Ravi Maths Tuition Centre

Time : 1 Mins **HYDROGEN HYDROCARBONS' 1** **Marks : 925**

1. Which of the following is not a process of preparation of hydrogen peroxide?
   a) Auto-oxidation of 2-ethylanthraquinol. b) By passing oxygen through boiling water.
   c) By oxidation of isopropyl alcohol. d) Byreaction of barium peroxide with dil. H_2SO_4.
2. Which of the following hydrides is electron deficient?
   a) NaH b) CaH_2 c) CH_4 d) B_2H_6
3. Which of the following act as a stabiliser for the storage of H_2O_2?
   a) Alkali b) Dust c) Urea d) None of these.
4. A commercial sample of hydrogen peroxide is labelled as 10 volume. Its percentage strength is nearly:
   a) 3% b) 1% c) 90% d) 10%
5. In which of the following reaction H_2O acts as a Bromsted acid?
   a) $H_2O(l) + NH_3(aq) \rightleftharpoons OH(aq) + NH^+4(aq)$ b) $H_2O_{(l)} + H_2S_{(aq)} \rightleftharpoons H_3O^+_{(aq)} + HS^-_{(aq)}$
   c) $H_20_{(l)} + H_{2O(l)} \rightleftharpoons H_3O^+_{(aq)} + OH^-_{(aq)}$ d) $H+_{(aq)} + OH^-(aq) \rightleftharpoons H_2O_{(l)}$
6. The oxide that gives H_2O_2 on treatment with dilute H_2SO_4 is
   a) PbO_2 b) $BaO_2.8H_2O$ c) MnO_2 d) TiO_2
7. Some of the major uses of heavy water are given below. Which one is not correct?
   a) It is used as a moderator in nuclear reactors.
   b) It is used as a tracer compound for studying reaction mechanism.
   c) High concentration of heavy water accelerates the growth of plants.
   d) It is used in preparing deuterium.
8. Which of the following is an atom of tritium?
   a) 

   b) 

   c) 

   d) 

9. HI can be prepared by all the following methods except
   a) $PI_3 + H_2O$ b) $KI + H_2SO_4$ c) $H_2 + I_2 \xrightarrow{Pt}$ d) $I_2 + H_2S$
10. Which of the following equations depict the oxidising nature of H_2O_2?
    a) $2MnO_4^- + 6H^+ + 5H_2O_2 \rightarrow 2Mn^{2+} + 8H_2O + 5O_2$
    b) $2Fe^{3+} + 2H^+ + H_2O_2 \rightarrow 2Fe^{2+} + 2H_2O + O_2$ c) $2HI + H_2O_2 \rightarrow I_2 + 2H_2O$
    d) $KIO_4 + H_2O_2 \rightarrow KIO_3 + H_2O + O_2$

11. Statues and paintings coated with white lead turn black on long exposure to atmosphere. The original colour can be restored by treating them with H_2O_2. The reason behind this is:
    a)
    blackened statues get coated with PbS which on reaction with H_2O_2 is oxidised to white $PbSO_4$
    b) H_2O_2 dissolves the coating of white lead and exposes the inner surface.
    c) white lead reacts with H_2O_2 to form white $PbSO_4$
    d) blackened statues get coated with lead sulphate which reacts with H_2O_2 to give PbS.
12. Some statements about heavy water are given below:
    (i) Heavy water is used as a moderator in nuclear reactors.
    (ii) Heavy water is more associated than ordinary water.
    (iii) Heavy water is more effective solvent than ordinary water.
    Choose the correct answer:
    a) (i) and (ii) b) (i), (ii) and (iii) c) (ii) and (iii) d) (i) and (iii)
13. The production of dihydrogen obtained from coal gasification can be increased by reacting carbon monoxide of syngas mixture with steam in presence of a catalyst iron chromate. What is this process called?
    a) Hydrogen reaction b) Water-gas shift reaction c) Coal-gas shift reaction
    d) Syn gasification
14. What is heavy water?
    a) H_2O^{18} b) D_2O c) H_2O17 d) H_2O
15. **Assertion:** All the three isotopes of hydrogen have almost the same chemical properties.
    Reason: Isotopes differ from one another in respect of the presence of neutrons.
    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.
16. Phosphorus cannot form PH_5 with its outer electronic configuration as $3s^23p^3$ because
    a) phosphorus cannot show +5 oxidation state b) PH_5 is not a stable compound
    c)
    $\triangle_aH$ value of dihydrogen and $\triangle_{eg}H$ value of hydrogen do not favour higher oxidation state of phosphorus
    d) phosphorus is not very reactive hence does not form PH_5.
17. **Assertion:** $CuSO_4.5H_2O$ has one hydrogen-bonded molecule of water.
    Reason: The four molecules of water are coordinated in $CuSO_4.5H_2O$.
    a) If assertion is true but reason is false. b) If both assertion and reason are false.
    c)
    If both assertion and reason are true and reason is the correct explanation of assertion.

d)

If both assertion and reason are true but reason is not the correct explanation of assertion.

18. Match the column I with column II and mark the appropriate choice.

Column I		**Column - II**	
(A)	NaH	(i)	Interstitial hydride
(B)	CH_4	(ii)	Molecular hydride
(C)	$VH_{O.56}$	(iii)	Ionic hydride
(D)	B_2H_6	(iv)	Electron -deficient hydride

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

19. The boiling point of heavy water is:
a) 100°C b) 101.4°C c) 99°C d) 110°C

20. Alkenes combine with carbon monoxide and hydrogen in presence of octacarbonyldicobalt as catalyst under high temperature and pressure to form
a) aldehydes which can be further reduced to alcohols by hydrogen
b) alkanes which are formed by addition of hydrogen
c) alcohols formed by reaction of CO and hydrogen
d) ketones which can be further reduced to aldehydes by hydrogen.

21. In what respect electronic configuration of hydrogen and halogens are similar?
a) Hydrogen and halogens have one electron in their outermost shell.
b) Hydrogen and halogens have one electron less than the noble gas configuration.
c) Hydrogen and halogens can lose one electron to form positive ions.
d) Hydrogen and halogens show noble gas configuration.

22. Which of the following metals does not liberate hydrogen from acids?
a) Fe b) Cu c) Mg d) Zn

23. Which of the following metals directly combine with hydrogen gas to give a hydride?
a) Au b) Ni c) Ca d) Cu

24. What happens when an alkaline solution of potassium ferricyanide is reacted with H_2O_2?
a) Potassium ferricyanide is oxidised to potassium ferrocyanide and H_2O_2 is oxidised.
b) Potassium ferricyanide becomes colourless and H_2O_2 is oxidised to O_2
c) Potassium ferricyanide is reduced to ferric hydroxide and H_2O_2 is oxidised to H_2O.
d)

Potassium ferricyanide is reduced to potassium ferrocyanide and H_2O_2 is oxidised to O_2

25. Fluorine decomposes cold water to give
a) $4H^+ + 4F^-$ and O_2 b) HF and H_2 c) HF only d) H_2F_2 and HFO_4.

26. Some statements about heavy water are given below:
(a) Heavy water is used as a moderator in nuclear reactors.
(b) Heavy water is more associated than ordinary water.

(c) Heavy water is more effective solvent than ordinary water.

Which of the above statements are correct?

a) (a) and (c) b) (a) and (b) c) (a), (b) and (c) d) (b) and (c)

27. Last traces of water is removed from H_2O_2 by

a) electrolysis b) crystallisation c) condensation d) evaporation.

28. Which of the following metals will react with NaOH and KOH to liberate hydrogen gas?

a) Zn, Al, Fe and Mg b) Al, Fe, Mg and Sn c) Zn, Sn and Al d) Fe, Mg and Al

29. Non-stoichiometric hydrides are produced by

a) palladium, vanadium b) manganese, lithium c) nitrogen, fluorine

d) carbon, nickel

30. Which of the following hydrides is electron-precise hydride?

a) B_2H_6 b) NH_3 c) H_2O d) CH_4

31. A deuterium is

a) an electron with a positive charge b) a nucleus having two protons

c) a nucleus containing a neutron and two protons

d) a nucleus containing a neutron and a proton.

32. Choose the correct option as directed.

a) CsH > KH > NaH < LiH (Order of stability)

b) $H_2O < NH_3 < CH_4$ (Order of dipole moment)

c) $PH_3 < AsH_3 < NH_3 < SbH_3$ (Order of boiling point)

d) X ..... H - X,X = O > F > N > S > Cl (Order of strength of H-bonding)

33. Match the column I with column II and mark the appropriate choice.

Column - I		**Column - II**	
(A)	Clark's method	(i)	$Na_6P_6O_{18}$
(B)	Calgon's method	(ii)	$NaAlSiO_4$
(C)	Ion- exchange method	(iii)	RSO_3H
(D)	Synthetic resins method	(iv)	$Ca(OH)_2$

a) (A) $\rightarrow$ (i), (B) $\rightarrow$ (iii), (C) $\rightarrow$ (iv), (D)$\rightarrow$ (ii)

b) (A) $\rightarrow$ (ii), (B) $\rightarrow$ (iii), (C) $\rightarrow$ (iv), (D) $\rightarrow$ (i)

c) (A) $\rightarrow$ (iii), (B) $\rightarrow$ (ii) , (C) $\rightarrow$ (i), (D) $\rightarrow$ (iv)

d) (A) $\rightarrow$ (iv), (B) $\rightarrow$ (i), (C) $\rightarrow$ (ii), (D) $\rightarrow$ (iii)

34. Which of the following equation depicts reducing nature of H_2O_2?

a) $2[Fe(CN)_6]^{4-} + 2H^+ + H_2O_2 \rightarrow 2[Fe(CN)_6]^{3-} + 2H_2O$

b) $I_2 + H_2O_2 + 2OH^- \rightarrow 2I^- + 2H_2O + O_2$ c) $Mn^{2+} + H_2O_2 \rightarrow Mn^{4+} + 2OH^-$

d) $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$

35. Water gas is mixed with steam and the mixture is passed over heated Fe_2O_3 in presence of Cr_2O_3. The mixture when passed in water dissolves CO_2 and dihydrogen left undissolved is collected. This method of preparation of hydrogen gas is known as

a) Bosch process b) Lane process c) Kellner process d) Hall process

36. Which gas is produced when calcium nitride (Ca_3N_2)is hydrolysed by water?

a) N_2 b) NH_3 c) H_2 d) O_2

37. The method used to remove temporary hardness of water is:
    a) Clark's method b) Ion-exchange method c) Synthetic resins method
    d) Calgon's method

38. Match List-I with List-II. Choose the correct matching codes from the choices given

List I (Hydride)		**List II (Type of Hydride)**	
A.	BeH_2	1.	Complex
B.	AsH_3	2.	Lewis acid
C.	B_2H_6	3.	Interstitial
D.	LaH_3	4.	Covalent
E	$LiAlH_4$	5.	Intermediate

    a) A-6, B-2, C-4, D-5, E-I b) A-6, B-2, C-4, D-3, E-I c) A-6, B-4, C-2, D-3, E-5
    d) A-5, B-4, C-2, D-3, E-I

39. What will be the mass of oxygen liberated by decomposition of 200 mL hydrogen peroxide solution with a strength of 34 g per litre?
    a) 25.5 g b) 3.0 g c) 3.2 g d) 4.2 g

40. Which is not a property of water?
    a) It is a colourless and tasteless liquid.
    b) There is no hydrogen bonding in solid state of water.
    c) It is an excellent solvent for transportation of ions in plants and animals.
    d) Ice is lighter than liquid water.

41. Liquid water is denser than ice due to
    a) higher surface tension b) hydrogen bonding c) van der Waals forces
    d) covalent bonding.

42. Which of the following statements regarding hydrogen peroxide is false?
    a) It is a strong oxidising agent. b) It is decomposed by MnO_2.
    c) It behaves as a reducing agent. d) It is more stable in basic solution.

43. Which of the following compounds is used for water softening?
    a) $Ca_3(PO_4)_2$ b) Na_3PO_4 c) $Na_6P_6O_{18}$ d) Na_2HPO_4

44. A metal (M) produces a gas (N) on reaction with alkalies like NaOH and KOH. Same gas is produced when the metal reacts with dilute sulphuric acid. Gas (N) reacts with another toxic gas (P) to form methanol at high temperature and pressure. (N) also reacts with metals like (Q) to form electrovalent hydrides. M, N, P and Q respectively are
    a) Zn, H_2, CO, Na b) Na, H_2, Cl_2,Ca c) Al, H_2, H_2S, B d) Mg, H_2, NO_2, Al

45. In the following reaction using isotopic O in H_2O_2, isotopic oxygen goes _____
    $2MnO_4 + 3H_2 O_2^{18} \rightarrow 2MnO_2 + 3O_2 + 2H_2O + 2OH^-$
    a) with O_2 b) with MnO_2 c) with OH^- d) one with O_2 and one with MnO_2

46. Which of the following easily catalys the decomposition of H_2O_2 when stored?
    (i) Rough surface, (ii) Sunlight, (iii) Dust particles, (iv) Metals

a) (i) and (ii) b) (i), (ii) and (iii) c) (ii) and (iv) d) All of these.

47. **Assertion:** In gaseous phase, H_2O and H_2O_2 both have bent structures.
Reason : Bond angle of both H_2O and H_2O_2 104.5^0.
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.

48. Elements of which of the following group(s) of periodic table do not form hydrides.
a) Groups 7, 8, 9 b) Group l3 c) Groups 15,16,17 d) Group 14

49. **Assertion:** Permanent hardness of water can be removed by using washing soda.
Reason: Washing soda reacts with soluble calcium and magnesium chlorides and sulphates in hard water to form insoluble carbonates.
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.

50. Among NH_3, H_2O, HF and H_2S which would have highest magnitude of hydrogen bonding?
a) HF due to maximum polarity. b) H_2O due to lone pairs of electrons.
c) NH_3 due to small size of nitrogen. d) H_2S due to higher electron affinity of sulphur.

51. Hydrogen resembles halogens in many respects for which several factors are responsible. Of the following factors which one is the most important in this respect?
a) Its tendency to lose an electron to form a cation.
b)
Its tendency to gain a single electron in its valence shell to attain stable electronic configuration.
c) Its low negative electron gain enthalpy value d) Its small size

52. A water sample is said to contain permanent hardness if water contains
a) sulphates and chlorides of calcium and magnesium
b) carbonates of calcium and magnesium c) bicarbonates of calcium and magnesium
d) sulphates and chlorides of sodium and potassium.

53. Which of the following reactions shows reducing nature of H_2O_2?
a) $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$ b) $Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$
c) $2HCHO + H_2O_2 \rightarrow 2HCOOH + H_2O$ d) $Na_2SO_3 + H_2O_2 \rightarrow Na_2SO_4 + H_2O$

54. Which of the following ions will cause hardness in water sample?
a) Ca^{2+} b) Na^+ c) Cl^- d) K^+

55. Compound X on reduction with $LiAlH_4$ gives a hydride Y containing 21.72% hydrogen and other products. The compound Y reacts with air explosively resulting in boron trioxide. What are X and Y respectively?
    a) BCl_3, B_2H_6 b) PCl_3, B_2H_6 c) B_2H_6, BCl_3 d) $LiAlH_4$, PCl_3

56. Match the following and identify the correct option.
    B_2H_6
    a) An electron deficient hydride b) Non-Planar structure c) Synthesis gas
    d) $Mg(HCO_3)_2 + Ca(HCO_3)_2$

57. Which of the following reactions shows reduction of water?
    a) $2H_2O + 2Na \rightarrow 2NaOH + H_2$ b) $6C0_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6H_20 + 60_2$
    c) $2F_2 + 2H_2O \rightarrow 4H^+ + 4F^- + O_2$ d) $P_4O_{10} + 6H_2O \rightarrow 4H_3PO_4$

58. The temporary hardness of water due to calcium bicarbonate can be removed by adding
    a) $CaCO_3$ b) $CaCl_2$ c) HCl d) $Ca(OH)_2$

59. Syngas is a mixture of:
    a) $CO_2 + H_2$ b) $CO + H_2$ c) $CO + CO_2$ d) $CO + O_2$

60. Which of the following statements regarding hydrides is not correct?
    a) Ionic hydrides are crystalline, non-volatile and non-conducting in solid state.
    b) Electron-deficient hydrides act as Lewis acids or electron acceptors.
    c) Elements of group-13 form electron-deficient hydrides.
    d) Elements of group 15-17 form electron-precise hydrides.

61. Strength of 10 volume hydrogen peroxide solution means
    a) 30.35 gL^{-1} b) 17 gL^{-1} c) 34 gL^{-1} d) 68 gL^{-1}

62. The maximum number of hydrogen bonds formed by a water molecule in ice is
    a) 4 b) 1 c) 2 d) 3

63. Which of the following reactions is an example of use of water gas in the synthesis of other compounds?
    a) $CH_4(g) + H_2O(g) \xrightarrow[Ni]{1270k} CO_{(g)} + H2_{(g)}$ b) $CO_{(g)} + H_2O(g) \xrightarrow[catalyst]{673k} CO_2(g) + H_2(g)$
    c) $CnH_{2n+2} + nH_2O_{(g)} \xrightarrow[Ni]{1270K} nCO + (2n+1)H_2$ d) $CO(g) + 2H_{2(g)} \xrightarrow[catalyst]{cobalt} CH_3OH_{(l)}$

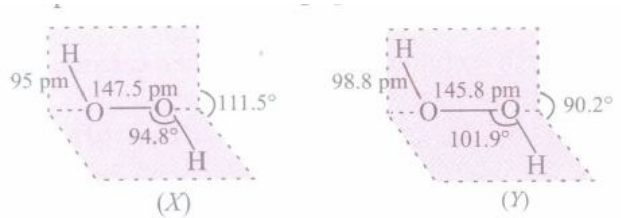
64. Match the following and identify the correct option.
    H_2O_2
    a) Non-Planar structure b) Synthesis gas c) An electron deficient hydride
    d) $Mg(HCO_3)_2 + Ca(HCO_3)_2$

65. Which of the following is an amphoteric hydroxide?
    a) $Ca(OH)_2$ b) $Mg(OH)_2$ c) $Be(OH)_2$ d) $Sr(OH)_2$

66. Which of the following represents calgon?
    a) $Na_2Al_2Si_2O_8$ b) $Mg_3(PO_4)_2$ c) $Na_2[Na_4(PO_3)6]$ d) $Na_2[Mg_2(PO_3)6]$

67. From group 6, only one metal forms hydride. This metal is
    a) Mo b) W c) Cr d) Sg

68. Which of the following statements is correct regarding hydrogen?
    a) Hydrogen shows +1 and -1 oxidation states.
    b) Hydrogen is never liberated at anode.
    c) Hydrogen has same ionisation enthalpy as that of alkali metals.
    d) Hydrogen has same electronegativity as that of halogens.
69. Which of the following properties of hydrogen is incorrect?
    a) Like halogens, hydrogen is liberated at cathode
    b) The ionisation energy of hydrogen is quite close to halogens.
    c) Like halogens, hydrogen exists as a diatomic gas.
    d) Like halogens, hydrogen exhibits -1 oxidation state in its compounds with metals.
70. **Assertion:** Hydrides of N, O and F have lower boiling points than the hydrides of their subsequent group members.
    Reason: Boiling point depends upon the molecular mass only.
    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.
71. Two structures of H_2O_2 are drawn below. Identify the phases X and Y of H_2O_2.



    a) (X) is the structure of H_2O_2 in gas phase and (Y) in solid phase
    b) (X) is structure of H_2O_2 in solid phase and (Y) in gas phase
    c) (X) and (Y) are structures of H_2O_2 in gas phase
    d) (X) and (Y) are structures of H_2O_2 in solid phase
72. Which of the following cannot be used as a test for H_2O_2?
    a) It gives blue colour with $K_4[Fe(CN)_6]$. b) It decolourises acidified $KMnO_4$ solution.
    c) A paper dipped in PbS (black) turns white when brought in contact with H_2O_2.
    d)
    Potassium ferricyanide is reduced to potassium ferrocyanide and H_2O_2 is oxidised to O_2,
73. **Assertion:** Hydrides of group 13 elements are Lewis acids whereas hydrides of group 15-17 elements are Lewis bases..
    Reason : Group 13 hydrides have few electrons whereas group 15-17 hydrides have excess electrons which are present as lone pairs.

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.

74. Radioactive elements emit α, β and y rays and are characterised by their half-lives. The radioactive isotope of hydrogen is

a) protium b) deuterium c) tritium d) hydronium.

75. The various types of hydrides and examples of each type are given below:

	Hydride type		**Compound**
(A)	Electron deficient	(i)	LiH
(B)	Saline	(ii)	CH_4
(C)	Electron -precise	(iii)	NH_3
(D)	Interstitial	(iv)	B_2H_6
(E)	Electron rich	(v)	CrH

Choose the correct matching from the codes given below:

a) (A) - (ii), (B) - (iv), (C) - (v), (D) - (iii), (E) - (i)

b) (A) - (iv), (B) - (i), (C) - (ii), (D) - (v), (E) - (iii)

c) (A) - (iv), (B) - (iii), (C) - (v), (D) - (ii), (E) - (i)

d) (A) - (v), (B) - (iii), (C) - (iv), (D) - (ii), (E) - (i)

76. In a permutit, the calcium and magnesium ions of hard water are exchanged by:

a) CO_3^{2-} and HCO_3^- ions of permutit b) Na^+ ions of permutit

c) Al^{3+} ions of permutit d) Si^{4+} ions of permutit.

77. H_2O_2 acts as a bleaching agent because of

a) reducing nature of H_2O_2 b) oxidising nature of H_2O_2 c) acidic nature of H_2O_2

d) basic nature of H_2O_2

78. **Assertion:** A 30% solution of H_2O_2 is marketed a '100 volume' hydrogen peroxide.

Reason: 1 L of 30% H_2O_2 will give 100 mL ofoxygen at STP.

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.

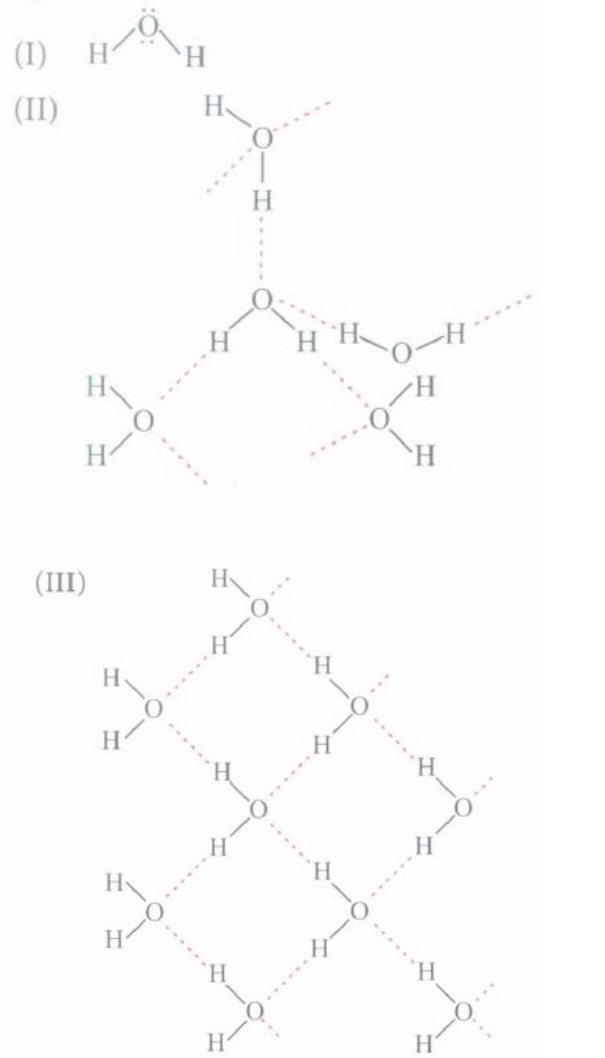
79. Which of the following is not a disadvantage of using hard water?

a) In production of steam in boilers b) Formation of scales in cooking utensils

c) In cooking, bathing and washing d) In ion exchangers

80. During hydrate formation from aqueous solution, water can be associated in different forms. Indicate the wrong combination.
    (i) Coordinated water - $[Cr(H_2O)_6^{3+}3Cl^-$
    (ii) Interstitial water - $BaCl_2 \cdot 2H_2O$
    (iii) Hydrogen bonded water - $[Cu(H_2O)_4]^{2+}SO_4^{2-} \cdot H_2O$
    a) (i) b) (ii) c) (iii) d) None of these.
81. What is meant by demineralised water?
    a) Water free from cations and anions b) Water free from minerals dissolved in it.
    c) Water free from impurities. d) Water free from Na^+ and K^+ ions
82. The density of water is less in its solid state because:
    a)
    in solid state (ice), water molecules are arranged in highly ordered open cage like structure
    b) more extensive hydrogen bonding is present in solid state ice
    c) the water molecules are closest in solid state of water
    d) water is a rigid crystalline, closely packed structure in its solid state.
83. Which of the following metal evolves hydrogen on reacting with cold dilute HNO_3?
    a) Mg b) Al c) Fe d) Cu
84. Metal hydrides are ionic, covalent or molecular in nature. Among LiH, NaH, KH, RbH, CsH, the correct order of increasing ionic character is
    a) LiH > NaH > CsH > KH>RbH b) LiH < NaH < KH < RbH < CsH
    c) RbH> CsH > NaH > KH > LiH d) NaH> CsH > RbH > LiH > KH
85. When CO_2 is bubbled through a solution of barium peroxide in water
    a) carbonic acid is formed b) H_2O_2 is formed c) H_2O is formed
    d) barium hydroxide is formed.
86. The H -O-H angle in water molecule is about
    a) 90^0 b) 180^0 c) 102^0 d) 105^0
87. Peroxodisulphate, on hydrolysis yields
    a) water b) dihydrogen c) hydrogen peroxide d) deuterium.
88. In complex hydrides, hydride ions act as ligand and are coordinated to metal ions. These hydrides are good reducing agents. Which of the following hydrides is not a complex hydride?
    a) $LiAlH_4$ b) $NaBH_4$ c) $(AlH_3)_n$ d) $LiBH_4$

89. Choose the correct statement about the given figures.



a) (II) represents solid state while (III) represents liquid state
b) (II) represents liquid state while (III) represents solid state
c) (1) represents solid state while (III) represents liquid state
d) (I) represents liquid state while (III) represents solid state,

90. Heavy water is used as
a) drinking water b) detergent c) washing water d) a moderator.

91. Pure nascent hydrogen is best obtained by
a) Na and C_2H_5OH b) Al and NaOH c) Zn and dil. H_2SO_4 d) all of these.

92. Given below are the two reactions of H_2O_2. Mark the correct statement which follows.
(i) $2KMnO_4+3H_2SO_4+5H_2O_2 \rightarrow K_2SO_4+2MnSO_4 + 8H_2O + 5O_2$
(ii) $2Cr(OH)_3 + 4NaOH + 3H_2O_2 \rightarrow 2Na_2CrO_4 + 8H_2O$
a) (i) Shows oxidising nature of H_2O_2 and (ii) shows reducing nature of H_2O_2.
b) In (i) H_2O_2 acts as a reducing agent and in (ii) it acts as an oxidising agent.
c) In both (i) and (ii), H_2O_2 acts as an oxidising agent.
d) In both (i) and (ii), H_2O_2 acts as a reducing agent.

93. Which compound is formed when calcium carbide reacts with heavy water?
a) C_2D_2 b) CaD_2 c) CD_2 d) Ca_2D_2

94. The order of reactivity of halogens towards hydrogen is

a) $F_2 > Cl_2 > Br_2 > I_2$ b) $I_2 > Br_2 > Cl_2 > F_2$ c) $Cl_2 > Br_2 > I_2 > F_2$
d) $Br_2 > Cl_2 > F_2 > I_2$

95. On moving from left to right in a period what is the order of acidic character of hydrides?
a) $NH_3 < H_2O < HF$ b) $HF < H_2O < NH_3$ c) $H_2O < HF < NH_3$ d) $H_2O < NH_3 < HF$

96. The process of production of syngas from sewage, saw-dust, scrap wood, etc. is quite common these days. The production of syngas from coal is called
a) carbonisation b) water gas shift c) coal gasification d) synthesis gas shift

97. Polyphosphates like sodium hexametaphosphate (calgon) are used as water softening agents because they
a) form soluble complexes with anionic species b) precipitate anionic species
c) form soluble complexes with cationic species d) precipitate cationic species.

98. Mark the following statements as true or false.
(i) Ordinary hydrogen is a mixture of 75% ortho and 25% para-forms.
(ii) All the four atoms of molecule of H_2O_2 lie in the same plane.
(iii) Hydrogen peroxide is neutral like water.
(iv) H_2O_2 can be prepared from BaO_2 but not from MnO_2 and PbO_2.
a) (i) and (iv) - true, (ii) and (iii) - false b) (i) and (ii) - true, (iii) and (iv) - false
c) (iii) and (iv) - true, (i) and (ii) - false d) (i) and (iii) - true, (ii) and (iv) - false

99. Match the column I with column II and mark the appropriate choice.

Column - I		**Column - II**	
(A)	Syngas	(i)	$Na_6P_6O_{18}$
(B)	Calgon	(ii)	$NaAlSi0_4$
(C)	Permutit	(iii)	$CO+H_2$
(D)	Producer gas	(iv)	$CO+N_2$

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

100. Presence of water can be detected by
a)
adding a drop to anhydrous copper sulphate which changes its colour from white to blue
b) by boiling and testing for the presence of H_2 and O_2,
c) by seeing its colour and transparency
d) by checking the production of lather when mixed with soap.

101. Which of the statements given below are true for the structure of water molecule?
(i) Oxygen undergoes sp^3 hybridisation.
(ii) Due to the presence of two lone pairs of electrons on oxygen the H - O - H bond angle is 118.4°.
(iii) Due to angular geometry the net dipole moment of water is not zero, u = 1.84 D.
a) (i) and (ii) b) (ii) and (iii) c) (i) and (iii) d) only (ii)

102. Which of the following reactions of hydrogen with non-metals represents Haber's process?

a) $2H_2 + O_2 \xrightarrow{heat} 2H_2O; \triangle H = -285.9$ KJ mol^{-1}

b) $3H_2 + N_2 \xrightarrow[200\ atm]{673k, Fe} 2NH_3; \triangle H = -92.6$ KJ mol^{-1} c) $H_2 + Cl_2 \xrightarrow{hv} 2HCl$

d) $2H_2 + C \xrightarrow[1100\ C]{} CH_4$

103. Match the reactions of column I with their types given in column II and mark the appropriate choice.

Column - I		**Column -II**	
(A)	$H_2O + NH_3 \rightleftharpoons NH_4^+ + OH$	(i)	Self ionisation of H_2O
(B)	$FeCl_3 + 3H_2O \rightarrow Fe(OH)_3 + 3HCl$	(ii)	Decomposition
(C)	$H_2O + H_2O \rightleftharpoons H_3O^+ + OH$	(iii)	Acidic nature of H_2O
(D)	$2H_2O \rightarrow 2H_2 + O_2$	(iv)	Hydrolysis

a) (A) $\rightarrow$(ii), (B) $\rightarrow$ (i), (C) $\rightarrow$ (iii), (D) $\rightarrow$ (iv)

b) (A) $\rightarrow$(iii), (B) $\rightarrow$ (ii), (C) $\rightarrow$ (iv), (D) $\rightarrow$ (i)

c) (A) $\rightarrow$ (i), (B) $\rightarrow$ (ii), (C) $\rightarrow$ (iv), (D) $\rightarrow$ (iii)

d) (A) $\rightarrow$ (iii), (B) $\rightarrow$ (iv), (C) $\rightarrow$ (i), (D) $\rightarrow$ (ii)

104. Only one element of_____forms hydride.

a) group 8 b) group 9 c) group 6 d) group 7

105. **Assertion:** H_2O_2 is stored in wax-lined glass or plastic vessels.

Reason : H_2O_2 decomposes slowly on exposure to light.

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.

106. Given below are two reactions of water with sodium and carbon dioxide. What is the nature of water in these reactions?

(i) $2Na + 2H_2O \longrightarrow 2NaOH + H_2$

(ii) $6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$

a) In (ii) water acts as an oxidising agent and in (i) it acts as a reducing agent.

b) In (i) water acts as an oxidising agent while in (ii) it acts as a reducing agent.

c) In both, (i) and (ii) hydrogen acts as a reducing agent.

d) In both, (i) and (ii) hydrogen acts as an oxidising agent.

107. Hydrogen burns in air with a _____ .

a) light bluish flame b) yellow flame c) crimson red flame d) green flame.

108. Study the following reactions and mark the correct properties shown by water:

(i) $SO_3 + H_2O \rightarrow H_2SO_4$

(ii) $Cl_2O_7 + H_2O \rightarrow 2HClO_4$

(iii) $Na_2O + H_2O \rightarrow 2NaOH$

(iv) $CaO + H_2O \rightarrow Ca(OH)_2$

a) All oxides react with water to give hydroxides.

b) Acidic oxides are formed by metals and basic oxides by non-metals.

c)

Non-metal oxides combine with water to form acids while metallic oxides combine with water to form alkalies

d) Acidic oxides are stronger than basic oxides since they form strong acids.

109. The molecular formula of a commercial resin used for exchanging ions in water softening is $C_8H_7SO_3Na$ (Mol. wt. 206). What would be the maximum uptake of Ca^{2+} ions by the resin when expressed in mole per gram resin?

a) $\frac{2}{309}$ b) $\frac{1}{412}$ c) $\frac{1}{103}$ d) $\frac{1}{206}$

110. Consider the reactions:

(A) $H_2O_2 + 2HI \rightarrow I_2 + 2H_2O$

(B) $HOCl + H_2O_2 \rightarrow H_3O^+ + Cl^- + O_2$

Which of the following statements is correct about H_2O_2 with reference to these reactions? Hydrogen peroxide is_____.

a) an oxidising agent in both (A) and (B)

b) an oxidising agent in (A) and reducing agent in (B)

c) a reducing agentin (A)and oxidisingagent in (B)

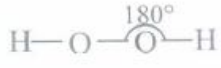
d) a reducing agent in both (A) and (B)

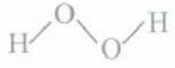
111. In which of the following properties hydrogen does not show similarity with alkali metals?

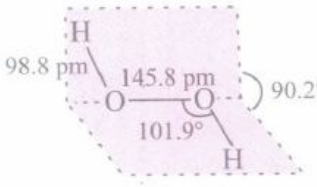
a) Electropositive character b) Reducing nature c) Electronic configuration (ns^1)

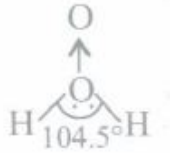
d) Diatomic nature of molecule

112. Which of the following is a true structure of H_2O_2 in solid phase?

a) 

b) 

c) 

d) 

113. Which of the following represents the chemical equation involved in the preparation of $H_2O_2$from barium peroxide?

a) $BaO_2 \cdot 8H_2O + H_2SO_4 \rightarrow BaSO_4 + H_2O_2 + 8H_2O$

b) $CH_3CHOHCH_3 + O_2 \rightarrow CH_3COCH_3 + H_2O_2$

c) $BaO_2 + CO_2 + H_2O \rightarrow BaCO_3 + H_2O_2$

d) $Ba_3(PO_4)_2 + 3H_2SO_4 \rightarrow 3BaSO_4 + 2H_3PO_4$

114. Number of hydrogen-bonded water molecules are associated in $CuSO_4 \cdot 5H_2O$ is:

a) Five b) One c) Four d) Three

115. **Assertion:** Softwater lathers with soap but not hard water.

Reason : Hard water reacts with soap to form insoluble salts which form scum, not lather.

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.

116. The reaction of H_2O_2 with hydrogen sulphide is an example of ..... reaction:
a) Addition b) Oxidation c) Reduction d) Acidic

117. Which property of hydrogen is shown by the following reactions?
(i) $Fe_3O_4 + 4H_2 \rightarrow 3Fe + 4H_2O$
(ii) $CO + H_2 \xrightarrow[ZnO_3]{Cr_2O_3} CH_3OH$
a) Reducing character b) Oxidising character c) Combustibility d) High reactivity

118. Hydrogen peroxide is_____
a) an oxidising agent b) a reducing agent c) both an oxidising and a reducing agent
d) neither oxidising nor reducing agent

119. **Assertion:** Melting and boiling points of D_2O are higher than those of ordinary H_2O.
Reason: D_2O has lesser degree of association and lower molecular mass than H_2O.
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.

120. Which of the following is not true?
a) Ordinary water is electrolysed more rapidly than D_2O.
b) Reaction between H_2 and Cl_2 is much faster than D_2 and Cl_2.
c) D_2O freezes at lower temperature than H_2O.
d) Bond dissociation energy for D_2 is greater than H_2

121. Match the following and identify the correct option.
Temporary hardness of water
a) $\mathrm{Mg(HCO_3)_2 + Ca(HCO_3)_2}$ b) An electron deficient hydride c) Synthesis gas
d) Non-Planar structure

122. Heavy water (D_2O) freezes at
a) -3.8 ^{0}C b) 3.8 ^{0}C c) 0 ^{0}C d) 3.82 ^{0}C

123. Select the incorrect statement from the following:
a) H^+ can exist as $H_9O_4^+$ in water b) H_2 is thermally stable.
c) Ionisation of CH_3COOH is slower than that of CH_3COOD.

d)

Kinetic isotopic effect is observed when there is retardation in the rate if H_2O is replaced by D_2O.

124. What is the trend of boiling points of hydrides of N, O and F?

a)

Due to lower molecular masses NH_3, H_2O and HF have lower boiling points than those of the subsequent group member hydrides.

b)

Due to higher electronegativity of N, O and F; NH_3, H_2O and HF show hydrogen bonding and hence higher boiling points than the hydrides of their subsequent group members.

c) There is no regular trend in the boiling points of hydrides.

d)

Due to higher oxidation states of N, O and F, the boiling points of NH_3, H_2O and HF are higher than the hydrides of their subsequent group members.

125. When sodium peroxide is treated with dilute sulphuric acid, we get_____.

a) sodium sulphate and water b) sodium sulphate and oxygen

c) sodium sulphate, hydrogen and oxygen d) sodium sulphate and hydrogen peroxide

126. Why does H^+ ion always get associated with other atoms or molecules?

a) Ionisation enthalpy of hydrogen resembles that of alkali metals.

b) Its reactivity is similar to halogens. c) It resembles both alkali metals and halogens.

d)

Loss of an electron from hydrogen atom results in a nucleus of very small size as compared to other atoms or ions. Due to small size it cannot exist free.

127. The formula for permutit or zeolite which is used as softner in ion-exchange method is

a) $NaAlSiO_4$ b) $NaAlO_2$ c) $Ca_3(PO_4)_2$ d) Na_2SO_4

128. Dihydrogen forms three types of hydrides. (i) hydrides are formed by alkali metals and alkaline earth metals. (ii) hydrides formed by non-metals and (iii) hydrides formed by d and f-block elements at elevated temperature. Complex metal hydrides that are powerful reducing agents are:

a)

(i)	**(ii)**	**(iii)**	**(iv)**	**(v)**
Covalent	Molecular	Saline	NaH	LiH

b)

(i)	**(ii)**	**(iii)**	**(iv)**	**(v)**
Molecular	Covalent	Ionic	$LiAlH_4$	CaH_2

c)

(i)	**(ii)**	**(iii)**	**(iv)**	**(v)**
Ionic	Covalent	Interstitial	$LiAlH_4$	CaH_2

d)

(i)	**(ii)**	**(iii)**	**(iv)**	**(v)**
Covalent	Saline	Interstitial	$LiAlH_4$	$NaBH_4$

129. **Assertion:** Hydrogen resembles both, alkali metals as well as halogens.

Reason : Hydrogen forms oxides, halides andsulphides, and exists as diatomic molecule.

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.

130. Water plays a key role in the biosphere. It is due to certain properties of H_2O as compared to other liquids. These are except

a) higher specific heat b) lesser thermal conductivity c) high dielectric constant d) high surface tension.

131. If a mole of hydrogen molecule is heated to a high temperature then which of the following reactions take place?

a) $H_{2(g)}$+ 436 kJ $mol^{-1} \rightarrow H_{(g)} + H_{(g)}$ b) $2H_{2(g)}$ + 820 kJ $mol^{-1} \rightarrow 2H_{2(g)}$

c) $H_{2(g)}$+ $H_{2(g)}$+ 436 kJ $mol^{-1} \rightarrow H^+_{(aq)} + H^-_{(aq)}$ d) $H_{2(g)}$+ 200 kJ $mol^{-1} \rightarrow H_{(g)} + H_{(g)}$

132. Hydrogen peroxide is obtained by the electrolysis of_____

a) water b) Sulphuric acid c) hydrochloric acid d) fused sodium peroxide

133. 5.0 cm^3 of H_2O_2 liberates 0.508 g of iodine from an acidified KI solution. The strength of H_2O_2 solution in terms of volume strength at STP is

a) 6.48 volumes b) 4.48 volumes c) 7.68 volumes d) none of these.

134. Heavy water is obtained by

a) boiling water b) heating H_2O_2 c) prolonged electrolysis of H_2O d) All of these.

135. Hydrolysis of $SiCl_4$ gives

a) $Si(OH)_4$ b) $SiOCl_2$ c) SiO_2 d) H_2SiO_4

136. Match the following and identify the correct option.

$\mathrm{CO(g) + H_2(\ g)}$

a) An electron deficient hydride b) Synthesis gas c) Non-Planar structure

d) $\mathrm{Mg(HCO_3)_2 + Ca(HCO_3)_2}$

137. **Assertion:** When sodium hydride in fused state is electrolysed, hydrogen is discharged at anode.

Reason : Sodium hydride is an electrovalent compound in which hydrogen is present as cation.

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.

138. Which of the following is laboratory preparation of dihydrogen?

a) 3Fe + 4H_2O (steam) $\rightarrow Fe_3O_4$ + 4H_2 b) 2Na + 2$H_2O \rightarrow$ 2NaOH + H_2

c) CaH_2 + 2$H_2O \rightarrow Ca(OH)_2$ + 2H_2 d) Zn + H_2SO_4(dil.) $\rightarrow ZnSO_4 + H_2$

139. Calgon used as a water softener, is :
a) $Na_2[Na_4(PO_3)_6]$ b) $Na_4[Na_2(PO_3)_6]$ c) $Na_4[Na_4(PO_4)_5]$ d) $Na_4[Na_2(PO_4)_6]$

140. The process used for the removal of hardness of water is
a) Baeyer b) Calgon c) Hoope d) Serpeck

141. What will be the strength of 20 vol of H_2O_2 in terms of gram per litre?
a) 60.71 gL^{-1} b) 5.6 gL^{-1} c) 30.62 gL^{-1} d) 17 gL^{-1}

142. Which of the following reactions increase production of dihydrogen from synthesis gas?
a) $CH_{4(g)} + H_2O_{(g)} \xrightarrow{1270K} CO_{(g)} + 3H_{2(g)}$ b) $C(s) + H_2O_{(g)} \xrightarrow{1270K} CO_{(g)} + H_{2(g)}$
c) $CO_{(g)} + H_2O_{(g)} \xrightarrow[catalyst]{673k^{Ni}} CO_{2(g)} + H_{2(g)}$ d) $C_2H_{6(g)} + 2H_{2(g)}O \xrightarrow[Ni]{1270\ k} 2CO_{(g)} + 5H_{2(g)}$

143. Which of the following is not a property of hydrogen?
a) It is a colourless, odourless gas. b) It is highly combustible.
c) It is highly poisonous gas. d) It is lighter than air.

144. The structure of H_2O_2 is
a) planar b) non-Planar c) spherical d) linear

145. Which of the following statements about hydrogen is incorrect?
a) Hydronium ion, H_3O^+ exists freely in solution.
b) Dihydrogen does not act 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.

146. Which of the following reagents cannot be used for the preparation of hydrogen peroxide
a) Sodium peroxide b) 2 - EthylanthraquinolSodium thiosulphate
c) Sodium thiosulphate d) Barium peroxide

147. Which of the following series of transitions in the spectrum of hydrogen atom fall in visible region?
a) Balmer series b) Paschen series c) Brackett series d) Lyman series

148. Given below are the elements and the type of hydrides formed by them. Mark the incorrect match.
a) Phosphorus-Molecular hydride b) Potassium-Ionic hydride
c) Vanadium-Interstitial hydride d) Nitrogen-Electron-deficient covalent hydride

149. Which of the following reactions is not used in preparation of deuterium compounds using heavy water?
a) $CaC_2 + 2D_2O \rightarrow C_2D_2 + Ca(OD)_2$ b) $SO_3 + D_2O \rightarrow D_2SO_4$
c) $2AlN + 3D_2O \rightarrow Al_2O_3 + 2ND$ d) $Al_4C_3 + 12D_2O \rightarrow 3CD_4 + 4Al(OD)_3$

150. **Assertion:** Ice cube floats on water.
Reason: Density of ice is less than that of water.

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.

151. **Assertion :** Dihydrogen is inert at room temperature.
Reason : The H - H bond dissociation enthalpy is the highest for a single bond between two atoms of any element.
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.

152. What is the reaction given below, called?
$H_2O_{(l)} + H_2O_{(l)} \rightleftharpoons H_3O+_{(aq)} + OH^-_{(aq)}$
a) Hydrolysis of water b) Hydration of water c) Disproportionation of water
d) Auto-protolysis of water

153. The isotopes of hydrogen have different physical properties due to difference in mass. They have almost same chemical properties with a difference in their rates of reactions which is mainly due to
a) their different enthalpy of bond dissociation b) different electronic configurations
c) different atomic masses d) different physical properties

154. Carbon hydrides of the type, C_nH_{2n+2} do not act as Lewis acid or Lewis base. They behave as normal covalent hydrides because:
a) carbon hydrides are electron-rich hydrides
b) carbon hydrides are electron -deficient hydrides
c) carbon hydrides are electron-precise hydrides
d) carbon hydrides are non-stoichiometric hydrides.

155. (i) $\mathrm{H_2O_2 + O_3 \rightarrow H_2O + 2O_2}$
(ii) $\mathrm{H_2O_2 + Ag_2O \rightarrow 2Ag + H_2O + O_2}$
Role of hydrogen peroxide in the above reactions is repectively.
a) Oxidizing in (i) andreducing in (ii) b) Reducing in (i) and oxidizing in (ii)
c) Reducing in (i) and (ii) d) Oxidizing in (i) and (ii)

156. A metal which does not react with cold water but reacts with steam to liberate H_2 gas is
a) Na b) Mg c) Au d) Fe

157. **Assertion:** In atomic form hydrogen consists of one proton and one electron.
Reason : In elemental form hydrogen exists as a diatomic molecule and is called dihydrogen.

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.

158. Assertion: Iodination of alkanes is carried out in the presence of oxidising agents like HIO_3 or HNO_3.

Reason : Iodination of alkanes is an irreversible reaction.

a)

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

b)

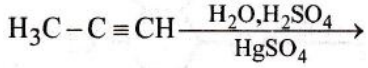
If both assertion and reason are true but reason is not the correct explanation of assertion

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

159. Which one of the following gives only one monochloro derivative?

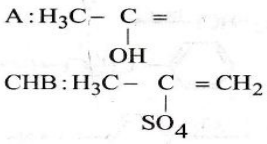
a) neo- Pentane b) n-Hexane c) 2-Methylpentane d) 3-Methylpentane

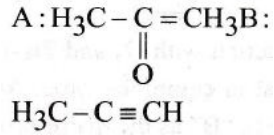
160. Predict the correct intermediate and product in the following reaction:

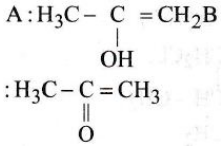


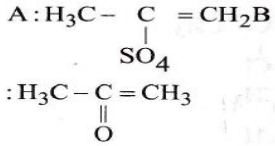
Intermediate → product

(A) (B)

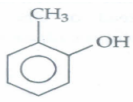
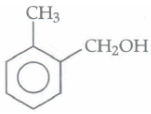
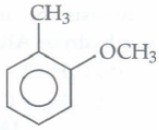
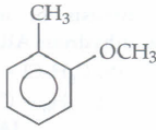
a) 

b) 

c) 

d) 

161. Which one is the most reactive towards electrophilic reagent?

a)  b)  c)  d) 

162. The compound that will react most readily with gaseous bromine has the formula is:

a) C_3H_6 b) C_2H_6 c) C_4H_{10} d) C_2H_4

163. Name the products of the following reactions.

(I) C_6H_6 reacts with methyl chloride in presence of $AlCl_3$.

II) C_6H_6 reacts with acetyl chloride in presence of $AlCl_3$.

(III) C_6H_6 reacts with fuming nitric acid in presence of conc. H_2SO_4.

(IV) C_6H_6 is catalytically hydrogenated.

a)

I	II	III	IV
Chloro-methane	Tolune	Nitro-benzene	n-Hexane

b)

I	II	III	IV
Methyl-benzene	Chloro-benzene	Phenyl nitrate	Trimethyl-benzene

c)

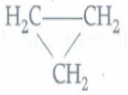
I	II	III	IV
Benzyl chloride	Trimethyl-benzene	Trinitro-tolune	Tolune

d)

I	II	III	IV
Tolune	Aceto-phenone	Trinitro-benzene	Cyclo hexane

164. The alkene that exhibits geometrical isomerism is
a) propene b) 2-methylpropene c) 2-butene d) 2-methyl-2-butene.

165. Which of the following compounds will not undergo Friedel - Craft's reaction easily?
a) Cumene b) Xylene c) Nitrobenzene d) Toluene

166. Which of the following compounds shall not produce propene by reaction with HBr followed by elimination or direct only elimination reaction?
a)  b) $H_3C-\overset{H_2}{\overset{|}{C}}-CH_2OH$ c) $H_2C=C=O$ d) $H_3C-\overset{H_2}{\overset{|}{C}}-CH_2Br$

167. Nitration and chlorination of benzene are:
a) nucleophilic and electrophilic substitution respectively
b) electrophilic and nucleophilic substitution respectively
c) electrophilic substitution in both the reactions
d) nucleophilic substitution in both the reactions.

168. Which of the following chemical system is non-aromatic?
a)  b)  c)  d) 

169. The correct trend of acidic nature of the following alkynes is:
a) $CH\equiv CH > CH_3-C\equiv CH > CH_3C\equiv CCH_3$
b) $CH_3-C\equiv CH > CH\equiv CH > CH_3C\equiv CCH_3$
c) $CH_3C\equiv CCH_3 > CH_3-C\equiv CH > CH\equiv CH$
d) $CH\equiv CH > CH_3C\equiv CCH_3 > CH_3C\equiv CH$

170. In the following reaction:

$$HC\equiv CH \xrightarrow[Hg^{2+}]{H_2SO_4} \text{'P'}$$

Product 'P' will not give.
a) Idoform test b) Tollen's reagent test c) Brady's reagent test d) Victor Meyer test

171. Ozonolysis products of 2-pentyne after decomposition of ozonide with water and subsequent oxidation are
a) ethanoic acid and propanoic acid b) ethanoic acid and propanone
c) ethanoic acid d) formic acid and glyoxal.

172. $CH_3CH_2CH_2OH \xrightarrow[170^oC]{conc.H_2SO_4} A \xrightarrow[500^oC]{Cl_2} B$
A and B are:

a) A = $CH_3CH_2CH_3$, B = $CH_3CH_2CH_2Cl$ b) A = CH_3CH =CH_2, B = CH_2ClCH =CH_2
c) A = CH_2 =CH_2, B = CH_3CH_2Cl d) A = $CH_3CH_2CH_3$, B = CH_3CH =CH_2

173. Match the column I with column II and mark the appropriate choice.

Column-I		Column-II	
(A)	n-Butane⟶2- Methylpropane	(i)	Free radical substitution
(B)	$CH_4 + Cl_2 \xrightarrow{hv} CH_3Cl$	(ii)	Wurtz reaction
(C)	RCOONa + soda lime⟶RH	(iii)	Isomerisation
(D)	$RX+Na \xrightarrow{ether} R-R$	(iv)	Decarboxylation

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

174. With respect to the conformers of ethane, which of the following statements is true?
a) Bond angles remains same but bond length changes
b) Bond angle changes but bond length remains same
c) Both bond angle and bond length change
d) Both bond angle and bond length remain same.

175. The cylindrical shape of an alkyne is due to the fact that it has:
a) three sigma C - C bonds b) three π C - C bonds
c) two sigma C - C and one π C - C bonds d) one sigma and two π C - C bonds

176. Which of the following can exhibit cis−trans isomerism?
a) CH_3 - CHCl - COOH b) H - C ≡≡ C - Cl c) ClCH = CHCl d) $ClCH_2$ - CH_2Cl

177. An alkene X is obtained by dehydration of an alcohol Y. X on ozonolysis gives two molecules of ethanal for every molecule of alkene. X and Y are:
a) X = 3-hexene, Y = 3-hexanol b) X = 2-butene, Y = 2-butanol
c) X = 1-butene, Y = 1-butanol d) X = 1-hexane, Y = 1-hexanol.

178. Which of the following reactions is expected to readily give a hydrocarbon product in good yields?
a) $RCOOK \xrightarrow[\text{oxidation}]{\text{Electrolytic}}$ b) $RCOOAg \xrightarrow{I_2}$ c) $\mathrm{CH_3CH_3} \xrightarrow[hv]{cl_2}$
d) $(\mathrm{CH_3})_2\mathrm{CCl} \xrightarrow{C_2H_5OH}$

179. Which of the following will give 2,2-dibromopropane on reaction with HBr?
a) CH_3 - CH = CH_2 b) $CH_3C \equiv CH$ c) CH_3CH = CHBr d) CH≡CH

180. Reduction of 2-butyne with sodium in liquid ammonia gives predominantly:
a) cis-2-butene b) trans-2-butene c) no reaction d) n-butane

181. What happens when calcium carbide is treated with water?
a) Ethane is formed b) Methane and ethane are formed c) Ethyne is formed
d) Ethene and ethyne are formed

182. Wurtz reaction may be used to unite:
a) two alkyl halides b) two aryl halides c) alkyl and aryl halides
d) two benzene units.

183. The pair of electrons in the given carbanion, $CH_3C \equiv C^-$ is present in which of the following orbitals?
a) sp^2 b) sp c) 2p d) sp^3

184. Which of the following products is formed when n-heptane is passed over (Al_2O_3 + Cr_2O_3) catalyst at 773 K?
a) Benzene b) Toluene c) Polyheptane d) Cycloheptane

185. The alkene $R-CH=CH_2$ reacts readily with B_2H_6 and the product on oxidation with alkaline hydrogen peroxides produces ?
a) $R - CH_2 - CHO$ b) $R - CH_2 - CH_2 - OH$ c) $R - \underset{\underset{CH_3}{|}}{C} = O$ d) $R - \underset{\underset{OH}{|}}{CH} - \underset{\underset{OH}{|}}{CH_2}$

186. Which of the following will not show cis-trans isomerism?
a) $CH_3 - CH = CH - CH_3$ b) $CH_3 - CH_2 - CH = CH - CH_2CH_3$
c) $CH_3 - \underset{\underset{CH_3}{|}}{C} = CH - CH_2 - CH_3$ d) $CH_3 - \underset{\underset{CH_3}{|}}{C} - CH = CH - CH_2 - CH_3$

187. The reaction in terms of intermediates and type of reaction is given below. Mark the incorrect option.
a) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} = CH_2 + HBr \longrightarrow Carbocation \quad intermediate$
b) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} = CH_2 + HBr \overset{peroxide}{\longrightarrow} Free \quad radical \quad intermediate$
c) $>C=C< + X_2 \longrightarrow$ Electrophilic substitution d) $>C=C< + O_3 \longrightarrow$ Ozonide

188. Assertion: Staggered conformation of ethane is most stable while eclipsed conformation is least stable.
Reason: Staggered form has the least torsional strain and the eclipsed form has the maximum torsional strain.
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

189. Which of the following reactions does not show the correct products of the reaction?
a) $CH_3-CH=CH_2 \underset{peroxide}{\overset{HBr}{\longrightarrow}} CH_3-CH_2-CH_2Br$ b) $CH_3 - CH = CH_2 \underset{peroxide}{\overset{HCl}{\longrightarrow}} CH_3-CH_2-CH_2Cl$
c) $CH_3 - CH = CH_2 \overset{HBr}{\longrightarrow} CH_3 - \underset{\underset{Br}{|}}{CH} - CH_3$
d) $CH_3 - CH = CH_2 \overset{HCl}{\longrightarrow} CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_3$

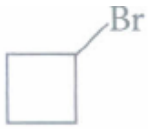
190. Which of the following alkynes is most acidic?
a) $CH_3C \equiv CH$ b) $CH_3C \equiv CCH_3$ c) $CH_3CH_2C \equiv CH$ d) $CH \equiv CH$

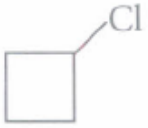
191. Ozonolysis of 2,3-dimethylbut-l-ene followed by reduction with zinc and water gives
a) methanal and hexanoic acid b) methanoic acid and butanone
c) methanal and 3-methylbutan-2-one d) butanoic acid and 2,3-dimethylbutanoic acid.

192. Which of the following alkane cannot be made in good yield by Wurtz reaction?
a) n-Butane b) n-Hexane c) 2, 3-Dimethylbutane d) n-Heptane

193. Assertion: The reaction, C_2H_5Br+ 2Na + C_2H_5Br → C_4H_{10} + 2NaBr is known as Wurtz reaction.
Reason : The reaction is carried out in presence of dry ether.
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

194. I-Bromo-3-chlorocyclobutane is treated with two equivalents of Na, in the presence of ether. Which of the following compounds will be formed?

a) 

b) 

c) 
d) 

195. The ozonolysis product(s) of the following reaction is(are)

CH_3CH_2 -C =CH $\xrightarrow[(ii)H_2O]{(i)O_3}$ product(s)

a) CH_3COCH_3 b) CH_3COCH_3 + HCHO c) CH_3COOH + HCOOH
d) CH_3CH_2COOH + HCOOH

196. in the given reactions:

(i) CH3Br $\xrightarrow{Na,\,ether}$ $X \xrightarrow[Br_2]{hv} YNa, ether \xrightarrow[CaO]{} Z$

(ii)CH3COOH $\xrightarrow{NaOH}$ $X \xrightarrow[NaOH]{} Y \xrightarrow[Br_2]{hv} Z$

a)

	X	Y	Z
(i)	CH_4	CH_3Br	CH_3CH_3
(ii)	CH_3COONa	CH_3CH_3	CH_3CH_2Br

b)

	X	Y	Z
(i)	CH_3CH_3	CH_4	CH_3Br
(ii)	CH_3COONa	CH_4	$CH_3CH_2CH_3$

c)

	X	Y	Z
(i)	CH_3CH_2Br	CH_3CH_3	$CH_3CH_2CH_3$
(ii)	$CH_3COONaCH_4$	CH_4	CH_3Br

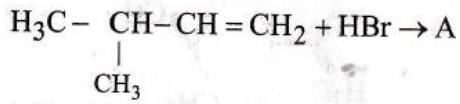
d)

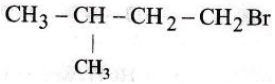
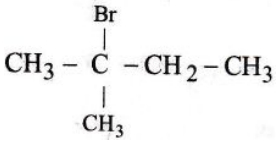
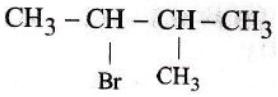
	X	Y	Z
(i)	CH_3CH_3	CH_3CH_2Br	$CH_3CH_2CH_2CH_3$
(ii)	CH_3COONa	CH_4	CH_3Br

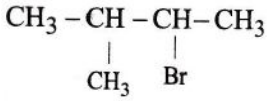
197. Nitration of benzene is carried out with conc. HNO_3 in presence of cone. H_2SO_4, The role of cone, H_2SO_4 is to provide:

a) nucleophile during the reaction b) free radical during the reaction
c) electrophile during the reaction d) catalyst during the reaction.

198. The number of chain isomers possible for hydrocarbon C_5H_{12} is
a) 3 b) 5 c) 4 d) 6

199. 
A (Predominantly) is:

a)  b)  c) 

d) 

200. Consider the nitration of benzene using mixed concentrated H_2SO_4 and HNO_3. If a large amount of $KHSO_4$ is added to the mixture, the rate of nitration will be:
a) unchanged b) doubled c) faster d) slower

201. An inhibitor is described as:
a) a substance that slows down or stops a reaction
b) a substance which inhibits the properties of a catalyst
c) a substance formed during the reaction and does not participate in the reaction
d) a substance which prevents formation of products in a reaction being most reactive

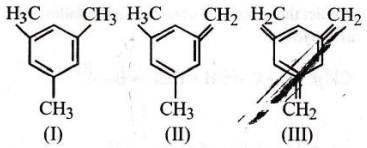
202. Kerosene is a mixture of:
a) aromatic hydrocarbons b) aliphatic hydrocarbons c) unsaturated hydrocarbons
d) saturated hydrocarbons

203. Complete the following reaction by identifying X and Y

$$CH_3CH_2C \equiv CH \xrightarrow{NaNH_2} X \xrightarrow{C_2H_2BrY}$$

a) X = CH_3CH_2COONa, Y = $CH_3CH_2CH = CH_2$
b) X = $CH_3CH_2C \equiv CNa$, Y = $CH_3CH_2C \equiv CC_2H_5$
c) X = $CH_3CH_2CH_2CH_2Na$, Y = $CH_3CH_2CH_2CH_3$
d) X=$CH_3CH_2CH{\equiv}CNa$, $Y = CH_3CH_2 - \underset{\underset{C_2H_5}{|}}{CH} - CH_3$

204. Given:



The enthalpy of the hydrogenation of these compounds will be in the order as:
a) III>II>I b) II>III>I c) II>I>III d) I>II>III

205. The IUPAC name of the compound having the formula $\mathrm{CH = C - CH \equiv CH_2}$ is _____ .
a) l-butyn-3-ene b) but-1-yne-3-ene c) l-butene-3-yne d) 3-butene-l-yne

206. Base strength of-

(i) H_3CCH_2

(ii) $H_2C = CH$

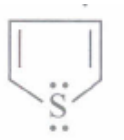
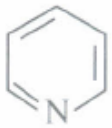
and (iii) H - C ≡ C is in the order of :

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

207. The IUPAC name of the compound $\mathrm{CH_3CH = CHC \equiv CH}$ is _____ .

a) Pent-1-yn-3-ene b) Pent-4-yn-2-ene c) Pent-3-en-1-yne d) Pent-2-en-4-yne

208. Which of the following species does not show aromaticity?

a)  b)  c)  d) 

209. Dehydrohalogenation involves removal of the halogen atom together with a hydrogen atom from a carbon atom adjacent to the one with halogen atom. Alcoholic KOH is used for dehydrohalogenation. According to Saytzeff's rule, when two alkenes may be formed, the alkene which is most substituted is the major product.

Arrange the following alkyl halides in decreasing order of the rate of β-elimination reaction with alcoholic KOH.

$$\underset{(i)}{CH_3CH_2CH_2Br} \quad \underset{(ii)}{CH_3-\underset{CH_3}{\underset{|}{CH}}-CH_3Br} \quad \underset{(iii)}{CH_3-CH_2-\underset{Br}{\underset{|}{CH}}-CH_3}$$

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

210. The radical  is aromatic because it has:

a) 7p--orbitals and 6 unpaired electrons b) 7p--orbitals and 7 unpaired electrons

c) 6p-orbitals and 7 unpaired electrons d) 6p--orbitals and 6 unpaired electrons

211. Coal tar is the main source of:

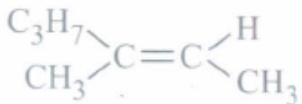
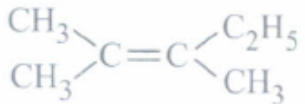
a) aromatic compounds b) alicyclic compounds c) aliphatic compounds

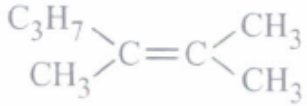
d) nitro compounds.

212. The distance between two adjacent carbon atoms is largest in:

a) benzene b) ethene c) butane d) ethyne

213. An unsaturated hydrocarbon was treated with ozone and resulting ozonide on hydrolysis gives 2-pentanone and acetaldehyde. What is the structure of alkene?

a) C_3H_7-CH=CH-CH_3 b)  c) 

d) 

214. 2, 3-Dimethyl-2-butene can be prepared by heating which of the following compounds with a strong acid?

a) $(CH_3)_3$ C - CH = CH_2 b) $(CH_3)_2$ C = $CHCH_2CH_3$ c) $(CH_3)_2CHCH_2CH = CH_2$

d) $(CH_3)_2CH - \underset{\underset{CH_3}{|}}{CH} - CH = CH_2$

215. Assertion: Wurtz reaction is not preferred for the preparation of alkanes containing odd number of carbon atoms.
Reason : It is not possible to prepare alkanes with odd number of carbon atoms through Wurtz reaction
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

216. Nitrobenzene can be prepared from benzene by using a mixture of concentrated HNO_3 and cone, H_2SO_4, In the mixture, nitric acid acts as an/a:
a) reducing agent b) acid c) base d) catalyst

217. **Assertion:** Addition of HBr to propene yields 2-bromopropane but in presence of a peroxide it yields l-bromopropane.
Reason: When reaction is carried out in the presence of a peroxide it follows free radical mechanism, 20 free radical is more stable than 10 free radical.
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.

218. Which of the following statements is true?
a) Soda lime is a mixture of sodium hydroxide and potassium hydroxide
b) Methane can be prepared by Wurtz reaction
c) In alkanes all carbon atoms are sp^3 hybridised.
d) neo-Pentane yields three different monochloro derivatives.

219. Which of the compounds with molecular formula C_5H_{10} yields acetone on ozonolysis?
a) 3-methane-1-butene b) cyclopentane c) 2-methyl-l-butene d) 2-methyl-2-butene

220. Assertion: Boiling point of pentane is higher than 2,2-dimethylpropane.
Reason : There is steady increase in boiling point with increase in molecular mass.
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

221. The major constituent of natural gas is:
a) methane b) propane c) butane d) hexane.

222. Presence of unsaturation in organic compounds can be tested with:
a) Fehling's reagent b) Tollens'reagent c) Baeyer's reagent d) Fittig's reaction.

223. Match the column I with column II to identify the products of oxidation of alkanes and mark the appropriate choice

Column-I		**Column-II**	
(A)	$CH_4 + 2O_2 \xrightarrow[[O]]{KMnO_4}$	(i)	$HCOOH + H_2O$
(B)	$2CH_4 + O_2 \xrightarrow[100atm]{Cu/523K}$	(ii)	$CO_2 + 2H_2O$
(C)	$CH_4 + O_2 \xrightarrow[\triangle]{M_{O_2}O_3}$	(iii)	$2CH_3OH$
(D)	$CH_4 + \frac{3}{2}O_2 \xrightarrow{(CH_3COO)_2Mn}$	(iv)	$HCHO+H_2O$

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

224. In preparation of alkene from alcohol using Al_2O_3 which is effective factor?
a) Temperature b) Concentration c) Surface area of Al_2O_3 d) Porosity of Al_2O_3

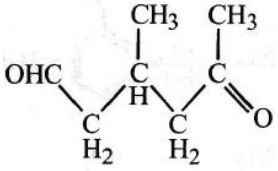
225. **Assertion**: Cyclopentadienyl anion is aromatic in nature.
Reason: Cyclopentadienyl anion has six πelectrons.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

226. Benzene reacts with CH_3Cl in the presence of anhydrous $AlCl_3$ to form:
a) toluene b) chlorobenzene c) benzylchloride d) xylene

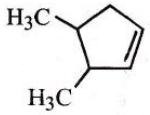
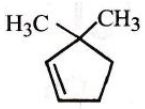
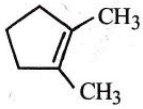
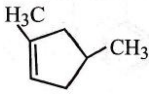
227. Which of the following organic compounds has same hybridizationas its combustion product (CO_2)?
a) Ethane b) Ethyne c) Ethene d) Ethanol

228. Benzene easily shows
a) ring fission reactions since it is unstable
b) addition reactions since it is unsaturated.
c) electrophilic substitution reactions due to stable ring and high π electron density.
d) nucleophilic substitution reactions due stable ring and minimum electron density.

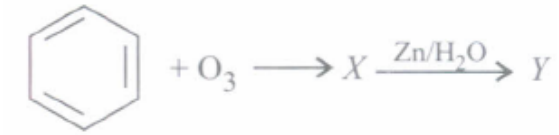
229. A single compound of the structure:



is obtainable from ozonolysis of which of the following cyclic compounds?

a)  b)  c)  d) 

230. Similar to alkenes and alkynes benzene also undergoes ozonolysis. In the sequence of the given reaction identify X and Y.



a) X = Triozonide, Y = Glyoxal b) X = Diozonide, Y = Succinic acid

c) X = Monoozonide, Y = Benzoic acid d) X = Triozonide, Y = Benzaldehyde.

231. Complete the following reactions:

(i) $C_2H_5I + H_2 \xrightarrow[C_2H_5OH]{Zn-Cu} X$

(ii) $CH_3COONa + H_2O \xrightarrow{Electrolysis} Y$

(iii) $CH_3CH_2CH_2CH_2CH_2CH_3 \xrightarrow[773K]{Cr_2O_3/AI_2O_3} Z$

a) X = C_2H_6, Y = C_2H_6, Z = C_6H_6 b) X = CH_4, Y = CH_3COOH, Z = CH_3CH_3

c) X = C_2H_6, Y = CH_4, Z = C_4H_{10} d) X = C_2H_6, Y = CH_4, Z = C_5H_{10}

232. Mark the incorrect statement from the following.

a) Benzene has a planar structure

b) Benzene is an unsaturated hydrocarbon and shows addition reactions like alkenes

c) In benzene carbon uses two p-orbitals for hybridisation.

d)

Aromatic hydrocarbons contain high percentage of carbon hence burn with sooty flame.

233. Which of the following steps is not correct in the mechanism of electrophilic substitution of benzene?

a) Generation of electrophile like X^+, R^+, RC^+O, NO^+_2, etc.

b)

Attack of electrophile resulting in the formation of arenium ion in which one of the carbon is Sp^3 hybridised.

c) Addition of proton on benzene ring to give carbocation.

d) Removal of proton from Sp^3 carbon atom to restore aromatic character.

234. Which of the following compounds will react with Na to form 4,5-diethyloctane?

a) $CH_3CH_2CH_2CH_2Br$ b) $CH_3CH_2CH_2-\underset{CH_3}{\underset{|}{CH}}-CH_2CH_2Br$

c) $CH_3CH_2CH_2CH_2-\underset{Br}{\underset{|}{CH}}-CH_3$ d) $CH_3CH_2CH_2-\underset{Br}{\underset{|}{CH}}-CH_2CH_3$

235. The following reaction is known as

$C_6H_6 + CH_3Cl \xrightarrow[(anhy.)]{AlCl_3} C_6H_5CH_3 + HCl$

a) Wurtz-Fittig reaction b) Friedel-Crafts reaction c) Rosenmund reaction

d) Sandmeyer reaction.

236. Which of the following isomeric heptanes can yield seven different monochlorinated products upon free radical chlorination?

a) 2,2- Dimethylpentane b) 2- Methylhexane c) 3-Methylhexane

d) 2,4-Dimethylpentane

237. Which of the following reagents will be able to distinguish between 1-butyne and 2-butyne?

a) $NaNH_2$ b) HCl c) O_2 d) Br_2

238. Hydrocarbon (A) reacts with bromine by substitution to form an alkyl bromide which by Wurtzreaction is converted to gaseous hydrocarbon containing less than four carbon atoms. (A) is:

a) CH_3 - CH_3 b) $CH_2 = CH_2$ c) CH ≡ CH d) CH_4

239. 2-Bromopentane is treated with alcoholic KOH solution. What will be the major product formed in this reaction and what is the type of elimination called?

a) Pent-1-ene,β-Elimination b) Pent -2-ene, β - Elimination

c) Pent-l-ene, Nucleophilic substitution d) Pent-2-ene, Nucleophilic substitution

240. Which alkane is produced when sodium salt of butanoic acid is heated with soda lime?

a) CH_3CH_3 b) $CH_3CH_2CH_2CH_3$ c) CH_4 d) $CH_3CH_2CH_3$

241. Ethane is formed during the formation of chloromethane by chlorination of methane because:

a) higher members of the hydrocarbons are generally formed during reactions

b) two methyl free radicals may combine during chlorination to give ethane

c) two chloromethane molecules react to form ethane

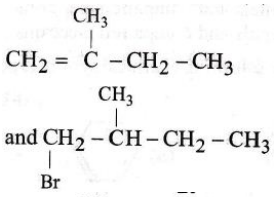
d) chlorine free radical reacts with methane to give ethane.

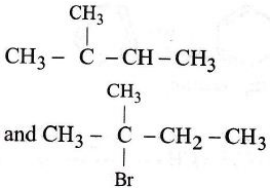
242. In the following reactions,

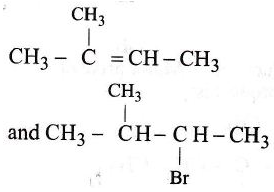
(*i*) $CH_3-\underset{CH_3}{\underset{|}{CH}}-\underset{OH}{\underset{|}{CH}}-CH_3 \xrightarrow{H^+/Heat}$ A (Major Products) + B (Minor Products)

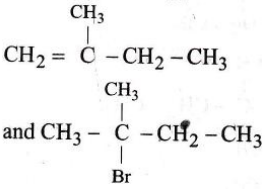
(*ii*) $A \xrightarrow[\text{in absence of peroxide}]{HBr,\ dark}$ C (Major product) + D (Minor Product)

the major products (A) and (C) are respectively:

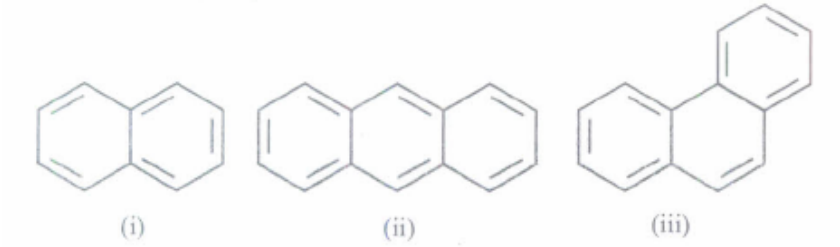
a) 

b) 

c) 

d) 

243. Identify the polynuclear aromatic compound which is aromatic.



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

244. In Friedel-Craft's alkylation, besides $AlCl_3$ the other reactants are:

a) $C_6H_6 + NH_2$ b) $C_6H_6 + CH_4$ c) $C_6H_6 + CH_3Cl$ d) $C_6H_6 + CH_3COCl$

245. Pent-1-ene with HCl gives:

a) 3-chloropentane b) 2-chloropentane c) 1,2-dichloropentane d) 1-chloropentane

246. Geometrical isomerism is caused:

a) by restricted rotation around C = C bond

b) by the presence of one asymmetric carbon atom

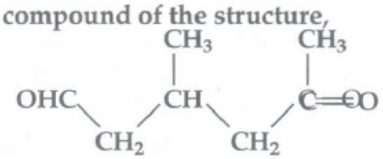
c) due to the different groups attached to the same functional group

d) by swing of hydrogen atom between two divalent atoms.

247. Hydrocarbon which is liquid at room temperature is:

a) pentane b) butane c) propane d) ethane.

248. A single compound of the structure,



is obtainable from ozonolysis of which of the following cyclic compounds?

A (predominantly) is :

a) $CH_3 - \underset{CH_3}{CH} - CH_2 - CH_2Br$ b) $CH_3 - \underset{CH_3}{\overset{Br}{C}} - CH_2CH_2$

c) $CH_3 - \underset{Br}{CH} - \underset{CH_3}{CH} - CH_3$ d) $CH_3 - \underset{CH_3}{CH} - \underset{Br}{CH} - CH_3$

249. Chlorination of methane does not occur in dark because:

a) methane can form free radicals in presence of sunlight only

b)

to get chlorine free radicals from Cl_2 molecules energy is required. It cannot happen in dark

c) substitution reaction can take place only in sunlight and not in dark

d) termination step cannot take place in dark. It requires sunlight.

250. Arrange the halogens F_2, Cl_2, Br_2, I_2, in order of their increasing reactivity with alkanes _____ .

a) $I_2 < Br_2 < Cl_2 < F_2$ b) $Br_2 < Cl_2 < F_2 < I_2$ c) $F_2 < Cl_2 < Br_2 < I_2$

d) $Br_2 < I_2 < Cl_2 < F_2$

251. Cyclic hydrocarbon 'A' has all the carbon and hydrogen atoms in a single plane. All the carbon bonds have the same length less than 1.54 Å but more than 1.34 Å. The C - C - C bond angle will be:

a) $109^0 28'$ b) 100^0 c) 180^0 d) 120^0

252. What is the order of reactivity of hydrogen atoms attached to the carbon atom in an alkane for free radical substitution?

a) 3°>1°>2° b) 2°>1°>3° c) 3°>2°>1° d) 1°>2°>3°

253. During halogenation of alkanes the halogens and alkane show a specific trend. Which of the following statements is not correct?

a) The reactivity of halogens is in the order $F_2 > Cl_2 > Br_2 > I_2$

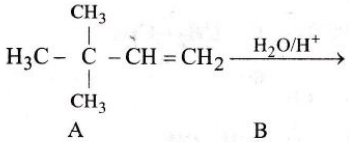
b) For a given halogen the reactivity of hydrocarbon is in the order of 3° > 2° > 1°.

c) Bromine is less reactive than chlorine towards a particular alkane.

d)

On chlorination monosubstituted product is formed while on bromination disubstituted products are formed.

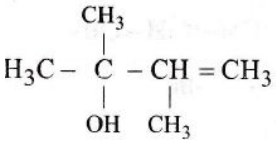
254. In the following reaction:

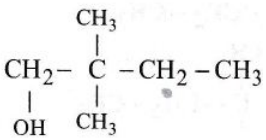


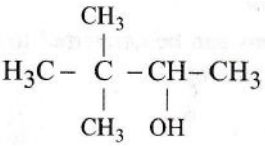
A B

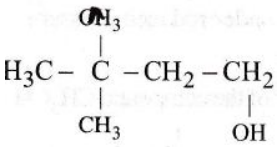
Minor product (+) Minor product

The major product is:

a) 

b) 

c) 

d) 

255. Which step is chain propagation step in the following mechanism?

hv

(i) $Cl_2 \longrightarrow Cl\cdot + Cl\cdot$

(ii) $Cl + CH_4 \longrightarrow \cdot CH_3 + HCl$

(iii) $Cl + Cl\cdot \longrightarrow Cl_2$

(iv) $CH_3 + \dot{C}l \longrightarrow CH_3Cl$

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

256. Assertion: 2,2-Dimethylbutane does not have any tertiary carbon atom.
Reason: Tertiary carbon atom is attached to three carbon atoms

a)

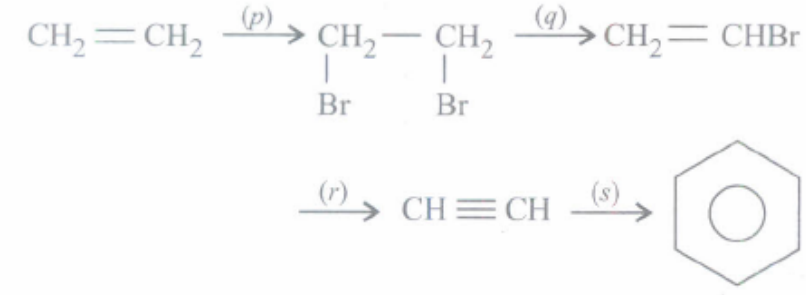
If both assertion and reason are true and reason is the correct explanation of assertion.

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

257. Choose the correct reagents used in the conversion.



a)

p	q	r	s
Br_2	alc.KOH	NaOH	Al_2O_3

b)

p	q	r	s
HBr	alc.KOH	CaC_2	$KMnO_4$

c)

p	q	r	s
HBr	alc.KOH	$NaNH_2$	red hot iron tube

d)

p	q	r	s
Br_2	alc.KOH	$NaNH_2$	red hot iron tube

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

a) CN b) SO_3H c) COOH d) NO_2

259. An organic compound C_6H_{12} (X) on reduction gives C_6H_{14} (Y). X on ozonolysis gives two aldehydes C_2H_4O (I) and C_4H_8O (II). Identify the compounds X, Y and aldehydes (I) and (II).

a)

X = $CH_3CH = CHCH_2CH_2CH_3$, Y = $CH_3(CH_2)_4CH_3$,(I) = CH_3CHO, (II) = $CH_3(CH_2)_2CHO$

b) X = $CH_3CH_2CH = CHCH_2CH_3$, Y = $CH_3(CH_2)_4CH_3$,(I) = CH_3CHO, (II) = CH_3CHO

c)

X = $CH_3CH_2CH_2CH_2CH = CH_2$, y = $CH_3(CH_2)_3CH_3$, (I) = HCHO, (II) = $CH_3(CH_2)_2CHO$

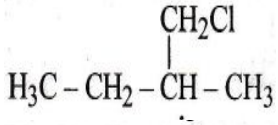
$X = CH_3CH_2 - \underset{\underset{CH_3}{|}}{C} = CH - CH_3$,Y=$CH_3(CH_2)_3CH_3$

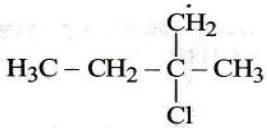
d) (I) = CH_3CHO, (II) = CH_3CH_2CHO

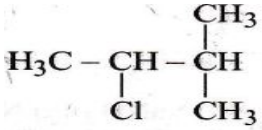
260. Reaction of HBr with propene in the presence of peroxide gives:

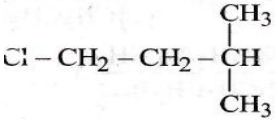
a) iso - propyl bromide b) 3 - bromo propane c) allyl bromide d) n - propyl bromide

261. An alkene "A" on reaction with O_3 and $Zn - H_2O$ gives propanone and ethanal in equimolar ratio, Addition of HCl to alkene "A" gives "B" as the major product. The structure of product "B" is:

a) 

b) 

c) 

d) 

262. The Cl - C - Cl angle in 1, 1, 2, 2 - tetrachloroethene and tetrachloromethane respectively will be about:

a) 120.0° and 109.5° b) 90° and 109.5° c) 109.5° and 90° d) 109.5° and 120°

263. Which one is the correct order of acidity?

a) $CH_2 = CH_2 > CH_3 - CH = CH_2 > CH_3 - C \equiv CH > CH \equiv CH$

b) $CH \equiv CH > CH_3 - C \equiv CH > CH_2 = CH_2 > CH_3 - CH_3$

c) $CH \equiv CH > CH_2 = CH_2 > CH_3 - C \equiv CH > CH_3 - CH_3$

d) $CH_3 - CH_3 > CH_2 = CH_2 > CH_3 - C \equiv CH > CH \equiv CH$

264. Which one of the following has the shortest carbon - carbon bond length?

a) Benzene b) Ethene c) Ethyne d) Ethane

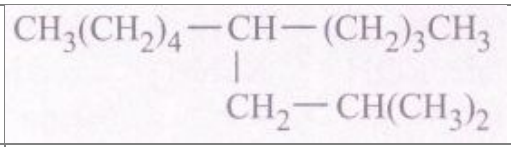
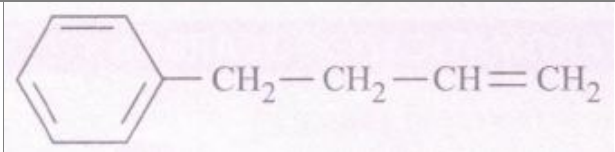
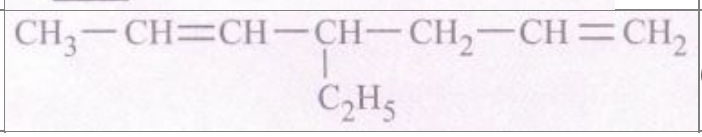
265. How many structures are possible for C_5H_8 with one triple bond?

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

266. The most stable configuration of n-butane will be _____ .

a) Skew boat b) Eclipsed c) Gauche d) Staggered-anti

267. Match the column I with column II to give the correct IUPAC names and mark the appropriate choice.

Column I		Column II	
A.		(i)	Pent-1-en-3-yne
B.	CH_2=CH-C ≡ C-CH_3	(ii)	4-Ethyl-1, 5-heptadiene
C.		(iii)	5-(2-Methylpropyl) decane
D		(iv)	4-Phenylbut-1-ene

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

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

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

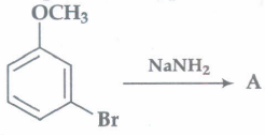
d) (A) ⟶ (ii), (B) ⟶ (Iii), (C) ⟶ (i), (D) ⟶ (iv)

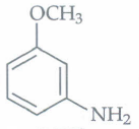
268. How many geometrical isomers are possible for the given compound?

CH_3 - CH= CH- CH= CH- C_2H_5

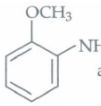
a) Four b) Three c) Two d) Five

269. Identify A and predict the type of reaction

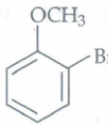


a) 

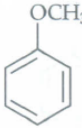
and substitution reaction

b) 

and elimination addition reaction

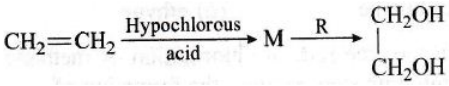
c) 

and cine substitution reaction

d) 

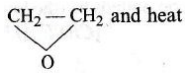
and cine substitution reaction

270. In a reaction,



M = molecules, R = reagent, M and R are

a) CH_3CH_2Cl and $NaOH$ b) $CH_2Cl \cdot CH_2OH$ and aq.$NaHCO_3$

c) CH_3CH_2OH and HCl d) 

271. Assertion: In case of aryl halides, halogens are moderately deactivating.
Reason: Halogens are ortho, para directing groups.

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

272. Propanal-l and pentan-3-one are the ozonolysis products of an alkene. What is the structural formula of alkene?

a) $CH_3CH_2-\underset{CH_2CH_3}{\overset{|}{C}}=CH-CH_2CH_3$ b) $CH_3CH_2-CH=CH-\overset{CH_2CH_3}{\overset{|}{CH}}-CH_3$

c) $CH_3-\underset{CH_2CH_3}{\overset{|}{C}}=\overset{CH_2CH_3}{\overset{|}{C}}-CH_3$ d) $CH_3CH_2CH_2CH_2$ - CH = CH - CH_2CH_3

273. Chlorination of alkanes is a photochemical process. It is initiated by the process of:
a) heterolysis b) homolysis c) pyrolysis d) hydrolysis.

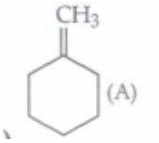
274. The reaction of toluene with Cl_2 in the presence of $FeCl_3$ gives 'X' and reaction in presence of light gives 'Y', Thus, 'X' and 'Y' are:
a) X = m-chlorotoluene, Y = p-chlorotoluene
b) X = o - and p-chlorotoluene, Y = Trichloromethyl benzene
c) X = benzyl chloride, Y = m-chlorotoluene
d) X = benzal chloride, Y = 0-chlorotoluene

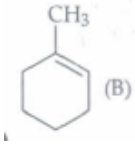
275. In the reaction, Cl_2+$CH_4\xrightarrow{h\upsilon}$ CH_3Cl +HCl presence of a small amount of oxygen

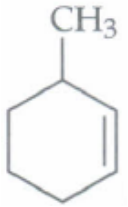
a) increases the rate of reaction for a brief period of time
b) decreases the rate of reaction for a brief period of time
c) does not affect the rate of reaction d) completely stops the reaction

276. Reactivity of hydrogen atoms attached to different carbon atoms in alkanes has the order:
a) tertiary > primary > secondary b) primary > secondary > tertiary
c) Both (a) and (b) d) tertiary > secondary > primary

277. In the reaction with HCl, an alkene reacts in accordance with the Markovnikov's rule to give a product 1-chloro-1 methyl cyclohenxane. The possible alkene is:

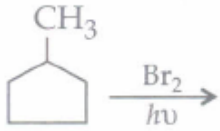
a) 

b) 

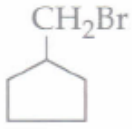
c) (a) and (b) d) 

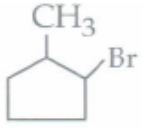
278. What are the products of dehydrohalogenation of 2-iodopentane?
a) 2-Pentene (major), 1-Pentene (minor) b) 1-Pentene (major), 2-Pentene (minor)
c) 2-Pentene (50%), 1-Pentene (50%) d) None of these

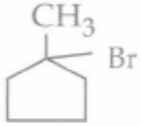
279. In the following reaction,

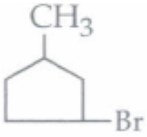


the major product obtained is

a) 

b) 

c) 

d) 

280. Which one of these is not compatible with arenes?
a) Greater stability b) Delocalisation of π - electrons c) Electrophilic additions
d) Resonance

281. Which of the following groups is o-p directing but deactivates benzene ring for electrophilic substitution?
a) - CH_3 b) - NH_2 c) - Cl d) - NO_2

282. How many stereoisomers does this molecule has?
$CH_3CH = CHCH_2CHBrCH_3$
a) 4 b) 6 c) 8 d) 2

283. Which of the following has the lowest boiling point?
a) 2-Methylbutane b) 2-Methylpropane c) 2,2-Dimethylpropane d) n-Pentane

284. Which is the most suitable reagent among the following to distinguish compound (III) from rest of the compounds?
I. $CH_3 - C \equiv C - CH_3$
II. $CH_3 - CH_2 - CH_2 - CH_3$
III. $CH_3 - CH_2 - C \equiv CH$
IV. $CH_3 - CH = CH_2$

a) Bromine in carbon tetrachloride b) Bromine in acetic acid c) Alkaline $KMnO_4$
d) Ammoniacal silver nitrate reagent

285. Among the following compounds one that is most reactive towards electrophilic nitration is:
a) benzoic acid b) nitrobenzene c) toluene d) benzene

286. $CH_3CH_2CH_2CH_3 \xrightarrow[Cl_2]{hv} \underset{(monochlorinationproducts)}{A+B}$
The approximate ratio of percentage yields of A and B formed in the above reaction is
a) 50: 50 b) 72: 28 c) 45: 55 d) 60:40

287. Which of the following compound has the lowest boiling point?
a) $CH_3CH_2CH_2CH_2CH$ b) $CH_3CH = CH - CH_2CH_3$ c) $CH_3 CH = CH - CH = CH_2$
d) $CH_3CH_2CH_2CH_3$

288. A mixture of 1-iodoethane and 1-iodopropane is treated with sodium metal and dry ether to carry out Wurtz reaction. Which of the following hydrocarbons will be formed?
a) Propane + Hexane b) Ethane + Propane c) Butane + Propane
d) Butane + Pentane + Hexane

289. The ease of dehydrohalogenation for different halogens is in the order:
a) iodide> bromide> chloride b) bromide> iodide> chloride
c) chloride > bromide > iodide d) iodide> chloride > bromide.

290. Few reactions of alkanes are given below. Identify the name of the reaction which is not correctly matched with the reaction is:
a) $CH_3CH_2CH_2CH_3 \xrightarrow{AlCl_3+HCl} \underset{Isomerisation}{CH_3-\overset{CH_3}{\overset{|}{C}}H-CH_3}$
b) $CH_6H_{14} \xrightarrow{773\quad K} C_4H_8 + C_2H_6$-Pyrolysis
c) $CH_4 + 2O_2 \xrightarrow{\triangle} CO_2 + 2H_2O$-Controlled oxidation
d) $CH_4 + HNO_3 \xrightarrow{400^oC} CH_3NO_2$-Nitration

291. Assertion : Alkenes are easily attacked by electrophilic reagents.
Reason : Alkenes are unstable molecules in comparison to alkanes
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

292. Although benzene is highly unsaturated it does not undergo addition reactions. The explanation of this can be suggested as
a) π-electrons of benzene ring are delocalised
b) since π-electrons are present inside the ring, addition cannot take place

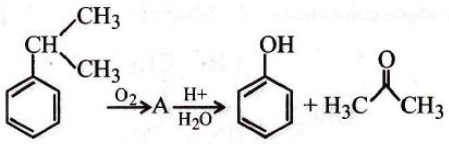
c) cyclic structures do not show addition reactions

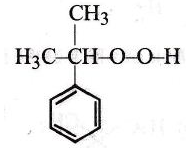
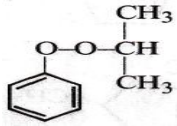
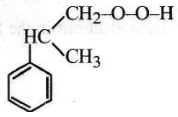
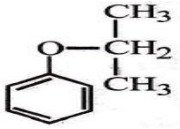
d) benzene is not a reactive compound.

293. Which of the following compounds with molecular formula, C_5H_{10} yields acetone on ozonolysis?

a) 2-methyl-2-butene b) 3-methyl-l-butene c) Cyclopentane d) 2-methyl-l-butene

294. The structure of intermediate A in the following reaction, is:



a)  b)  c)  d) 

295. Fill in the blanks with appropriate words.

Benzene has a planar structure. All carbon atoms in benzene are __(I)__ hybridised. The ring structure of benzene was proposed by ___(II)____ It shows __(III)_substitution reactions It reacts with __(IV)__ in presence of aluminium chloride to form acetophenone.

a)

I	II	III	IV
sp^2	Kekule	electrophilic	acetyl chloride

b)

I	II	III	IV
sp	Dewar	nucleophilic	chloromethane

c)

I	II	III	IV
sp^3	Ladenberg	electrophilic	chloroethane

d)

I	II	III	IV
sp^2	Baeyer	nucleophilic	methyl bromide

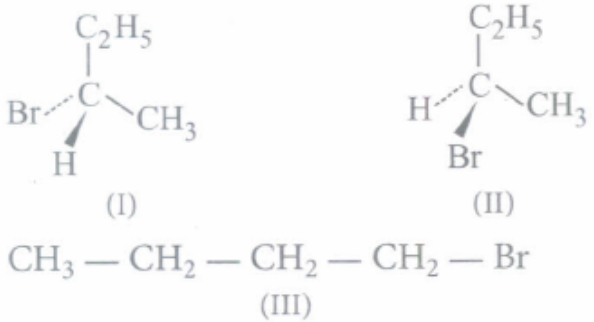
296. Products of the following reaction:

$CH_3C \equiv CCH_2CH_3 \xrightarrow[(i)O_3]{(ii)Hydrolysis}$ ... are

a) $CH_3CHO + CH_3CH_2CHO$ b) $CH_3COOH + CH_3COCH_3$

c) $CH_3COOH + HOOC.CH_2CH_3$ d) $CH_3COOH + CO_2$

297. The addition of HBr to l-butene gives a mixture of products (I), (II) and (III)



The mixture consists of

a) (I) and (II) as major and (III) as minor products

b) (II) as major, (I) and (III) as minor products

c) (II) as minor, (I) and (III) as major products

d) (I) and (II) as minor and (III) as major products.

298. Geometrical isomers differ in:
a) position of functional group b) position of atoms c) spatial arrangement of atoms
d) length of carbon chain

299. Which is the correct symbol relating the hetero Kekule structure of benzene?
a) ⇌ b) ⟶ c) ≡ d) ↔

300. Liquid hydrocarbons can be converted to a mixture of gaseous hydrocarbons by:
a) Oxidation b) Cracking c) Distillation under reduced pressure d) Hydrolysis

301. Which of the following species is aromatic?
a)  b)  c)  d) 

302. Select the true statement about benzene amongst the following:
a) Because of unsaturation benzene easily undergoes addition
b) There are two types of C - C bonds in benzene molecule
c) There is cyclic delocalization of pi-bonds in benzene
d) Monosubstitution of benzene gives three isomeric products

303. Which of the following compounds will show cistrans isomerism?
a) $(CH_3)_2C = CHC_2H_5$ b) $H_2C = CCl_2$ c) $CH_3HC = CClCH_3$ d) $HClC = CH_2$

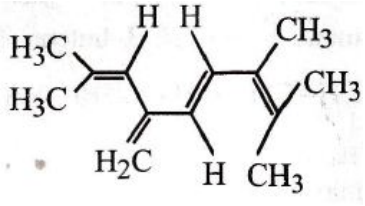
304. Match the column I with column II and mark the appropriate choice.

Column-I		Column-II	
A	Alkyl halide + Sodium in presence of dry ether	(i)	Sulphonation
B	Arene+Acid halide in presence of $AlCl_3$	(ii)	Wurtz reaction
C	Arene + Fuming sulphuric acid	(iii)	Catalytic hydrogenation
D	Arene + Hydrogen in presence of Ni	(iv)	Friedel-crafts reaction

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

305. Arrange the following in decreasing order of their boiling points
(I) n-Butane
(II) 2-Methylbutane
(III) n-Pentane
(IV) 2,2-Dimethylpropane
a) I > II > III > IV b) II > III > IV > I c) IV > III > II > 1 d) III > II > IV > I

306. In halogenation of aromatic hydrocarbon, a halogen carrier is used which is generally a Lewis acid. The main function of this reagent is to generate the species
a) X b) X^- c) X^+ d) $X\cdot$

307. The total number of π-bond electrons in the following structure is:


a) 8 b) 12 c) 16 d) 4

308. Identify the reagent from the following list which can easily distinguish between l-butyne and 2-butyne.
a) Bromine water b) Baeyer's reagent c) Dilute H_2SO_4 + $HgSO_4$
d) Ammoniacal Cu_2Cl_2

309. Assertion: Sodium salt of butanoic acid on heating with soda lime gives butane.
Reason : Decarboxylation reaction yields alkanes havingsamenumber of carbon atoms as the parent acid
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 assertion is true but reason is false.

310. Which of the following reactions of methane is incomplete combustion?
a) $2C_4+O_2 \xrightarrow{Cu/523K/100atm} 2CH_3OH$ b) $CH_4 + O_2 \xrightarrow{Mo_2O_3} HCHO + H_2O$
c) $CH_4 + O_2 \rightarrow C_{(s)} + 2H_2O_{(l)}$ d) $CH_4 + 2O_2 \rightarrow CO_{2(g)} + 2H_2O_{(l)}$

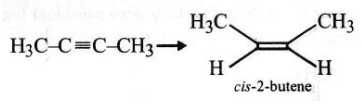
311. Arrange the following hydrogen halides in order of their decreasing reactivity with propene.
a) HCl> HBr > HI b) HBr> HI > HCl c) HI> HBr > HCl d) HCl> HI > HBr

312. When acetylene is passed through dilute H_2SO_4 in presence of $HgSO_4$, the compound formed is:
a) ether b) ketone c) acetic acid d) acetaldehyde

313. **Assertion**: Decolourisation of $KMnO_4$ solution is used as a test for unsaturation.
Reason : Alkenes on reaction with cold, dilute aqueous solution of potassium permanganate produce vicinal glycols.
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.

314. Products of the following reaction:
a) $CH_3COOH + CO_2$ b) $CH_3COOH + HOOC.CH_2CH_3$
c) $CH_3CHO + CH_3CH_2CHO$ d) $CH_3COOH + CH_3COCH_3$

315. The most suitable reagent for the following conversion is:



a) $H_2, Pd/C, quinoline$ b) Zn/HCl c) $Hg^{2+}/H^+, H_2O$ d) $Na/liquid NH_3$

316. In commercial gasolines the type of hydrocarbons which are more desirable is:

a) branched hydrocarbon b) straight chain hydrocarbon
c) linear, unsaturated hydrocarbon d) toluene

317. **Assertion**: cis-form of alkene is found to be more polar than the trans-form.
Reason : Since the groups are in opposite directions in the trans-form, the dipole moments of bonds cancel each other making trans-form almost non-polar.
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.

318. Identify the product for the following reaction:
$CH \equiv CH + HOCl \rightarrow$
a) Cl_2CHCHO b) CH(OH) = CHCl c) $ClCH_2CH_2OH$ d) CH_3COCl

319. Arrange the following carbanions in order of their decreasing stability
(I) $H_3C\text{-}C \equiv C$
(II) $H\text{-}C \equiv C$
(III) $H_3C\text{ - }CH_2$
a) I > II > III b) II > I> III c) III > II > I d) III > I > II

320. The shortest C - C bond distance is found in:
a) acetylene b) diamond c) ethane d) benzene

321. A compound is treated with $NaNH_2$ to give sodium salt. Identify the compound.
a) C_2H_2 b) C_6H_6 c) C_2H_6 d) C_2H_4

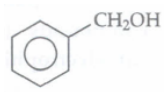
322. An alkane C_6H_{14} gives two monochloro derivatives on chlorination. Its possible structure is
a) $CH_3CH_2CH_2CH_2CH_2CH_3$ b) $CH_3 - \underset{CH_3}{CH} - CH_2CH_2CH_3$
c) $CH_3 - \underset{CH_2CH_3}{CH} - CH_2CH_3$ d) $CH_3 - \underset{CH_3}{\overset{CH_3}{CH}} - \underset{}{\overset{CH_3}{CH}} - CH_3$

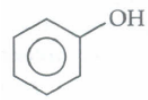
323. Predict the product C obtained in the following reaction of 1-butyne:
$CH_3CH_2\text{ - C} \equiv \text{CH + HCl} \longrightarrow \text{B} \xrightarrow{HI} \text{C}$
a) $CH_3 - \underset{Cl}{CH} - CH_2CH_2I$ b) $CH_3 - CH_2 - CH_2 - \underset{Cl}{\overset{I}{C}} - H$
c) $CH_3 - CH_2 - \overset{I}{CH} - CH_2Cl$ d) $CH_3 - CH_2 - \underset{Cl}{\overset{I}{C}} - CH_3$

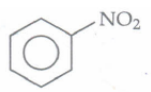
324. Which of the following alkynes can be identified and distinguished from the rest of the alkynes on reaction with ammoniacal silver nitrate to gave a white precipitate?
a) $CH_3C \equiv C\text{-}CH_3$ b) $CH_3CH_2C \equiv CH$ c) $CH_3CH_2C \equiv CCH_3$ d) $CH_3C \equiv CCH_2CH_2CH_3$

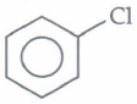
325. In the free-radical chlorination of methane, the chain-initiating step involves the formation of:
a) chlorine radical b) hydrogen chloride c) methyl radical d) chloromethyl radical

326. The compound formed when alcoholic solution of ethylene dibromide is heated with granulated zinc is
a) ethene b) ethyne c) ethane d) bromoethane.

327. Which one of the following is most reactive towards electrophilic attack?
a) 

b) 

c) 

d) 

328. The most acidic hydrogen atoms are present in
a) ethane b) ethene c) ethyne d) benzene.

329. One mole of 1, 2-dibromopropane on treatment with X moles of $NaNH_2$ followed by treatment with ethyl bromide gave a 2-pentyne. The value of X is:
a) one b) two c) three d) four

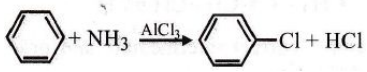
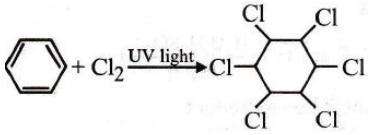
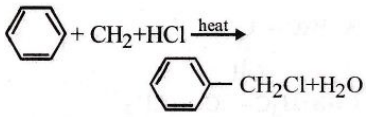
330. What is the carbon-carbon bond length in benzene?
a) 1.20 $\mathring{A}$ and 1.31$\mathring{A}$ b) 1.39$\mathring{A}$ c) 1.39$\mathring{A}$ and 1.20$\mathring{A}$ d) 1.20 $\mathring{A}$

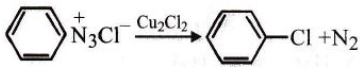
331. Assertion: The second substituent may enter the mono- substituted benzene ring at either ortho, para or at meta position.
Reason : The position of the incoming group is determined by the nature of the group present in monosubstituted benzene ring.
a)
If both assertion and reason are true and reason 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

332. The correct order of reactivity towards electrophilic substitution is
a) benzene> phenol> benzoic acid> chlorobenzene
b) phenol> benzene> chlorobenzene > benzoic acid
c) chlorobenzene > benzoic acid> phenol> benzene
d) benzoic acid> chlorobenzene > benzene> phenol.

333. When I-butyne undergoes oxymercuration with the help of $HgSO_4$ + H_2SO_4, the product(s) formed is/are
a) CH_3CH_2COOH + HCOOH b) $CH_3CH_2COCH_3$ c) $CH_3CH_2CH_2COOH$
d) $CH_3CH_2CH_2CHO$

334. Among the following, the reaction that proceeds through an electrophilic substitution, is _____ .

a)  b)  c) 

d) 

335. 1, 2-Benzpyrene is _____ .

a) a polynuclear hydrocarbon b) carcinogenic in nature c) an aromatic hydrocarbon d) both (a) and (b).

336. The products for the following reactions are

(i)$CH_3 - \overset{\overset{Br}{|}}{\underset{\underset{H}{|}}{C}} - CH_2 - CH_3 + alc.\,KOH \longrightarrow X$

(ii)$CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH = CH_2 \xrightarrow{O_3} Y + Z$

a) X=$(CH_3)_2C = CH_2$, Y = CH_3CH_2CHO, Z = CH_3CH_2CHO

b) X=$CH_2= CH_2$,Y=CH_3CHO,Z=CH_3COOH

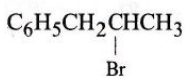
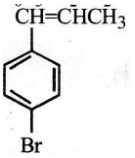
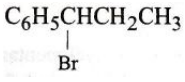
c) X = CH_3-CH=CH-CH_3,$Y = CH_3 - \overset{\overset{CH_3}{|}}{CH} - CHO, Z = HCHO$

d) X = CH_3 - CH = $C(CH_3)_2$ Y = HCHO, Z= CH_3CHO

337. 1,3,5,7-Octatetraene contains_X_ σ-bonds and_Y_ π bonds. 'X' and 'Y' are:

a) 23,4 b) 17,4 c) 18,5 d) 33,2

338. The reaction of $C_6H_5CH = CHCH_3$ with HBr produces:

a)  b) $C_6H_5CH_2CH_2CH_3Br$ c)  d) 

339. The correct statement regarding the comparison of staggered and eclipsed conformations of ethane is:

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 eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has no torsional strain.

340. The increasing order of reduction of alkyl halides with zinc and dilute HCl is:

a) R-Cl < R-I < R-Br b) R-Cl < R-Br < R-I c) R-I < R-Br < R-Cl d) R-Br < R-I < R-Cl

341. In the reaction,

H - C ≡ CH $\xrightarrow[(i)\quad NaNH_2/liq.NH_3]{(ii)\quad CH_3CH_2Br} X \xrightarrow[(i)\quad NaNH_2/liq.NH_3]{(ii)\quad CH_3CH_2Br} Y$ X and Y are:

a) X = 2-butyne, Y = 2-hexyne b) X = 1-butyne, Y = 2-hexyne

c) X = 1-butyne, Y = 3-hexyne d) X = 2-butyne, Y = 3-hexyne

342. Hydrolysis of ozonide of but-l-ene gives

a) ethylene only b) acetaldehyde and formaldehyde

c) propionaldehyde and formaldehyde d) acetaldehyde only.

343. Which of the following reactions does not show the acidic nature of ethyne?

a) Acetylene reacts with sodamide to form sodium acetylides

b)

When passed through ammoniacal cuprous chloride solution, a red precipitate is formed

c) Acetylene reacts with chlorine in the dark to form di or tetrachlorides

d) Acetylene when passed through ammoniacal silver nitrate gives a white precipitate.

344. What happens when methane reacts with conc. HNO_3 at high temperature?

a) Nitromethane is formed b) Methanol is formed c) CO_2 and H_2O are formed

d) CO and H_2O are formed

345. R - CH_2 - $CC1_2$ - R $\xrightarrow{Reagent}$

R - C ≡ C - R. The reagent is:

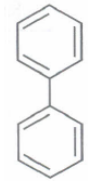
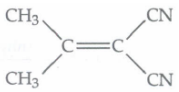
a) Na b) HCl in H_2O c) KOH in C_2H_5OH d) Zn in alcohol

346. In the following reaction, $C_6H_5CH_2Br \xrightarrow[2.H_3O^+]{1.Mg,\ Ether} X$ the product 'X' is _____ .

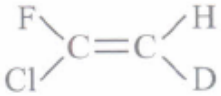
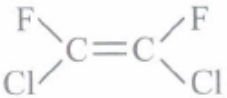
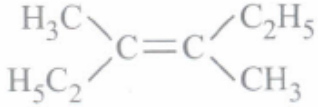
a) $C_6H_5CH_2CH_2C_6H_5$ b) $C_6H_5CH_2OCH_2C_6H_5$ c) $C_6H_5CH_2OH$

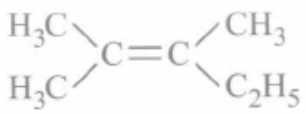
d) $C_6H_5CH_3$

347. In which of the following molecules, all atoms are coplanar?

a)  b)  c)  d) 

348. Which of the following will not show geometrical isomerism?

a)  b)  c) 

d) 

349. Assertion: Ethyne reacts with sodium metal and sodamide to form sodium acetylide with the liberation of dihydrogen gas.

Reason: Alkynes are highly unsaturated.

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