



CUET CHEMISTRY 2022

PAPER



10. Find out which part of the sentence has an error
 (a) with the demand for more working hours.
 (b) people are awake till late at night and
 (c) indulge in more junk food than home-cooked food
 (d) no error

11. Who among the following was an Indian American biochemist who shared the 1968 Nobel Prize for Physiology or Medicine with Marshall W. Nirenberg and Robert W. Holley for research that showed the order of nucleotides in nucleic acids, which carry the genetic code of the cell and control the cell's synthesis of proteins?
 (a) Visvesvaraya (b) Meghnad Saha (c) S.N. Bose (d) Har Gobind Khorana

12. India's first National Sport University is located in which of the following state/Union Territory of India?
 (a) Delhi (b) Goa (c) Manipur (d) Haryana

13. Security Printing and Minting Corporation of India Limited (SPMCIL) has set up two new bank note printing lines which are located in
 (a) Nepanagar and Salboni (b) Dewas and Nepanagar
 (c) Salboni and Hoshangabad (d) Nashik and Dewas

14. Which country is the largest shareholder of AIIB (Asian Infrastructure Investment Bank)?
 (a) Germany (b) France (c) China (d) India

15. Which of the following is TRUE about the Preamble to the Constitution of India?
 (a) 42nd Amendment to the Constitution added words Secular and Socialist to the preamble.
 (b) B.R. Ambedkar wrote the Preamble of Constitution of India
 (c) The Preamble was added to the Constitution after the enactment of Constitution itself
 (d) The Preamble has been amended twice since the enactment of the Constitution.

16. In a row of girls, Roopa is 7th from the left while Sunita is 12th from the right. On interchanging their respective positions, Roopa becomes 22nd from the left. How many total number of girls are there in the row?
 (a) 35 (b) 33 (c) 38 (d) 37

17. In a row of people Anamika is 9th from the left and Urvashi is 13th from the right. When they change their positions and then Anamika becomes 18th from the left. What is the new position of Urvashi from the right end of the row?
 (a) 23 (b) 22 (c) 24 (d) 25

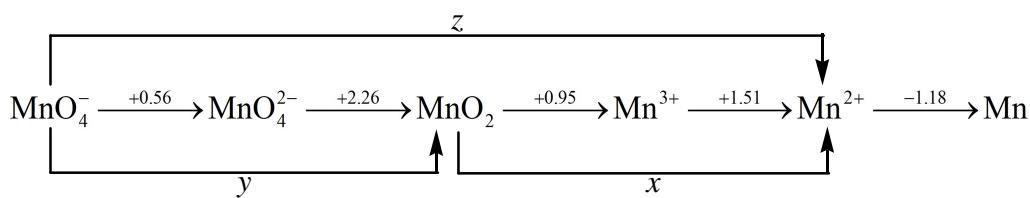
18. In a row of boys, if Akash is 10th from left and Bimal is 9th from the right. When they interchange their positions, then Akash becomes 15th from the left. How many boys are there in the row?
 (a) 22 (b) 25 (c) 23 (d) 26

19. J, K, H, R, F, L, N and Q are sitting around a circular table facing the centre. H is third to the left of L, who is the immediate right of K. R is third to the left of N but not neighbour of H or L. J is second to the right of Q. Who is second to the left of N?
 (a) Q (b) F or J (c) J (d) K

20. A, B, C, D, E, F, G and H are players sitting around a round table facing the centre. D is the neighbour of A but not of H. B is the neighbour of F and 4th to the left of D. E is the neighbour of H and 3rd to the right of F. C is neither the neighbour of A nor of G.
 Which of the following is correct?
 (A) B is to the immediate left of H (B) H is to the immediate left of E
 (C) D is 4th to the right of F (D) H is immediate right of E.
 (a) only A and B (b) only A and C (c) only B and C (d) only A, B and C

21. In a plane, there are 16 non-collinear points. Then the number of straight lines formed is
 (a) 24 (b) 30 (c) 60 (d) 120





x , y and z are

$$(a) x = +2.46, y = +2.82, z = +1.32 \quad (b) x = +1.23, y = +1.69, z = +1.51$$

(c) $x = +1.23, y = +2.07, z = +1.32$ (d) $x = +1.23, y = +1.38, z = +1.51$

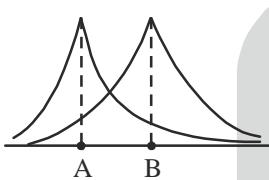
31. Which of these characteristics describe the PCl_3 molecule?
 (A) Trigonal planar shape (B) sp^3 hybridized phosphorus atom
 (C) Polar bonds (D) Non-polar molecules

Choose the correct answer from the options given below:
 (a) A and B only (b) B and C only (c) A and D only (d) B, C and D only

32. The correct increasing order of bond angle among F_2O , Cl_2O and Br_2O is ($\text{X}-\text{O}-\text{X}$, where X is F, Cl, Br)
 (a) $\text{F}_2\text{O} < \text{Cl}_2\text{O} < \text{Br}_2\text{O}$ (b) $\text{F}_2\text{O} < \text{Cl}_2\text{O} = \text{Br}_2\text{O}$
 (c) $\text{Cl}_2\text{O} < \text{F}_2\text{O} < \text{Br}_2\text{O}$ (d) $\text{Br}_2\text{O} < \text{Cl}_2\text{O} < \text{F}_2\text{O}$

33. What is the ground state electronic configuration for the Cu atom?
 (a) $1s^2 2s^2 2p^2 3s^2 3p^6 3d^9 4s^2$ (b) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$
 (c) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^3$ (d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9 4s^1 4p^1$

34. In the molecular orbital theory



The following graph represents.
 (a) $\Psi_{\text{bonding}} = \Psi_A + \Psi_B$
 (b) $\Psi_{\text{anti-bonding}} = \Psi_A - \Psi_B$
 (c) Ψ_A and Ψ_B for individual hydrogen atoms
 (d) Probability function for bonding orbitals

35. In the reaction,

$$2\text{MnO}_4^- + 16\text{H}^+ + 10\text{Br}^- \longrightarrow 2\text{Mn}^{2+} + 8\text{H}_2\text{O} + 5\text{Br}_2$$

Br^- ion is the
 (a) oxidizing agent and is oxidized (b) Oxidizing agent and is reduced
 (c) Reducing agent and is oxidized (d) Reducing agent and is reduced.

36. For the Lanthanides,
 (A) Lanthanides display only the (+3) oxidation state
 (B) Oxidation numbers (+2) and (+4) occur when they lead to a noble gas configuration
 (C) Oxidation numbers (+2) and (+4) are observed when they lead to a half-filled orbital
 (D) Yb^{2+} has a completely filled f-orbital

Choose the correct answer from the options given below:
 (a) A only (b) B and C only (c) C and D only (d) B, C and D only

37. Given below are two statements:
Statement-I: The electronic structures of the atoms in the second and third rows of transition metals always follow the pattern of the first row.
Statement-II: The electronic configuration of Pd is $[\text{Kr}]4\text{d}^{10} 5\text{s}^0$

In the light of the above statements, choose the correct answer from the options given below.
 (a) Both Statement I and Statement II are true (b) Both Statement I and Statement II are false
 (c) Statement I is true but Statement II is false (d) Statement I is false but Statement II is true



38. $\text{Fe}(\text{H}_2\text{O})_6^{2+}$ is a high-spin complex that absorbs light at about 1000 nm, corresponding to a transition between $^5\text{T}_{2g}$ and $^5\text{E}_g$ levels. The wave number of the radiation is
 (a) 100 cm^{-1} (b) 1000 cm^{-1} (c) 10000 cm^{-1} (d) 100000 cm^{-1}

39. The observed magnetic moment of a complex is 1.73 BM. The number of unpaired electrons in the complex is
 (a) 0 (b) 1 (c) 2 (d) 3

40. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:
Assertion-A: The binding energy of the lithium exceeds that of the Li_2 molecule though the Li-Li distance in the metal (3.03 Å) is significantly larger than in the diatomic Li_2 molecule (2.67 Å).
Reason-R: The bonds in the metal are weaker, but there are more Li-Li bonds in the metal.
 In the light of the above statements, choose the correct answer from the options given below:
 (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true but R is NOT the correct explanation of A
 (c) A is true but R is false (d) A is false but R is true

41. Given below are two statements:
Statement-I: A solvent with a large auto protolysis constant can be used to discriminate between a wide range of acid and base strengths.
Statement-II: Water have a leveling effect that brings all stronger acids down to the acidity of H_3O^+ .
 In the light of the above statements, choose the correct answer from the options given below:
 (a) Both Statement I and Statement II are true
 (b) Both Statement I and Statement II are false
 (c) Statement I is true but Statement II is false
 (d) Statement I is false but statement II is true

42. The oxidation state of iron in Haemoglobin is
 (a) +1 (b) +2 (c) +3 (d) 0

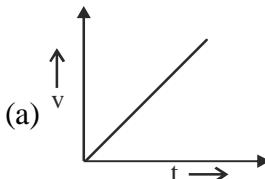
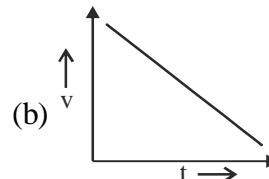
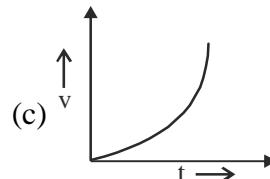
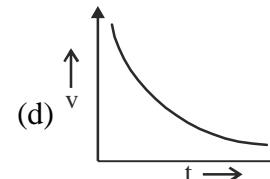
43. Given below are two statements:
Statement-I: The Stille coupling uses stannates as the organometallic compound.
Statement-II: The Suzuki coupling involves organosilyl as the organometallic component
 In the light of the above statements, choose the correct answer from the options given below:
 (a) Both statement I and Statement II are true (b) Both Statement I and Statement II are false
 (c) Statement I is true but Statement II is false (d) Statement I is false but Statement II is true

44. The point group to which CH_4 belongs is
 (a) D_{4h} (b) C_{4v} (c) C_{4h} (d) T_d

45. A particle is considered to be nano when its radius is in the region.
 (a) 10^{-11} to 10^{-10} m (b) 10^{-10} to 10^{-9} m
 (c) 10^{-9} to 10^{-8} m (d) 10^{-8} to 10^{-7} m

46. The molecular orbital diagram for the C_2^{2-} ion would show which of the following molecular orbitals?
 (a) $(\sigma_{1s})^2 (\sigma_{1s}^*)^2 (\sigma_{2s})^2 (\sigma_{2s}^*)^2 (\pi_{2p})^4$
 (b) $(\sigma_{1s})^2 (\sigma_{1s}^*)^2 (\sigma_{2s})^2 (\sigma_{2s}^*)^2 (\pi_{2p})^4 (\sigma_{2p})^2$
 (c) $(\sigma_{1s})^2 (\sigma_{1s}^*)^2 (\sigma_{2s})^2 (\sigma_{2s}^*)^2 (\pi_{2p})^4 (\sigma_{2p})^2 (\pi_{2p}^*)^2$
 (d) $(\sigma_{1s})^2 (\sigma_{1s}^*)^2 (\sigma_{2s})^2 (\sigma_{2s}^*)^2 (\sigma_{2p})^2 (\pi_{2p})^4$

47. Which one of these hydrogen atom spectra are observed in the visible region?
 (a) $n = 3 \rightarrow n = 2$ (b) $n = 4 \rightarrow n = 3$ (c) $n = 2 \rightarrow n = 1$ (d) $n = 5 \rightarrow n = 4$

48. Identify the graph which shows variable positive acceleration [v = velocity, t = time]
 (a)  (b)  (c)  (d) 

49. Gases A, B, C and D obey the van der Waals equation with 'a' and 'b' values as given (liter-atm system of units of)

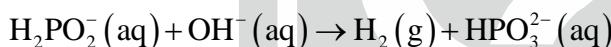
	A	B	C	D
a	6	6	6	6
b	1	2	3	4

The gas _____ has the highest critical temperature.

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

50. Calculate the number of molecules with translational energy $E_{\text{trans}} = 3.0 \text{ kT}$ relative to that with $E_{\text{trans}} = 2.0 \text{ kT}$. (Given: e = 2.72)
 (a) 0.37 (b) 0.61 (c) 1.64 (d) 2.72

51. The reaction between hydroxide ion, OH^- and phosphinate ions, H_2PO_2^-



has been studied by following the initial rate of formation of gaseous product. The results are tabulated below:

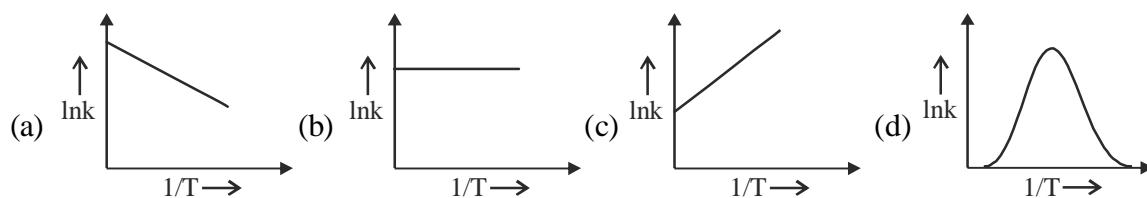
S.N.	Initial concentration of H_2PO_2^- (aq) / mol dm^{-3}	Initial concentration of OH^- (aq) / mol dm^{-3}	Initial rate of H_2 (g) evolution $10^{-3} \text{ dm}^3 \text{ min}^{-1}$
1	0.6	1.0	2.3
2	0.6	2.0	9.5
3	0.1	6.0	14.4
4	0.2	6.0	28.7

What is the overall reaction order?

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

52. If temperature becomes infinite then identify the correct pattern of the plot $\ln k$ (k is a rate constant) v/s $1/T$;

using arrhenius equation
$$k = A e^{-\frac{E_a}{RT}}$$



53. Consider a system consisting of 1 mole of a monoatomic gas contained in a piston. What is the temperature change of the gas if $q = 50 \text{ J}$ and $W = -100 \text{ J}$? (Given: $R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$)
 (a) -12°C (b) -4°C (c) 4°C (d) 12°C

54. For a cyclic irreversible process, the total work done by the system is
 (a) always positive (b) always negative (c) equal to zero (d) equal to infinity

55. Which of the following are not state functions?
 (A) $q + w$ (B) q (C) w (D) $H - TS$ (E) $q - w$
 Choose the most appropriate answer from the options given below:
 (a) A and D only (b) B and E only (c) B, C and D only (d) B, C and E only

56. A solution is prepared by dissolving solute A in solvent B, and it is found that $\Delta_{\text{mix}} H > 0$; this indicates that:
 (a) A-B interaction is same as in A-A and B-B interactions in the pure liquids
 (b) A-B interaction is less as compared to A-A and B-B interaction in the pure liquids
 (c) A-B interaction is more as compared to A-A and B-B interactions in the pure liquids
 (d) None of the above

57. Match **List-I** with **List-II**

List - I	List - II
(A) Optical Rotation	I. Stalagmometer
(B) Refractive Index	II. Polarimeter
(C) Relative Viscosity	III. Abbe Refractometer
(D) Surface Tension	IV. Ostwald Viscometer

Choose the correct answer from the options given below:
 (a) A-II, B-III, C-IV, D-I (b) A-II, B-IV, C-III, D-I
 (c) A-I, B-IV, C-II, D-III (d) A-III, B-I, C-II, D-IV

58. What is the effect of pressure in the following equilibrium reaction: $N_2 + O_2 \rightleftharpoons 2NO$
 (a) Reaction moves in the forward direction with increasing pressure.
 (b) Reaction moves in the backward direction with increasing pressure
 (c) Reaction remains unaltered with increasing pressure.
 (d) None of the above

59. When a sample of NO_2 is placed in a container, this equilibrium is rapidly established:

$$2NO_2(g) \rightleftharpoons N_2O_4(g)$$

 If this equilibrium mixture is a darker colour at high temperature and at low pressure, which one of these statements about the reaction is true?
 (a) The reaction is endothermic and N_2O_4 is darker in colour than NO_2 .
 (b) The reaction is endothermic and NO_2 is darker in colour than N_2O_4 .
 (c) The reaction is exothermic and N_2O_4 is darker in colour than NO_2 .
 (d) The reaction is exothermic and NO_2 is darker in colour than N_2O_4 .

60. Correct order of ionic conductance at infinite dilution is
 (a) $H^+ > Li^+ > Na^+ > K^+$ (b) $K^+ > Na^+ > Li^+ > H^+$
 (c) $Na^+ > K^+ > H^+ > Li^+$ (d) $H^+ > Na^+ > K^+ > Li^+$

61. Determine the Miller-Indices for a plane when intercepts along the axes are $2a, 3b, 2c$
 (a) (2, 3, 2) (b) (3, 2, 3) (c) (2, 3, 3) (d) (3, 3, 2)



62. Match the **List-I** and **List-II**:

List – I	List – II
(A) Triclinic	I. $a \neq b \neq c, \alpha = \beta = 90^\circ, \gamma \neq 90^\circ$
(B) Monoclinic	II. $a \neq b \neq c, \alpha \neq \beta \neq \gamma = 90^\circ$
(C) Orthorhombic	III. $a = b \neq c; \gamma = \beta = \alpha = 90^\circ$
(D) Tetragonal	IV. $a \neq b \neq c; \alpha = \beta = \gamma = 90^\circ$

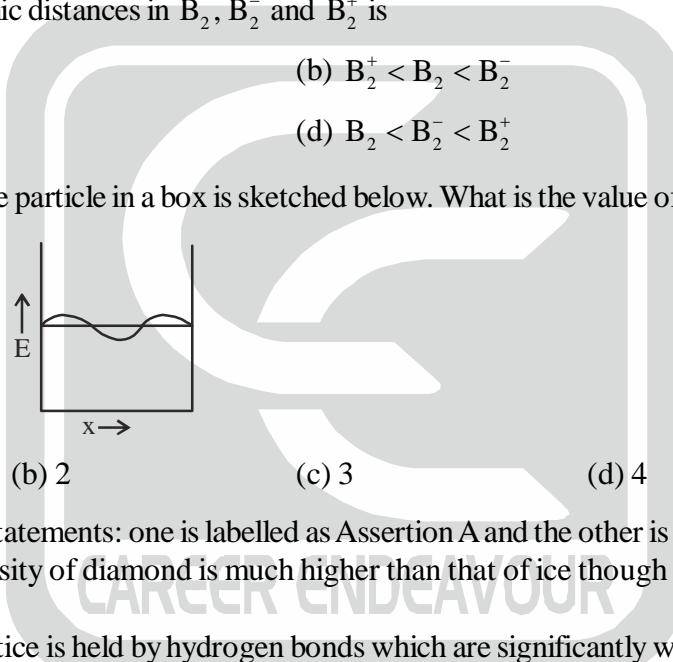
Choose the correct answer from the option given below:

64. The order of interatomic distances in B_2 , B_2^- and B_2^+ is

(a) $B_2 < B_2^+ < B_2^-$ (b) $B_2^+ < B_2 < B_2^-$
(c) $B_2^- < B_2 < B_2^+$ (d) $B_2 < B_2^- < B_2^+$

65. A wave function for the particle in a box is sketched below. What is the value of the quantum number, x ?

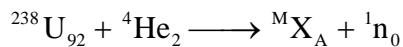
65. A wave function for the particle in a box is sketched below. What is the value of the quantum number, x ?



66. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:
Assertion A: The density of diamond is much higher than that of ice though both solids adopt analogous structures.
Reason R: The ice lattice is held by hydrogen bonds which are significantly weaker than the covalent C–C bonds in diamond.
In the light of the above statements, choose the correct answer from the options given below:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

67. Considering the following reaction:

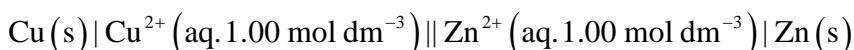
67. Considering the following reaction:



number of neutrons present in nucleus of X are _____

68. A commercial FM radio station operates at 100 MHz. The wavelength λ , for the radio wave is
(Given: $C = 3 \times 10^8 \text{ ms}^{-1}$)
(a) $3 \times 10^{12} \text{ m}$ (b) 3 m (c) 3 nm (d) 300 nm

69. For the following electrochemical cell



choose the correct option in the light of the following standard electrode potentials:

Half-reaction	E^0 / V
$\frac{1}{2} \text{Cu}^{2+} \text{ (aq)} + \text{e}^- \longrightarrow \frac{1}{2} \text{Cu(s)}$	+0.34
$\frac{1}{2} \text{Zn}^{2+} \text{ (aq)} + \text{e}^- \longrightarrow \frac{1}{2} \text{Zn(s)}$	-0.76V

(a) The potential of the cell is -1.10 V and the zinc electrode is negative.
 (b) The potential of the cell is 1.10 V and the zinc electrode is negative.
 (c) The potential of the cell is -1.10 V and the zinc electrode is positive.
 (d) The potential of the cell is 1.10 V and the zinc electrode is positive.

70. If $\Delta H_{\text{vap}}^0 = 30.8 \text{ kJ mol}^{-1}$ and $\Delta S_{\text{vap}}^0 = 87.2 \text{ J K}^{-1} \text{ mol}^{-1}$ for benzene, what is the boiling point of benzene?
 Assume that ΔH_{vap}^0 and ΔS_{vap}^0 are independent of temperature.
 (a) 0.35° (b) 353°C (c) 80°C (d) 1.0 °C

71. The phosphorescence wavelength is
 (a) longer than the absorption wavelength (b) equal to the absorption wavelength
 (c) shorter than the absorption wavelength (d) equal to the fluorescence wavelength

72. Which of the following statements is false?
 (a) There are four vibration modes in carbon dioxide
 (b) The IR spectrum of CO_2 shows only two absorption bands
 (c) IR active vibration bands must have a change in dipole moment
 (d) The bending mode of CO_2 is IR inactive.

73. Given below are two statements:
Statement-I: Every molecule has a vibrational Raman spectrum
Statement-II: In vibrational Raman spectra, Stokes lines are more intense than anti-Stokes lines
 In the light of the above statements, choose the correct answer from the options given below:
 (a) Both Statement I and Statement II are true
 (b) Both Statement I and Statement II are false
 (c) Statement I is true but Statement II is false
 (d) Statement I is false but Statement II is true

74. When two σ -bonds on the same carbon cleave, the following chargeless carbon species will be formed with six electrons in the valence shell.
 (a) Benzyne only (b) Carbene only (c) Nitrene (d) Both carbene and benzyne

75. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:
Assertion A: Cyclopropane is more prone to undergo ring-opening reaction than cyclobutane
Reason R: According to Bayer strain theory, cyclobutane is more highly strained than cyclopropane. In the light of the above statements, choose the correct answer from the options given below:
 (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true but R is NOT the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true



76. Given below are two statements:

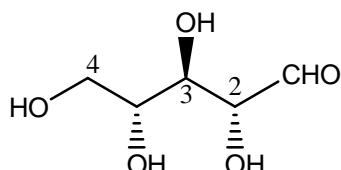
Statement-I: E2 reaction follows second-order kinetics and not accompanied by rearrangements.

Statement-II: E2 reaction shows large hydrogen isotope effect.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are true
- (b) Both Statement I and Statement II are false
- (c) Statement I is true but Statement II is false
- (d) Statement I is false but Statement II is true

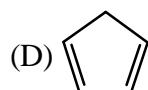
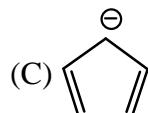
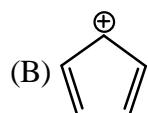
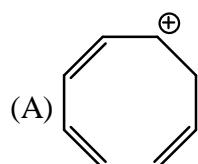
77. The absolute configuration (R/S configuration) of the following molecule is



- (a) 2R, 3R, 4R
- (b) 2R, 3S, 4R
- (c) 2S, 3R, 4R
- (d) 2R, 3R, 4S

78. Match **List-I** with **List-II**:

List-I



List-II

(I) Aromatic

(II) Anti-aromatic

(III) Homo-aromatic

(IV) Non-aromatic

Choose the correct answer from the options given below:

- (a) A-II, B-III, C-I, D-IV
- (b) A-IV, B-II, C-I, D-III
- (c) A-I, B-II, C-III, D-IV
- (d) A-III, B-II, C-I, D-IV

79. Given below are two statements:

Statement-I: The ratio of S_N1 reaction depends on both the carbon skeleton and the nucleophile

Statement-II: The rate of S_N2 reaction depends on the carbon skeleton, the leaving group and the nucleophile.

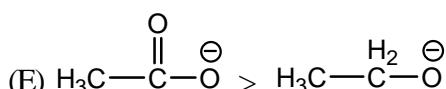
In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are true
- (b) Both Statement I and Statement II are false
- (c) Statement I is true but Statement II is false
- (d) Statement I is false but Statement II is true



80. Which of the following trends of nucleophilicity is not correct?

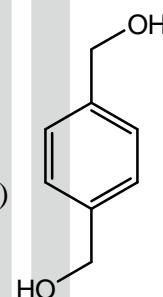
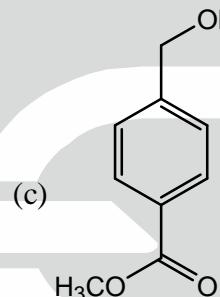
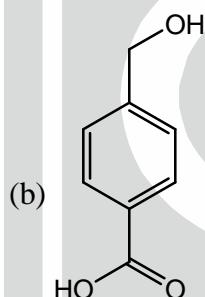
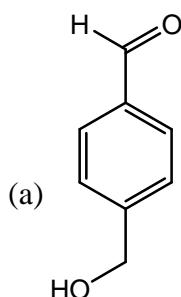
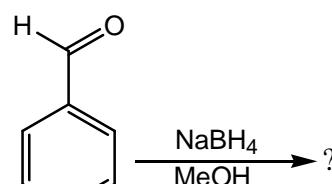
(A) $\text{EtO}^- > \text{OH}^-$ (B) $\ddot{\text{N}}\text{H}_3 > \text{H}_2\ddot{\text{O}}$ (C) $\text{PhO}^- > \text{OH}^-$ (D) $\text{I}^- > \text{Br}^-$



Choose the correct answer from the options given below:

(a) A and C only (b) A and E only (c) B and D only (d) C and E only

81. The major product of the following reaction is



82. The reaction between methylbromide and sodium t-butoxide delivers

(a) t-butyl methyl ether (b) t-butyl alcohol
(c) dimethyl ether (d) di-t-butyl ether

83. Match List-I and List-II

List-I

(A) Aldehyde + NH_2OH
(B) Aldehyde + NH_2-NH_2
(C) Aldehyde + $\text{PhNH}-\text{NH}_2$
(D) Aldehyde + $\text{H}_2\text{N}-\text{NHCONH}_2$

List-II

(I) Semicarbazone
(II) Phenylhydrazone
(III) Oxime
(IV) Hydrazone

Choose the correct answer from the options given below:

A-III, B-IV, C-II, D-I (b) A-III, B-I, C-II, D-IV
(c) A-IV, B-III, C-I, D-II (d) A-I, B-IV, C-II, D-III

84. Given below the following statements:

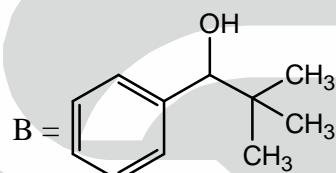
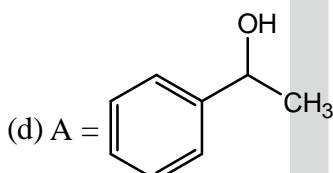
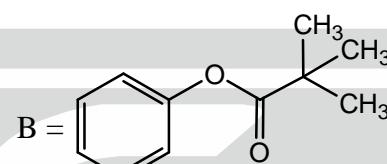
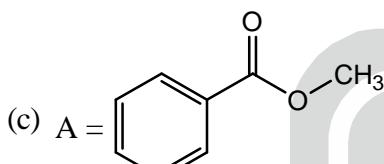
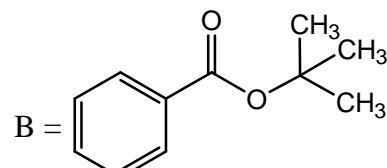
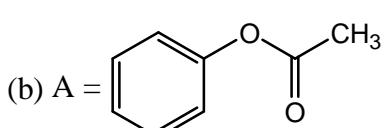
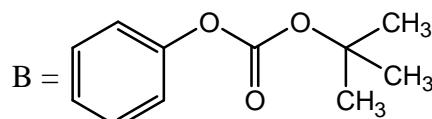
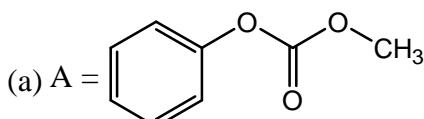
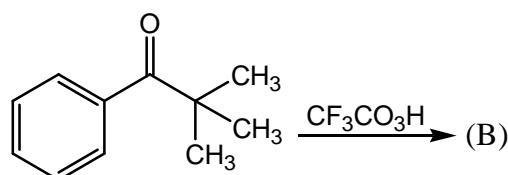
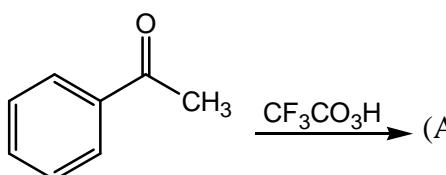
(A) p-nitrophenol is more acidic than phenol
(B) p-nitrophenol is less acidic than 3, 5-dimethyl-4-nitro-phenol
(C) Phenols acidity is based on the stability of the corresponding conjugate bases
(D) p-methoxyphenol is more acidic than phenol
(E) Phenols are more acidic than alcohols

Choose the correct answer from the options given below:

(a) A, B, C, E only (b) A, B, D, E only (c) A, C, E only (d) A, E only



85. The major products of the following reactions respectively are



86. The order of acidity of the following carboxylic acids is



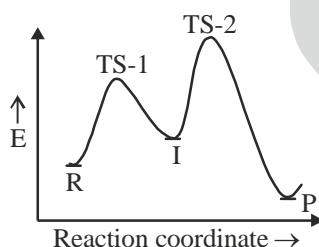
(a) D > C > B > A

(b) D > C > A > B

(c) A > B > C > D

(d) B > A > C > D

87.



The first and second steps respectively of the above two-step reaction are

(a) Endothermic and Endothermic
(c) Exothermic and Exothermic

(b) Endothermic and Exothermic
(d) Exothermic and Endothermic

88.

The major product formed in the reaction between n-butane and chlorine under photochemical condition is

(a) 1-chlorobutane
(c) 2-chlorobutane

(b) 1, 2-dichlorobutane
(d) 1, 3-dichlorobutane



89. Given below are two statements:

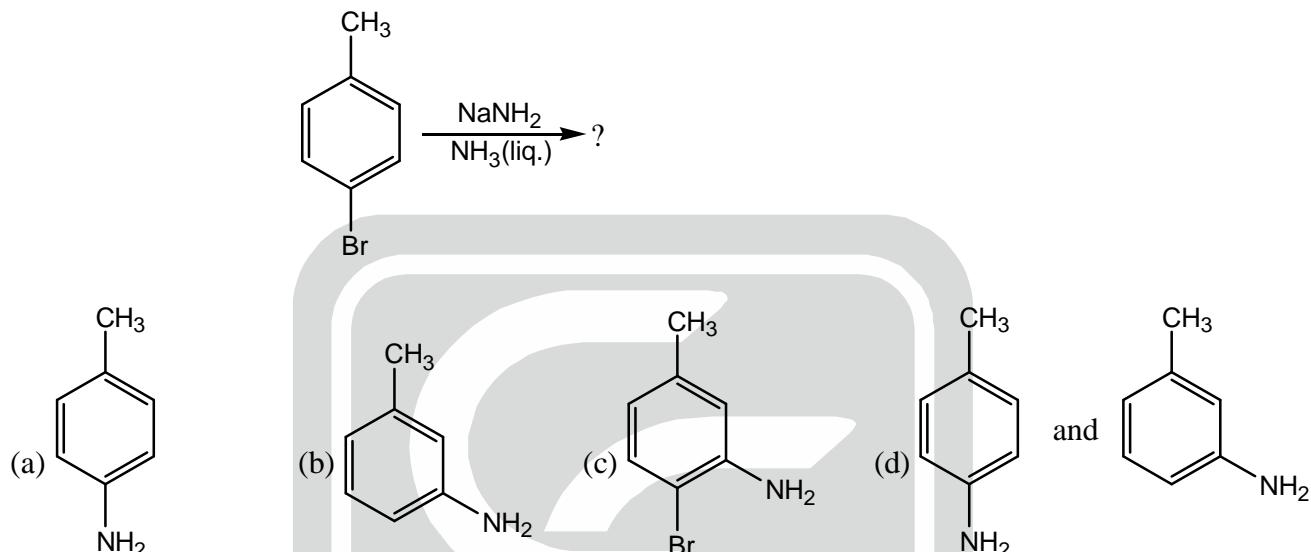
Statement-I: Any molecule which has a plane of symmetry or a centre of symmetry is achiral

Statement-II: Compounds that contain stereogenic centres but are themselves achiral are called *meso* compounds.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement I and Statement II are true
- (b) Both Statement I and Statement II are false
- (c) Statement I is true but Statement II is false
- (d) Statement I is false but Statement II is true

90. The major products of the following reaction is(are)



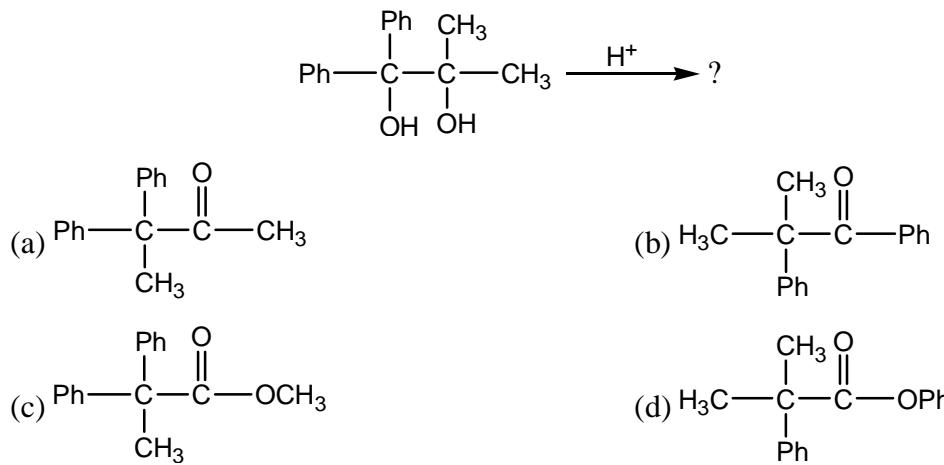
91. Consider the following statements:

- (A) The addition of HBr to unsymmetrical alkenes is Markovnikov addition
- (B) In the presence of peroxides, Anti-Markovnikov product is formed
- (C) E2 elimination of bridgehead position is easy to occur.
- (D) S_N2 reaction at vinylic positions is difficult to occur.

Choose the correct statements from the options given below:

- (a) A, B and C only
- (b) A and D only
- (c) B and D only
- (d) A, B and D only

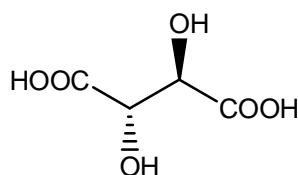
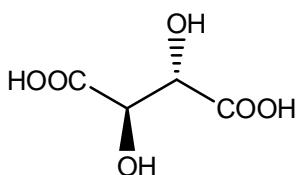
92. The major product of the following rearrangements reaction is



93. The Claisen condensation of ethyl acetate in the presence of sodium ethoxide delivers

- (a) $\text{CH}_3\text{COCH}_2\text{COCH}_3$
- (b) $\text{CH}_3\text{COCH}_2\text{COOEt}$
- (c) $(\text{CH}_3\text{COOEt})_2$
- (d) $\text{CH}_3\text{COCH}_2\text{COOH}$

94. How the following compounds are related to each other?



(a) Diastereomers
(c) Identical

(b) Enantiomers
(d) Epimers

95. The stereochemical requirements for E2 elimination is

(a) *syn*-periplanarity
(b) *anti*-periplanarity
(c) Both *syn* and *anti* periplanarity
(d) No stereochemical requirement

96. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: In ethylene glycol, skew conformation is more stable than staggered conformation

Reason R: Staggered conformation is unstable due to steric hindrance.

In the light of the above statements, choose the correct answer from the options given below:

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

97. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: Methoxymethyl chloride undergoes hydrolysis more than 10^4 times faster than methyl chloride.

Reason R: Methoxymethyl chloride undergoes S_N1 mechanism.

In the light of the above statements, choose the correct answer from the options given below:

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

98. Consider the following reactions involving S_N2 mechanism:

(A) $Nu^- : + R - L \rightarrow Nu + L^-$
(B) $Nu : + R - L \rightarrow R - Nu^+ + L^-$
(C) $Nu^- : + R - L^+ \rightarrow R - Nu + L^-$

Which of the above reactions will be accelerated upon increasing solvent ionizing power:

(a) Only A
(b) Only B
(c) Only C
(d) Both A and C

99. Given below are two statements:

Statement-I: is stabilized by resonance

Statement-II: In the above structure, formal charges on C and N are +1 and -1 respectively.

In the light of the above statements, choose the correct answer from the options given below:

(a) Both Statement I and Statement II are true
(b) Both Statement I and Statement II are false
(c) Statement I is true but Statement II is false
(d) Statement I is false but Statement II is true



100. Reaction of Z-2-phenyl-2-butene with bromine leads to 63% anti addition and 37% syn addition. While that of Z-2-butene leads to 100% anti-addition. This can be explained as
(A) Formation of an intermediate three membered ring cation a bromonium ion.
(B) Interaction of π -bond of the alkene and diatomic bromine molecule leads to polarization of bromine molecule.
(C) Bormonium ion is more stable than the corresponding open carbocation intermediate
(D) Bormonium ion is less stable than the corresponding open carbocation intermediate.

Correct answer is

(a) A and C (b) A and D (c) A, B and C (d) D only

