



CUET CHEMISTRY 2022

PAPER

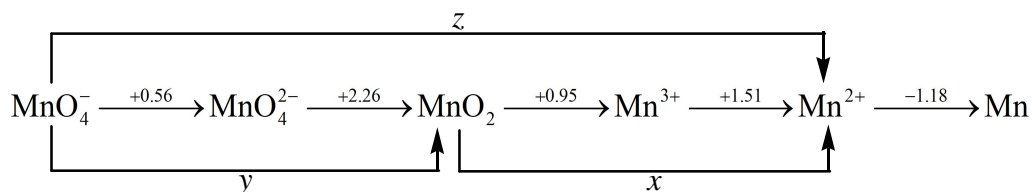
- Identify the correct preposition for making a meaningful sentence.
The detectives found that the victim was stabbed _____ the neck.
(a) on (b) to (c) in (d) at
- Identify meaning of the underlined idiom from the options given.
The students were beaten black and blue by the people of the nearby region because of the protest.
(a) to shout loudly (b) to beat mercilessly
(c) to curse rudely (d) to abuse repeatedly
- Choose the correct option to make a meaningful sentence.
My mother wears sarees but last time when I _____ her, she _____ salwar suit.
(a) saw, was wearing (b) saw, worn
(c) seeing, is wearing (d) see, wear
- Identify the correctly spelt word from the options given below:
(a) Benediction (b) Bereavment (c) Belicose (d) Blasphemous
- Identify antonym for the underlined word in the sentence.
The child was set free after his parents paid the ransom.
(a) abducted (b) ransacked
(c) freedom (d) seized
- Identify the correct passive voice for the sentence given below:
The thief stole several possessions from the house. Even the fridge has been emptied.
(a) Several possessions were stolen from the house by the thief. Even the fridge he has emptied.
(b) Several possessions were stolen from the house by the thief. Even the fridge was emptied.
(c) Including the fridge, several possessions from the house have been emptied by the thief.
(d) The thief stolen several possessions from the house, also fridge has been emptied.
- Identify the correct indirect speech for the sentence given below:
Rajesh said, "Dr. Babasaheb Ambedkar was born in Mhow, Madhya Pradesh"
(a) Rajesh told that Dr. Babasaheb Ambedkar had born in Mhow, Madhya Pradesh
(b) Rajesh asked that Dr. Babasaheb Ambedkar born in Mhow, Madhya Pradesh
(c) Rajesh suggested that Dr. Babasaheb Ambedkar is born in Mhow, Madhya Pradesh
(d) Rajesh said that Dr. Babasaheb Ambedkar was born in Mhow, Madhya Pradesh
- Choose the correct order of the paragraph to create a meaning out of PQRS set:
Saussure stressed
P: in a language's structure and maintained
Q: the interaction at any one time of elements
R: in a network of relations
S: that these were interrelated
(a) RSQP (b) PSRQ (c) QPSR (d) SRPQ
- Choose the correct sentence.
(a) I hope you will excuse me leaving early (b) I hope you will excuse my leaving early
(c) I hope you will excuse mine leaving early (d) I hope you will excuse leaving early.



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 Noble 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 Khurana
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) Neapanagar and Salboni (b) Dewas and Neapanagar
 (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 Urvasi is 13th from the right. When they change their positions and then Anamika becomes 18th from the left. What is the new position of Urvasi 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 become 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



22. A student has to score 30% marks throughout. If he gets 30 marks and fails by 30 marks, then the maximum marks set for the examination is
 (a) 100 (b) 150 (c) 200 (d) 400
23. A man bought 20 cows in Rs. 200000. If the average cost of 12 cows is Rs. 12500, then the average cost of remaining cows will be?
 (a) Rs. 6250 (b) Rs. 6520 (c) Rs. 6025 (d) Rs. 6052
24. A sum of simple interest of $13\frac{1}{2}\%$ per annum amounts to Rs. 3080 in 4 yrs, then the sum is
 (a) Rs. 3000 (b) Rs. 2000 (c) Rs. 1000 (d) Rs. 2500
25. The system of equation, $2x + 4y + 16 = 0$ and $3x + 6y + 24 = 0$ is
 (a) Unique solution (b) Infinitely many solutions
 (c) Inconsistent (d) Only two solutions
26. According to Slater's rule, the effective nuclear charge (Z_{eff}) for a 2p electron of carbon is
 (a) 2.75 (b) 3.25 (c) 4.00 (d) 6.00
27. According to the Lewis structure for HNNH how many σ bonds, π bonds and lone pairs of electrons are present?
 (a) sigma bonds (σ)-2, pi bonds (π)-2, lone pairs of electrons (n)-2
 (b) sigma bonds (σ)-3, pi bonds (π)-2, lone pairs of electrons (n)-0
 (c) sigma bonds (σ)-3, pi bonds (π)-1, lone pairs of electrons (n)-2
 (d) sigma bonds (σ)-3, pi bonds (π)-0, lone pairs of electrons (n)-4
28. Which set of elements has the lowest melting points?
 (a) Alkali metals (b) Alkaline earth metals
 (c) Transition metals (d) Lanthanide metals
29. Given below are two statements:
Statement-I: Hard acids form complexes with stabilities in the order: $\text{I}^- < \text{Br}^- < \text{Cl}^- < \text{F}^-$
Statement-II: Soft acids form complexes with stabilities in the order: $\text{F}^- < \text{Cl}^- < \text{Br}^- < \text{I}^-$
 In the light of the above statements, choose the most appropriate answer from the options given below:
 (a) Both Statement I and Statement II are correct
 (b) Both Statement I and Statement II are incorrect
 (c) Statement I is correct and Statement II is incorrect
 (d) Statement I is incorrect and Statement II is correct
30. The potential diagram for manganese at $[\text{H}^+] = 1$ is given as (values are in V)



x , y and z are

- (a) $x = +2.46$, $y = +2.82$, $z = +1.32$ (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

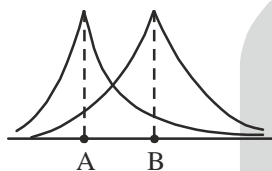
32. The correct increasing order of bond angle among F_2O , Cl_2O and Br_2O is ($\text{X}-\text{O}-\text{X}$, where X is F, Cl, Br)

- (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) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9 4s^2$ (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,



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 $[\text{Kr}] 4d^{10} 5s^0$

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

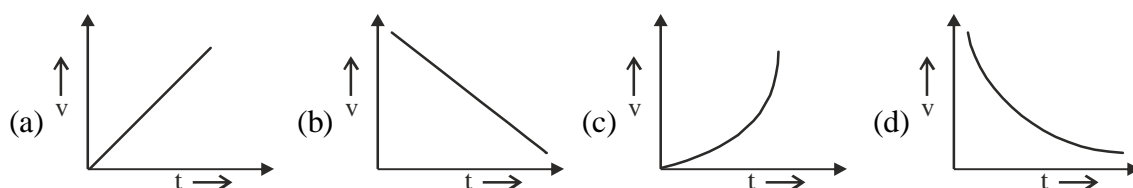
- (a) Both Statement I and Statement II are true (b) Both Statement I and Statement II are false
(c) Statement I is true but Statement II is false (d) Statement I is false but Statement II is true



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 Statment 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]



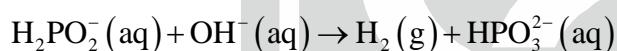
49. Gases A, B, C and D obey the vander Waals equation with 'a' and 'b' values as given (liter-atm system of units of)

	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^-



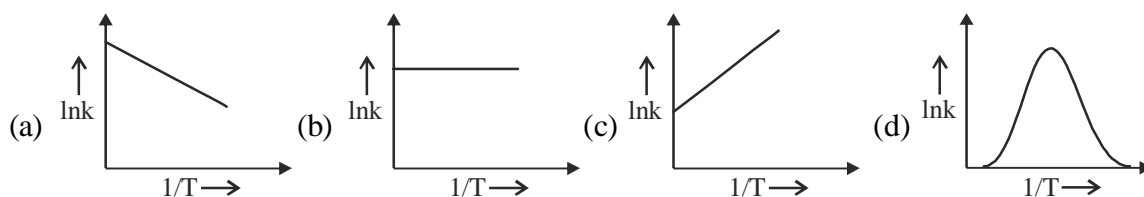
has been studied by following the initial rate of formation of gaseous product. The results are tabulated below:

S.N.	Initial concentration of $\text{H}_2\text{PO}_2^-(\text{aq}) / \text{mol dm}^{-3}$	Initial concentration of $\text{OH}^-(\text{aq}) / \text{mol dm}^{-3}$	Initial rate of $\text{H}_2(\text{g})$ 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 $\left[k = Ae^{\frac{E_a}{RT}} \right]$



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: $R = 8.31 \text{ JK}^{-1} \text{ mol}^{-1}$)
 (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)

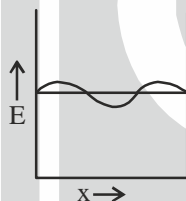


62. Match the **List-I** and **List-II**:

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:

- (a) A-II, B-I, C-IV, D-III (b) A-I, B-III, C-IV, D-II
 (c) A-II, B-III, C-I, D-IV (d) A-IV, B-I, C-III, D-II
63. The process of removing ions/molecules from a sol by diffusion through a permeable membrane is called
 (a) Ultrafiltration (b) Dialysis
 (c) Electrodialysis (d) Electrophoresis
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 ?



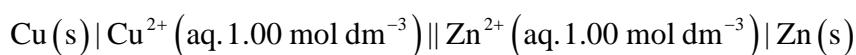
- (a) 1 (b) 2 (c) 3 (d) 4
66. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:
Assertion A: The density of diamond is much higher than that of ice though both solids adopt analogous structures.
Reason R: The ice lattice is held by hydrogen bonds which 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:

$${}^{238}\text{U}_{92} + {}^4\text{He}_2 \longrightarrow {}^M\text{X}_A + {}^1\text{n}_0$$

 number of neutrons present in nucleus of X are _____
 (a) 147 (b) 238 (c) 94 (d) 162
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
$\frac{1}{2} \text{Cu}^{2+}(\text{aq}) + e^- \longrightarrow \frac{1}{2} \text{Cu(s)}$	+0.34
$\frac{1}{2} \text{Zn}^{2+}(\text{aq}) + e^- \longrightarrow \frac{1}{2} \text{Zn(s)}$	-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 $\Delta S_{\text{vap}}^0 = 87.2 \text{ JK}^{-1} \text{ mol}^{-1}$ 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:

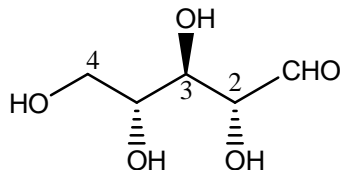
Statement-I: E2 reaction follows second-order kinetics and not accompanied by rearrangements.

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

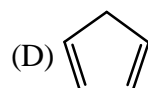
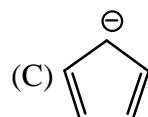
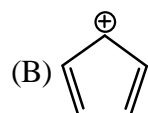
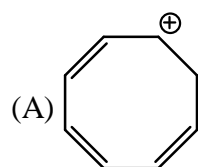
77. The absolute configuration (R/S configuration) of the following molecule is



- (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.

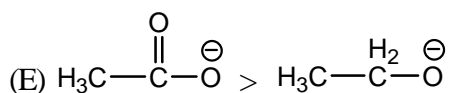
In the light of the above statements, choose the correct answer from the options given below:

- (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?

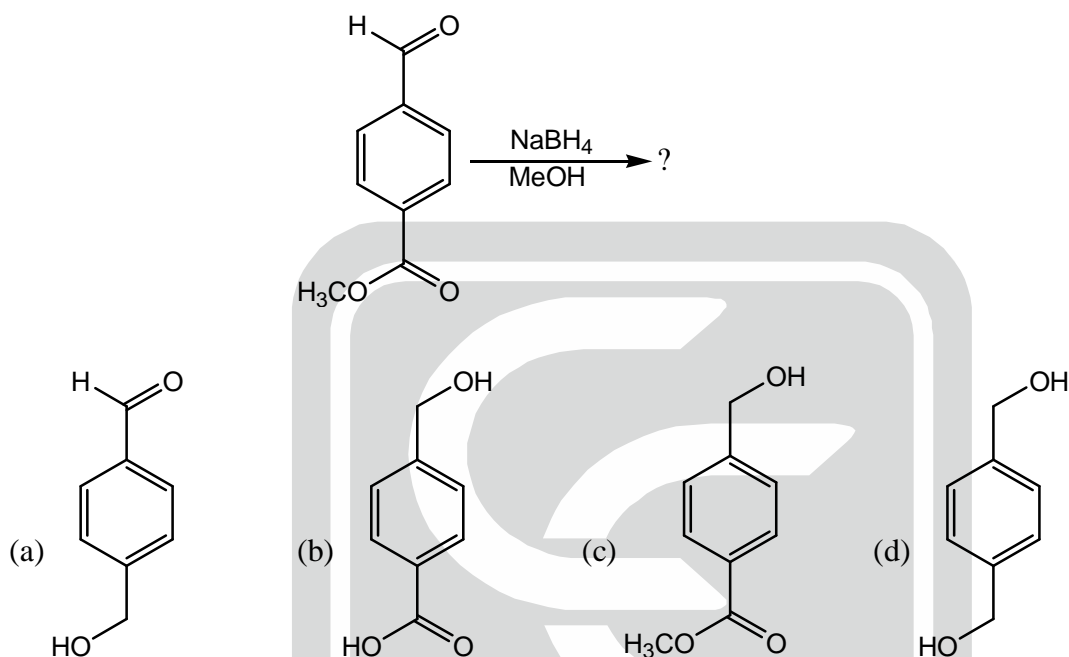
- (A) $\text{EtO}^- > \text{OH}^-$ (B) $\ddot{\text{N}}\text{H}_3 > \text{H}_2\ddot{\text{O}}$ (C) $\text{PhO}^- > \text{OH}^-$ (D) $\text{I}^- > \text{Br}^-$



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:

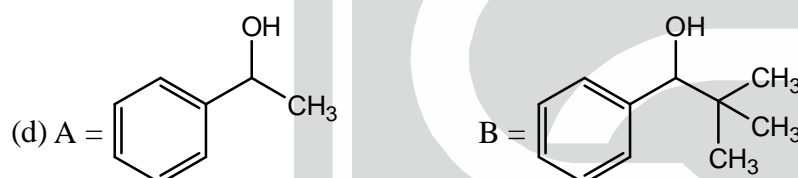
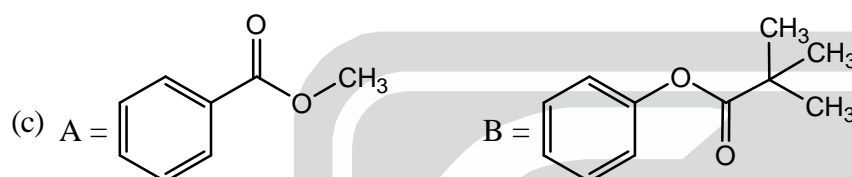
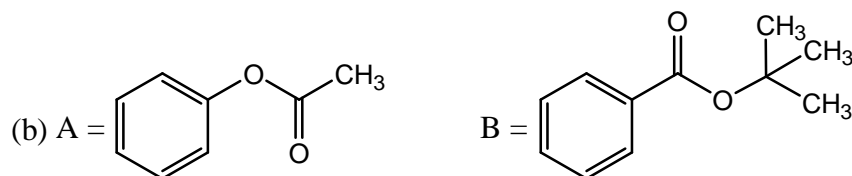
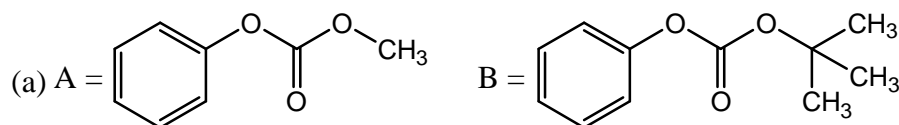
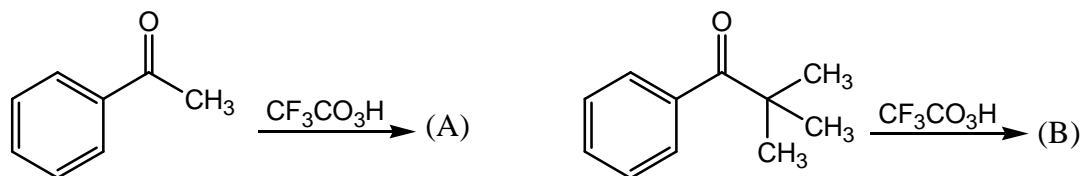
- (A) p-nitrophenol is more acidic than phenol
(B) p-nitrophenol is less acidic than 3, 5-dimethyl-4-nitro-phenol
(C) Phenols acidity is based on the stability of the corresponding conjugate bases
(D) p-methoxyphenol is more acidic than phenol
(E) Phenols are more acidic than alcohols

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



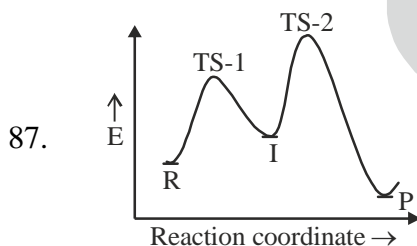
85. The major products of the following reactions respectively are



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



- (a) $\text{D} > \text{C} > \text{B} > \text{A}$ (b) $\text{D} > \text{C} > \text{A} > \text{B}$ (c) $\text{A} > \text{B} > \text{C} > \text{D}$ (d) $\text{B} > \text{A} > \text{C} > \text{D}$



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

- (a) Endothermic and Endothermic (b) Endothermic and Exothermic
 (c) Exothermic 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 (b) 1, 2-dichlorobutane
 (c) 2-chlorobutane (d) 1, 3-dichlorobutane

89. Given below are two statements:

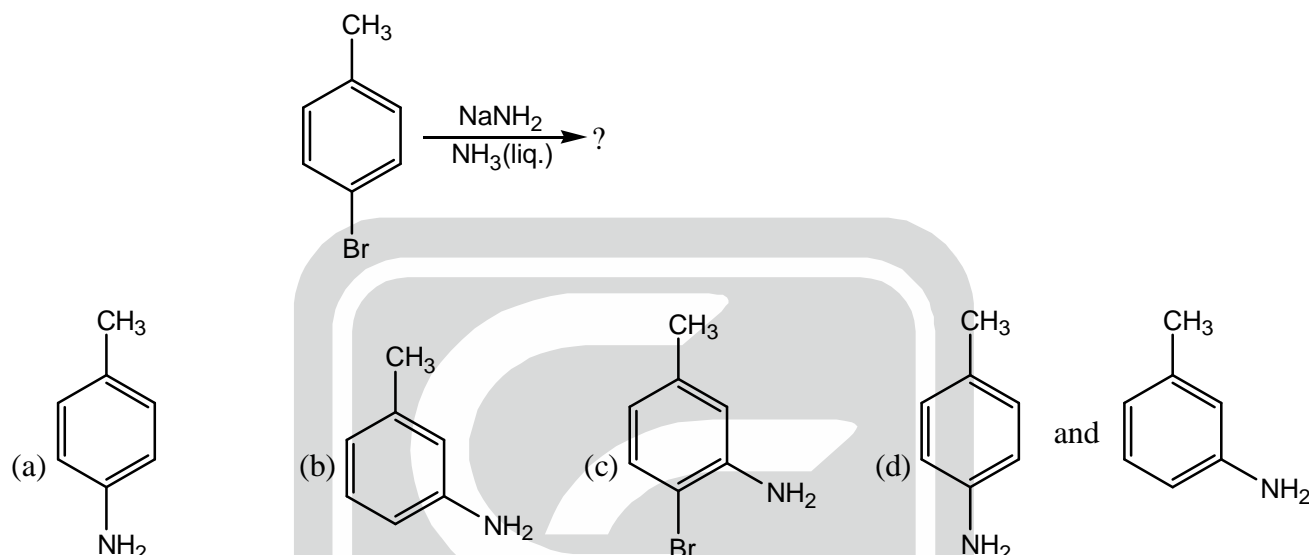
Statement-I: Any molecule which has a plane of symmetry or a centre of symmetry is achiral

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)



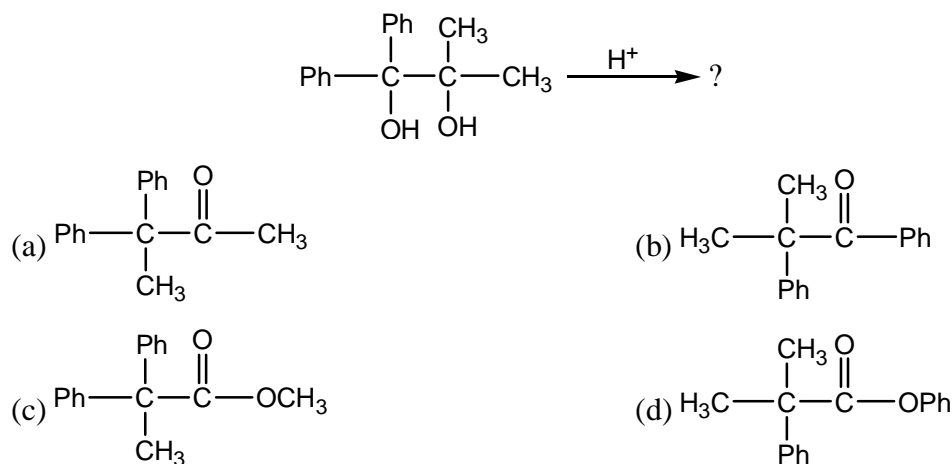
91. Consider the following statements:

- (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

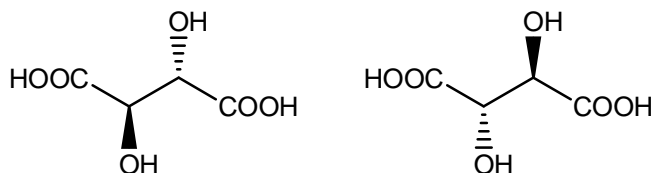


93. The Claisen condensation of ethyl acetate in the presence of sodium ethoxide delivers

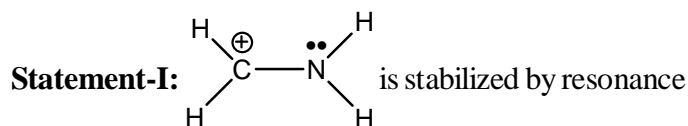
- (a) $\text{CH}_3\text{COCH}_2\text{COCH}_3$ (b) $\text{CH}_3\text{COCH}_2\text{COOEt}$
 (c) $(\text{CH}_2\text{COOEt})_2$ (d) $\text{CH}_3\text{COCH}_2\text{COOH}$



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



- (a) Diastereomers (b) Enantiomers
(c) Identical (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) $\text{Nu}^- + \text{R} - \text{L} \rightarrow \text{Nu} + \text{L}^-$
(B) $\text{Nu} + \text{R} - \text{L} \rightarrow \text{R} - \text{Nu}^+ + \text{L}^-$
(C) $\text{Nu}^- + \text{R} - \text{L}^+ \rightarrow \text{R} - \text{Nu} + \text{L}$
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-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) Bromonium ion is more stable than the corresponding open carbocation intermediate
 - (D) Bromonium 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

