$ b) $x < y$ c) $x = y$ d) $x \geq y$

163. Enthalpy change for the reaction, $4H_{(g)} \longrightarrow 2H_{2(g)}$ is - 869.6 kJ This dissociation energy of H-H bond is :
a) - 869.6 kJ b) + 434.8 kJ c) + 217.4 kJ d) - 434.8 kJ

164. **Assertion:** For the change, $H_2O_{(l)} \longrightarrow H_2O_{(s)}$, $\triangle H = \triangle U$.
Reason: No enthalpy change is involved in this process.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and 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

165. In which of the following reactions, standard entropy change $\left(\Delta S^{\circ}\right)$ is positive and standard Gibb's energy change $\left(\Delta S^{\circ}\right)$ decreases sharply with increasing temperature?
a) $C\ graphite + \frac{1}{2}O_2(g) \rightarrow CO(g)$ b) $CO(g) + \frac{1}{2}O_2(g) \rightarrow | CO_2(g)$ c) $Mg(s) + \frac{1}{2}O_2(g) \rightarrow MgO(s)$
d) $\frac{1}{2}C\ graphite + \frac{1}{2}O_2(g) \rightarrow \frac{1}{2}CO_2(g)$

166. The value for △U for the reversible isothermal evaporation of 90 g water at 100°C will be ($\triangle H_{evap}$ of water = 40.8 kJ mol^{-1} , R = 8.314 J K^{-l} mol^{-1})
a) 125.03 kJ b) 4800 kJ c) 188.494 kJ d) 40.8 kJ

167. Two litres of an ideal gas at a pressure of 10 atm expands isothermally into a vacuum until its total volume is 10 litres. How much heat is absorbed and how much work is done in the expansion?
a) 10 J, 10 J b) 18 J, 10 J c) 18 J, 10 J d) 0 J, 0 J

168. **Assertion:** Heat added to a system at lower temperature causes greater randomness than when the same quantity of heat is added to it at higher temperature.
Reason: Entropy is a measure of the degree of randomness or disorder in the system.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and 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

169. For the reaction given below the values of standard Gibbs free energy of formation at 298 K are given. What is the nature of the reaction?
$I_2+H_2S \longrightarrow 2HI+S$

$\triangle G_f^o$(HI) = 1.8 kJ mol^{-1}, $\triangle G_f^o$(H_2S)= 33.8 kJ mol^{-1}

a) Non-spontaneous in forward direction. b) Spontaneous in forward direction.

c) Spontaneous in backward direction d) Non-spontaneous in both forward and backward directions.

170. The work done during the expansion of a gas from a volume of 4 dm^3 to 6 dm^3 against a constant external pressure of 3 atm, is:

a) - 6 J b) - 608 J c) + 304 J d) - 304 J

171. **Assertion:** If both $\triangle H^o$and $\triangle S^o$ are positive then reaction will be spontaneous at high temperature.
Reason: All processes with positive entropy change are spontaneous.

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

b) If both assertion and 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.

172. Consider the following processes:

$\Delta H(kJ/mol)$

$1/2\ A \rightarrow B \quad +150$

$3B \rightarrow 2C + D \quad -125$

$E + A \rightarrow 2D \quad +350$

For $B + D \rightarrow E + 2C$, ΔH will be:

a) $525\ kJ/mol$ b) $-175\ kJ/mol$ c) $-325\ kJ/mol$ d) $325\ kJ/mol$

173. Change in enthalpy for reaction, $2H_2O_2(l) \rightarrow 2H_2O(1) + O_2(g)$ If heat of formation of $H_2O_2(1)$ and $H_2O(l)$ are -188 and -286 kJ/mol respectively:

a) -196 kJ/mol b) + 196 kJ/mol c) + 948 kJ/mol d) - 948 kJ/mol

174. In an adiabatic process, no transfer of heat takes place between system and surroundings. Choose the correct option for free expansion of an ideal gas under adiabatic condition from the following.

a) q=0,ΔT≠0,W=0 b) q≠0,ΔT=0,W=0 c) q=0,ΔT=0,W=0 d) q=0,ΔT<0,W≠0

175. **Assertion:** In the process, $H_{2(g)} \rightarrow 2H_{(g)}$, entropy increases.
Reason: Breaking of bonds is an endothermic process.

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

b) If both assertion and 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

176. The total entropy change ($\triangle S_{total}$) for the system and surrounding of a spontaneous process is given by

a) $\triangle S_{total} = \triangle S_{system} \triangle S_{surr} > 0$ b) $\triangle S_{total} = \triangle S_{system} \triangle S_{surr} < 0$ c) $\triangle S_{system} = \triangle S_{total} \triangle S_{surr} > 0$

d) $\triangle S_{surr} = \triangle S_{total} \triangle S_{system} > 0$

177. The enthalpy of solution of sodium chloride is 4 kJ mol^{-l} and its enthalpy of hydration of ions is -784 kJ mol^{-1}. What will be the lattice enthalpy of sodium chloride?

a) +780 kJ mol^{-l} b) +394 kJ mol^{-1} c) +788 kJ mol^{-l} d) +398 kJ mol^{-1}

178. **Assertion:** Heat of neutralisation of HNO_3 and NaOH is same as that of HCl and KOH.
Reason: Both HNO_3 and HCl are strong acids and NaOH and KOH are strong bases.

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

b) If both assertion and 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

179. What is the entropy change (in JK^{-1} mol^{-1}) when one mole of ice is converted into water at 0^0C? (The enthalpy change for the conversion of ice to liquid water is 6.0 kJ mol^{-1} at 0^0C)

a) 2.198 JK^{-1} mol^{-1} b) 21.98 JK^{-1} mol^{-1} c) 21.98 JK^{-1} mol^{-1} d) 2.013 JK^{-1} mol^{-1}

180. One word answer is given for the following definitions. Mark the one which is incorrect.

a) The process in which temperature remains constant: Isobaric

b) The process in which volume remains constant: Isochoric

c) The relation between △H and △U when all the reactants and products are solid: △H = △U

d) The relation between △G, △H and S△ : △G = △H - T△S