1. Acetic acid in benzene solution forms dimer due to intermolecular H-bonding. For this case van't Hoff factor is:

(A) i= 1

(B) i> 1

(C) i< 1

(D) inclusive

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2. 90% of a first-order reaction completes in 90 minutes. 50% of the reaction will be over in approximately:

(A) 50 minutes

(B) 54 minutes

(C) 27 minutes

(D) 62 minutes

90% → 90 min
$50\% = \frac{90}{90} \times \frac{50}{100}$

3. Lanthanide contraction is caused due to

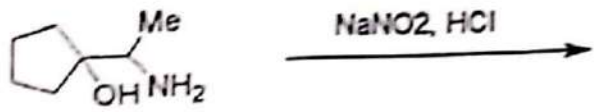
(A) The appreciable shielding on outer electrons by 4f electrons from the nuclear charge

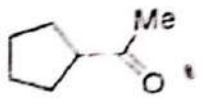
(B) The appreciable shielding on outer electrons by 5d electrons from the nuclear charge

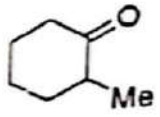
(C) The same effective nuclear charge from Ce to Lu

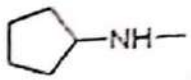
(D) The imperfect shielding on outer electrons by 4f electrons from the nuclear charge

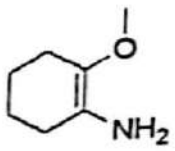
4. Which is the main final product of the following diazotization of an amine?



A. 

B. 

C. 

D. 

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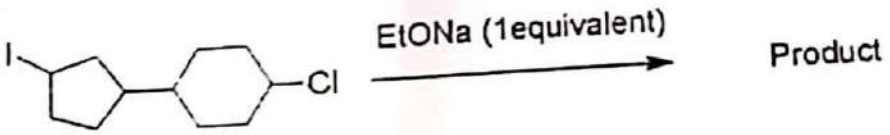
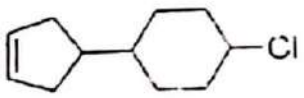
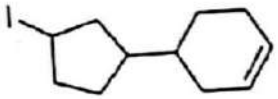
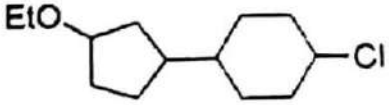
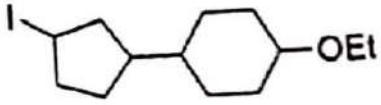
5. Predict the predominant product of the following regioselective elimination reaction



A. 

B. 

C. 

D. 

6. Crystal field splitting energy value of octahedral (O_h) and tetrahedral (t_h)

(A) $\Delta_0 = 4/9\Delta_t$

(B) $\Delta_0 = 9/4\Delta_t$

(C) $\Delta_t = 9/4\Delta_0$

(D) $\Delta_t = 3/4\Delta_0$

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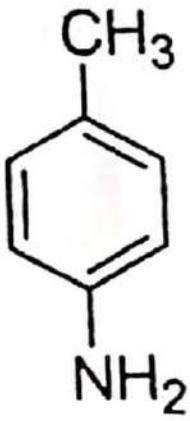
7. What is the sequence of reagents that will accomplish the synthesis of the following aromatic amine from benzene?



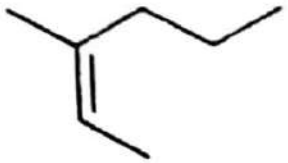
(A) CH_3Cl, $AICl_3$; HNO_3, H_2SO_4; H_2

(B) CH_3Cl, $AICl_3$; HNO_3, H_2SO_4; Fe, HCl; NaOH

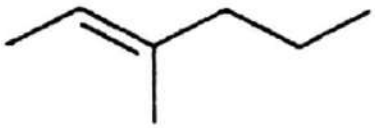
(C) HNO_3, H_2SO_4; Fe, HCl; NaOH; CH_3Cl, $AICl_3$

(D) HNO_3, H_2SO_4; CH_3Cl, $AICl_3$; Fe, HCl; NaOH

8. Determine the double bond stereochemistry (E or Z) for the following molecules.



P



Q

(A) P is Z and Q is E

(B) P is Z and Q is Z

(C) P is E and Q is E

(D) P is E and Q is Z

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9. Time for completion of 75% of a reaction is thrice the time for completion of 50% of the same reaction. Hence, the order of the reaction is:

(A) 0

(B) 1

(C) 2

(D) 3

10. A cell reaction is spontaneous if:

(A) $E_{cell} > 0$

(B) $\Delta G < 0$

(C) $K > 1$

(D) all of these

11. For the octahedral complex ion $[Co(en)(NH_3)_2Cl_2]^+$, the number of possible isomers are, (en = ethylenediamine)

(A) 2

(B) 4

(C) 6

(D) 8

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12. The percentage of p-character in the orbitals forming P-P bonds in P_4 is

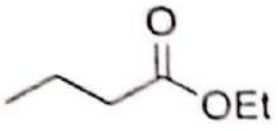
(A) 25

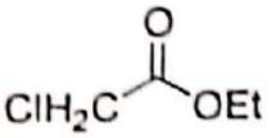
(B) 33

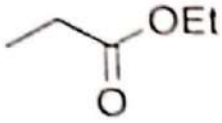
(C) 75

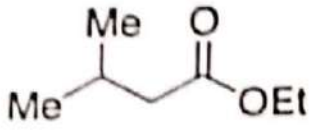
(D) 50

13. Which ester will not give a good yield of the Claisen condensation product with NaOEt in EtOH?

A. 

B. 

C. 

D 

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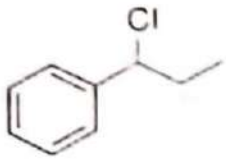
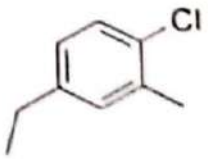
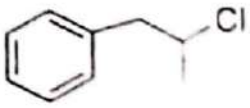
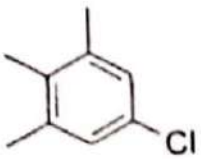
14. Which is the most reactive compound by the S_N2 mechanism?

A. 

B. 

C. 

D. 

15. Under which of the following conditions, H_2 has the highest entropy per mole?

(A) H_2 at 25 °C at 1 atm (B) H_2 at STP

(C) H_2 at 100 K at 1 atm (D) H_2 at 0 K at 1 atm

16. Heat of combustion of C_6H_6 (I) is, if the heat of formation of C_6H_6 (I), H_20 (I) and CO_2 (g) are $-X_1$, $-X_2$ and $-X_3$ calories respectively:

(A) $X_1 - X_2 - X_3$ (B) $X_1 - 6X_2 - 3X_3$

(C) $X_1 + X_2 + X_3$ (D) $X_1 - 3X_2 - 6X_3$

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17. Among the elements Zn, As, Ga and Ge, which has the highest first ionization energy?

(A) Zn (B) As

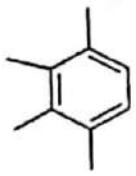
(C) Ga (D) Ge

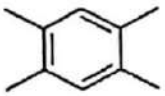
18. In calcium complex of $EDTA^{2-}$, the numbers of donor atoms are

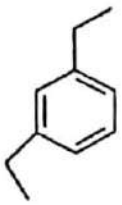
(A) Two (B) Four

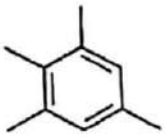
(C) Five (D) Six

19. An organic compound having the molecular formulae $C_{10}H_{14}$ exhibited two singlets in the ^{1}H NMR spectrum and three signals in the ^{13}C NMR. What is the compound?

A. 

B. 

C. 

D. 

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20. Which of the following compounds does NOT undergo mutarotation?

(A) Glucose (B) Maltose

(C) Sucrose (D) Fructose

21. 'x' moles of lead acetate and 0.1 mole of acetic acid were taken in 1 litre solution to make a solution of pH = 5.04. The value of 'x' will be if pK_a of CH3COOH is 4.74:

(A) 0.2 mole

(B) 0.05 mole

(C) 0.1 mole

(D) 0.02 mole

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22. E°_{red} (standard reduction electrode potentials) of different half-cells are given:

E° cu $^{2+}$/cu = 0.34 V ; E° zn $^{2+}$/zn = -0.76 V

$E^\circ Ag^+/Ag$ = 0.80 V; E° M^{2+}/Mg = -2.37 V

In which cell is ΔG° is most negative?

(A) $Zn \mid Zn^{2+}$ (1M) $\mid\mid Mg^{2+}$(1M) $\mid Mg$

(B) $Zn \mid Zn^{2+}$ (1M) $\mid\mid Ag^{+}$(1M) $\mid Ag$

(C) $Cu \mid Cu^{2+}$ (1M) $\mid\mid Ag^{+}$(1M) $\mid Ag$

(D) $Ag \mid Ag^{2+}$ (1M) $\mid\mid Mg^{2+}$(1M) $\mid Mg$

23. $B_2 H_6$ reacts with $H_2O$and O_2 to give

(A) $H_3 BO_3 + H_2$ and $B_2O_3 + H_2O$ respectively

(B) $H_3BO_3 + H_20$ and $B_2O_3 + H_2O$ respectively

(C) $H_3 BO_3 + H_20$ and $B_2O_3 + H_2$ respectively

(D) $H_3BO_3 + H_2$ and $B_2O_3 + H_2$ respectively

24. The IUPAC name of Na_3 [Fe $(CN)_5$ NO] is

(A) Sodium penracyanonitrosy liron (II)

(B) Sodium nitrosylpenracyanoiron (II)

(C) Sodium penracyanonitrosoniumferrate (I)

(D) Sodium nitrosylpenracyanonferrate (I)

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25. Which of the following is NOT an example of secondary structure found in proteins?

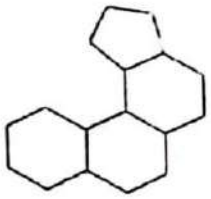
(A) Alpha helix

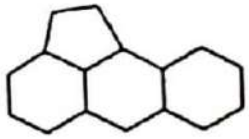
(B) Beta pleated sheet

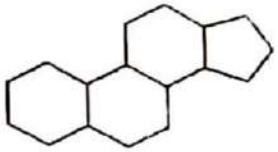
(C) Hydrophobic folding

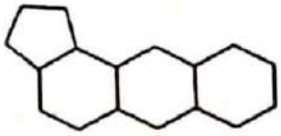
(D) Random coil

26. Which of the following tetracyclic compounds corresponds to the typical 17- carbon steroid nucleus?

A. 

B. 

C. 

D. 

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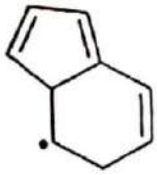
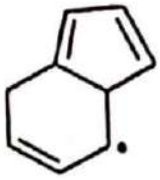
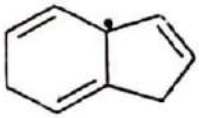
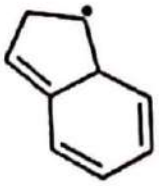
27. Most stable carbon free radical among the following would be

A. 

B. 

C. 

D. 

28. Which of the following can act as a protective colloid?

(A) Silica gel (B) Gelatin

(C) oil-in-water emulsion (D) all of these

29. A catalyst accelerates the rate of reaction by:

(A) decreasing energy of activation

(B) increasing Arrhenius constant

(C) increasing both energy of activation and Arrhenius constant

(D) decreasing both energy of activation and Arrhenius constant

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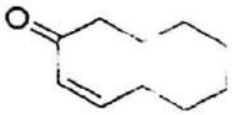
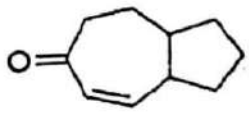
30. Class of voids that can exist in any close-packed structures are:

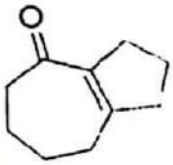
(A) Trigonal, tetrahedral (B) Trigonal, octahedral

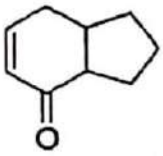
(C) Tetrahedral l, octahedral (D) Only octahedral

31. What is the predominant product of the following sequence of reactions?

A. 

B. 

C. 

D. 

32. Conjugate base of hydrazoic acid is

(A) NH_3 (B) N_3^-

(C) N_2^- (D) NH_2^-

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33. An electron trapped in an anion vacancy within the crystal is called:

(A) n-type conductor (B) p-type conductor

(C) Insulator (D) F-centre

34. The ratio between the root mean square speeds of H_2 at 50 K and O_2 at 800 K is:

(A) ¼ (B) 1

(C) 2 (D) 4

35. Which is the most reactive compound by the S_N1 mechanism?

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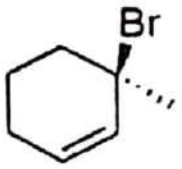
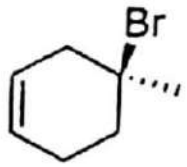
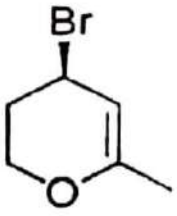
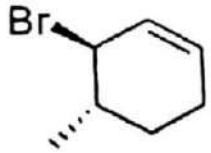
A. 

B. 

C. 

D. 

36. Peptides are composed of amino acids joined by amide bonds. Which of the following statements is not correct?

(A) Amide groups are more resistant to hydrolysis than are similar ester groups.

(B) p-π resonance stabilizes the amide bond.

(C) Stable conformations of peptides are restricted to those having planar amide groups.

(D) Amide groups do not participate in hydrogen bonding interactions.

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37. The complex ion which has highest magnetic moment of the following

(A) $[CoF_6]^{3-}$ (B) $[Co\ (NH3)_6)\ ^{3+}$

(C) $[Ni\ (NH3)_4]^{2+}$ (D) $[Ni\ (CN)_4]^{2-}$

38. The oxidation number of iodine in K $[I_3]$ is

(A) Zero (B) -1/3

(C) -1 (D) -3

39. The r.m.s. velocity of hydrogen is $\sqrt{7}$ times the r.m.s. velocity of nitrogen. If T is the temperature of the gas:

(A) $T(H_2) = T(N_2)$

(B) $T(H_2) > T(N_2)$

(C) $T(H_2) < T(N_2)$

(D) $T(H_2) = \sqrt{7}\,(N_2)$

40. In the Lassaigne's test for detection of nitrogen element in an organic compound, the Prussian blue colour is obtained due to the formation of

(A) $K_3[Fe(CN)_6]$

(B) $Fe_2[Fe(CN)_6]$

(C) $Fe_4[\,Fe(CN)_6]_3$

(D) $Fe_3[Fe(CN)_5]_4$

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41. The bond order for the following molecules/ion(s) is 3

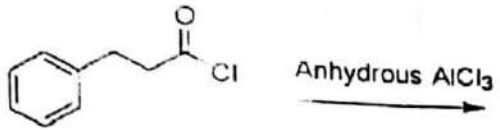
(A) N_2^+, CO and NO^+

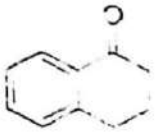
(B) O_2 , CO and NO^+

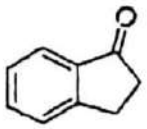
(C) N_2 , CO and NO

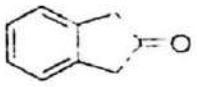
(D) N_2 , CO and NO^+

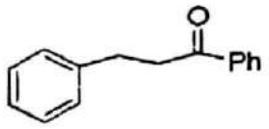
42. Which is the most probable main product of the following reaction?



A 

B. 

C 

D. 

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43. The reason for normalizing a wave function ψ is:

(A) to guarantee that ψ is square-integrable .

(B) to make $\psi * \psi$ equal to the probability distribution function for the particle.

(C) to make ψ an Eigen function for the Hamiltonian operator .

(D) to make ψ satisfy the boundary conditions for the problem.

44. Which of the following atomic orbitals can overlap with an atomic orbital of the same type on an adjacent atom (both atoms lie on the x axis) to give a π bond?

(A) $2P_x$ (B) $3d_{xy}$

(C) 2s (D) $3p_x$

45. In the emission spectrum of hydrogen, which series of emission lines falls in the visible region?

(A) Lyman (B) Paschen

(C) Balmer (D) Pfund

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46. The dark purple colour of KMn04 is due to

(A) Charge transfer transition (B) d-d transition

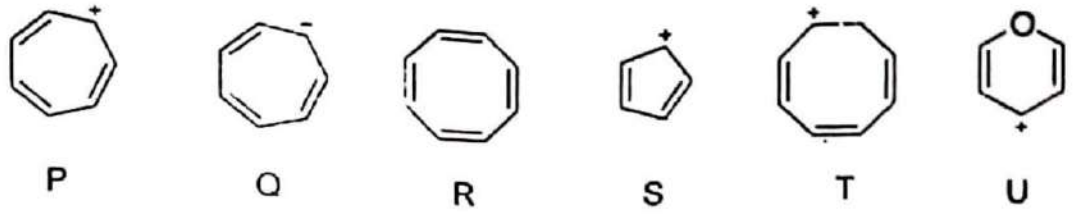
(C) f-f transition (D) π- π^* transition

47. The following complex obeys EAN and 18 rules:

(A) $[Cr(CN)_6]^{3-}$ (B) $[Fe(CN)_6]^{3-}$

(C) $[Ni(CN)_4]^{2-}$ (D) $[Cu(CN)_4]^{3-}$

48. Non-Aromatic compounds among the following is/are:



(A) Q, S, T and U

(B) T and U

(C) R and T

(D) Q, T and U

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49. For which of the following elements is the process of attaching the first electron the most exothermic?

(A) O

(B) H

(C) I

(D) Na

50. The coordination numbers of Ti (IV) and O^{2-} in rutile are, respectively:

(A) 6 and 3

(B) 3 and 6

(C) 2 and 4

(D) 4 and 2

51. Which of the following statements is incorrect about oxalic acid ($H_2C_2O_4$) for which $K_{a(1)} = 5.9 \times 10^{-2}$ M and $K_{a(2)} = 6.4 \times 10^{-5}$ M?

(A) The observation that $K_{a(1)} > K_{a(2)}$ is general for dibasic acids

(B) Both $H_2C_2O_4$ and its conjugate base behave as weak acids

(C) $pK_{a(1)} > pK_{a(2)}$

(D) Oxalic acid forms salts including $Na_2C_2O_4$, MgC_2O_4 and KHC_2O_4

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52. The molecules having the same hybridization, shape and number of lone pairs of electrons are

i) XeF_4 ii) SF_4 iii) $XeOF_4$ iv) XeO_2F_2

(A) ii & ii

(B) ii & iii

(C) iii & iv

(D) ii & iv

53. Carbonic anhydrase, metalloenzyme catalysis

(A) Hydration of CO_2

(B) Hydration of CO

(C) Hydration of proteins

(D) Dehydration of proteins

54. Which among the following is not an ambident nucleophile?

(A) CN^- (B) NO_2^-

(C) PhO^- , (D) $CH_3CH_2^-$

55. Which reagent will react irreversibly with a carbonyl compounds?

(A) EtOH (B) HCN

(C) HCl (D) $LiAlH_4$

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56. In neutral aqueous solution, E° for the Mn^{3+}/Mn^{2+} couple is +1.54 V. At pH 14, E° for the $Mn(OH)_3/Mn(OH)_2$ couple is +0.15V. Which of the following statements is incorrect?

(A) At pH 14, Mn(11) and Mn(111) both precipitate from aqueous solution as hydroxides

(B) Mn(111) is less stable with respect to reduction to Mn(11) at pH 14 than at pH 7

(C) The $Mn(OH)_3/Mn(OH)_2$ couple refers to an equilibrium involving Mn(111) and Mn(ll)

(D) At pH 7, $Mn^{3+}(aq)$ is a relatively strong oxidizing agent

57. Which one of the following is the correct formula for the lowest-energy Eigen function for a particle in a one-dimensional box having infinite barriers at

x = - L/2 and L/2?

(A) $\sqrt{\frac{2}{L}}\sin\left(\frac{\pi x}{L}\right)$ (B) $\sqrt{\frac{2}{L}}\cos\left(\frac{\pi x}{L}\right)$

(C) $\sqrt{\frac{2}{L}}\exp\left(\frac{i\pi x}{L}\right)$ (D) $\sqrt{\frac{2}{L}}\exp\left(\frac{-i\pi x}{L}\right)$

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58. Which of the following complex exhibits John-Teller Distortion?

(A) $[Mn(H_2O)_6)^{2+}$ (B) $[Cr(H_2O)_6)^{3+}$

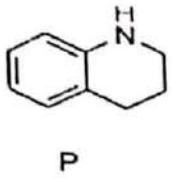
(C) $[Mn(H_2O)_6)^{3+}$ (D) $[Co(NH_3)_6)^{3+}$

59. Which metal complex has maximum crystal field stabilization energy (CFSE)

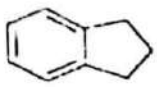
(A) $[CoCl_4)^{2-}$ (B) $[CoF_6)^{3-}$

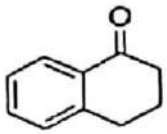
(C) $[Co(H_2O)_6)^{3+}$ (D) $[Co(NH_3)_6)$

60. The correct order for the rates of electrophilic aromatic substitution of the following compound is

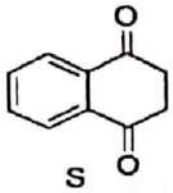


P


Q



R



S

(A) P<Q<R<S

(B) S<R<Q<P

(C) R<S<Q<P

(D) Q<R<S<P

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61. A molecule in a gas undergoes about 1.0 x 109 collisions in each second. Suppose that one collision in 10 is effective in deactivating the molecule rotationally. The width (in hertz) of rotational transitions in the molecule will be:

(A) 1.59 MHz

(B) 15.9 MHz

(C) 159 MHz

(D) None of the above

62. The rotational structure in the Raman spectrum of carbon dioxide (CO_2), is offset from the wavenumber of the incident radiation by 2 .3622 cm^{-1} , 5 .5118 cm^{-1}, 8.6614 cm^{-1}. The rotational constant of carbon dioxide is:

(A) 0. 3937 cm^{-1}

(B) 0.5906 cm^{-1}

(C) 1. 1811 cm^{-1}

(D) 2. 3622 cm^{-1}

63. ΔH_{vap} = 30 kJ mol^{-1} and ΔS_{vap}=75 kJ $mol^{-1}K^{-1}$. Find temperature of vapour, at one atmosphere:

(A) 250 K

(B) 298 K

(C) 350 K

(D) 400K

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64. Molecular formula of Zeise's salt

(A) K [Pt (η^2-C_2H_4) Cl_3] .H_2O

(B) K_2 [Pt (η^2-C_2H_4) Cl_3] .H_2O

(C) K_2 [Pt (η^3-C_2H_4) Cl_3] .H_2O

(D) K [Pt (η^3-C_2H_4) Cl_3] .H_2O

65. The compound formed by vigorously hydrolysis of $ZrCl_4$ is

(A) $ZrO(OH)_2$ (B) $Zr(Or)_3$

(C) $ZrOCl_2$ (D) ZrO_2

66. Which element is used in the synthesis of pesticides?

(A) N (B) As

(C) Bi (D) Sb

67. Which of the following is not chelating agent

(A) Glycinato (B) Oxalato

(C) Thiosulphato (D) Ethylinediamine

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68. In a given cell, solution I transmits 42.0 per cent and solution II 85.0 per cent of radiation having a certain wavelength. What is the transmittance at the same wavelength of a solution made by mixing 35.0 cm^3 of solution I and 55.0 cm^3 of solution II, if no reaction occurs?

(A) 64.6 % (B) 68.3 %

(C) 35.7 % (D) 44.7 %

69. 0.1 mole of CH_3NH_2 (Kb = 5 x 10^{-4} M) is mixed with 0.08 mole of HCl and diluted to one litre. What will be the H^+ concentration in the solution?

(A) 8×10^{-2}M

(B) 8×10^{-11} M

(C) 1.6×10^{-11} M

(D) 8×10^{-5} M

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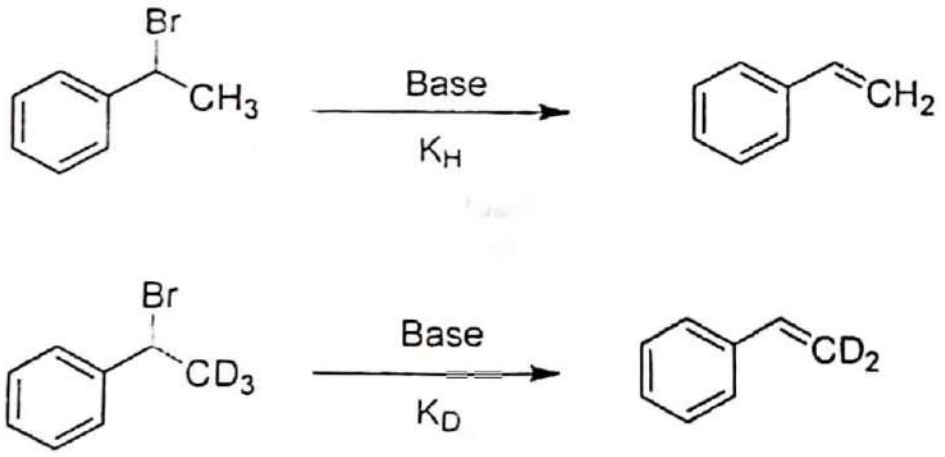
70. Assuming both the reactions as E1, where will the expected ratios between K_H/K_D lies between?



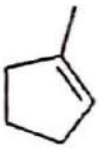
(A) 1

(B) Between 4 and 5

(C) 0

(D) Between 10 and 100

71. Identify the correct statements regarding reaction I and reaction II

I.  $\xrightarrow[2.\ NaOH,\ H_2O_2]{1.\ BH_3,\ THF}$

II.  $\xrightarrow{Br_2,\ CCl_4}$

(A) I and II are regioselective reactions.

(B) I and II are stereoselective reactions.

(C) I is stereo selective while II is regioselective

(D) Only I is stereoselective reaction.

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72. The pH of a salt of weak acid with weak base is given by the expression if K_w, K_a and K_b are the dissociation constants of water, weak acid and weak base respectively :

(A) $pH = \frac{1}{2} (pK_w + pK_a + pK_b)$

(B) $pH = \frac{1}{2} (pK_w - pK_a - pK_b)$

(C) $pH = \frac{1}{2} (pK_w + pK_a - pK_b)$

(D) $pH = \frac{1}{2} (pK_a + pK_b - pK_w)$

73. Which of the following reactions are disproportionation reactions?

i) $2MnO^-_4 + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^+$

ii) $2KMnO^-_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$

iii) $Cl_2 + 2NaOH \rightarrow NaCl + NaOCl + H_2O$

(A) i & ii (B) ii & iii

(C) ii only (D) iii only

74. Number of ions produced from the complex $[Co(NH_3)_6]Cl_3$ in solution are

(A) 2 (B) 3

(C) 4 (D) 5

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75. Nicotinic acid (K_a = 1.4 x 10^{-5} M) is represented by HNic. The % dissociation in a solution will be if it contained 0.1 mole of nicotinic acid per litre of solution:

(A) 1.673 (B) 4

(C) 6.673 (D) 10

76. Molar heat capacity of water in equilibrium with ice at constant pressure is

(A) 0 (B) ∞

(C) 40.45 kJ $K^{-1}mol^{-1}$ (D) 75.48 kJ $K^{-1}mol^{-1}$ ans B

77. Spontaneous adsorption of a gas on solid surface is an exothermic process because

(A) ΔH increases for system (B) ΔS increases for gas

(C) ΔS decreases for gas (D) ΔG increases for gas

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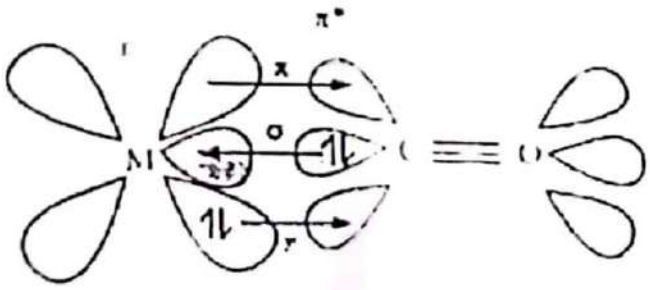
78. Consider the following figure, which type of bond formed between metal and ligand



(A) π- bond (B) σ-bond

(C) Synergic bond (D) δ-bond

79. Among the following, the correct statement is

(A) Boiling point, $PH_3 < AsH_3 < NH_3 < SbH_3$

(B) Acidic strength, $HOCl > HOClO > HOClO_2 > HOClO_3$

(C) Ionic character, $HI > HBr > HCl > HF$

(D) Ionic size, $Na^+ > Mg^{2+} > F^- > Al^{3+}$

80. Which of the following reaction involve ylide intermediate?

(A) Wittig reaction (B) Aldol reaction

(C) Cannizaro reaction (D) Perkin reaction

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81. The solubility of the sparingly soluble salt (LxMy) is 'S'. The solubility product (K_{sp}) of this salt is:

(A) S^{xy} (B) S^{x+y}

(C) $X^x Y^y S^{xy}$ (D) $X^x Y^y S^{x+y}$

82. An azeotropic mixture is a:

(A) constant vapour pressure mixture

(B) constant volume mixture

(C) constant temperature mixture

(D) constant boiling mixture

83. The formula of Caro's acid, Marshall's acid and oleum, respectively is

(A) H_2SO_4, H_2SO_5 and $H_2S_4O_6$

(B) H_2SO_5, $H_2S_2O_6$and $H_2S_2O_7$

(C) H_2SO_5, $H_2S_2O_7$ and $H_2S_2O_8$

(D) $H_2S_2O_3$, $H_2S_2O_6$and $H_2S_2O_7$

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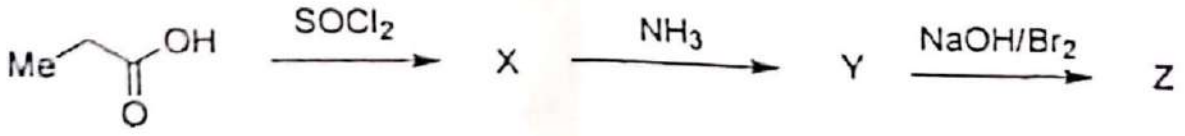
84. Starting from propanoic acid, the following reactions were carried out, what is the compound Z?



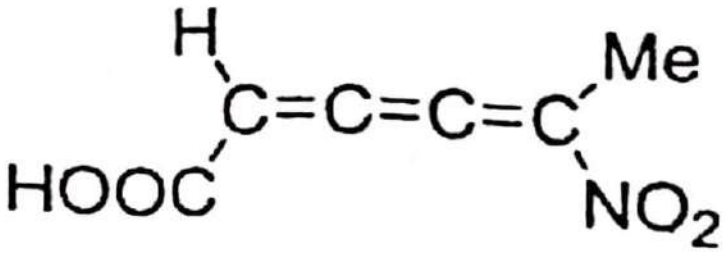
(A) Propyl amine

(B) Ethylamine

(C) Propenamide

(D) Butanoic acid

85. The following molecule has



(A) Plane of symmetry

(B) Centre of symmetry

(C) Chiral axis

(D) Chiral centre

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86. Which of the following compounds has the smallest bond angle?

(A) H_2O

(B) H_2S

(C) NH_3

(D) SO_2

87. Which of the following has tendency to act as oxidising agent?

(A) Lu^{3+}

(B) Gd^{3+}

(C) Ce^{4+}

(D) Sm^{2+}

88. Which type of amine is produced by reaction of ketones with primary amines, followed by reduction?

(A) Chiral amines (B) N-substituted amines

(C) N, N- di substituted amines (D) Primary amines

89. The copper in toxic proportion in the animals and plants will be removed by the following

(A) D-penicillamine (B) Glycine

(C) Desferrioxime (D) Oxaplatin

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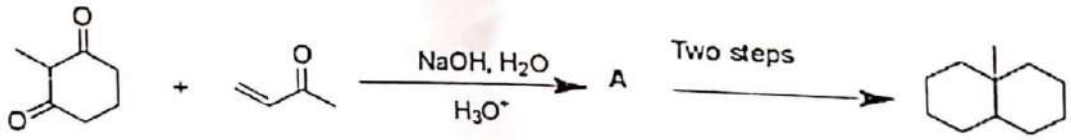
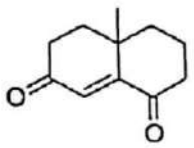
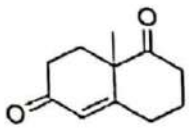
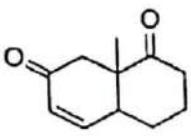
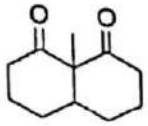
90. The intermediate compound A in the following transformation is



(A) 

(B) 

(C) 

(D) 

91. The ionic mobility of alkali metal ions in aqueous solution is maximum for

(A) K^+

(B) Rb^+

(C) Li^+

(D) Na^+

92. Which of the following sets of quantum numbers is correct for an electron in 5d orbital?

(A) $n = 5, I = 3, m_l = +1, m_s = + ½$

(B) $n = 5, I = 1, m_l = -1, m_s = + ½$

(C) $n = 5, I = 2, m_l, = +2, m_s = + ½$

(D) $n = 5, I = 4, m_l = -3, m_s = - ½$

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93. Which of the following interstitial hydride is

(A) NaH

(B) NH_3

(C) CaH_2

(D) LaH

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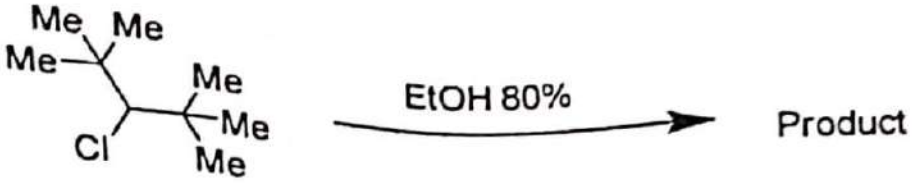
94. What is not true about below reaction?



(A) Major product is given by S_N1 reaction

(B) Major product is given by S_N2 reaction

(C) The predominant product formation also involve rearrangement

(D) Major product is given by E2 reaction

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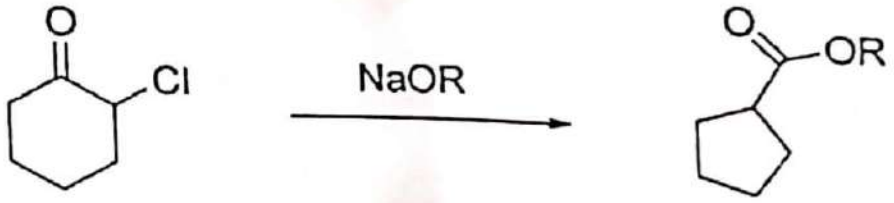
95. Following reaction is an example of



(A) Pummerer rearrangement (B) Favorskii rearrangement

(C) Shapiro reaction (D) Curtius rearrangement

96. In which of the following molecules are all the bonds not equal

(A) ClF_3

(B) BF_3

(C) AlF_3

(D) NF_3

97. The geometrical structure of $[PCl_4]^+$ and $[PCl_6]^-$ ions are

(A) Both octahedral

(B) Tetrahedral and octahedral respectively

(C) Octahedral and tetrahedral respectively

(D) Both tetrahedral

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98. Compound X reacts with HI. The product of this reaction, when treated with KOH in ethanol, gives Y (an isomer of X). Ozonolysis of Y (H_2O_2 workup) produces two compounds: a two carbon carboxylic acid, and a four carbon ketone. What is X?

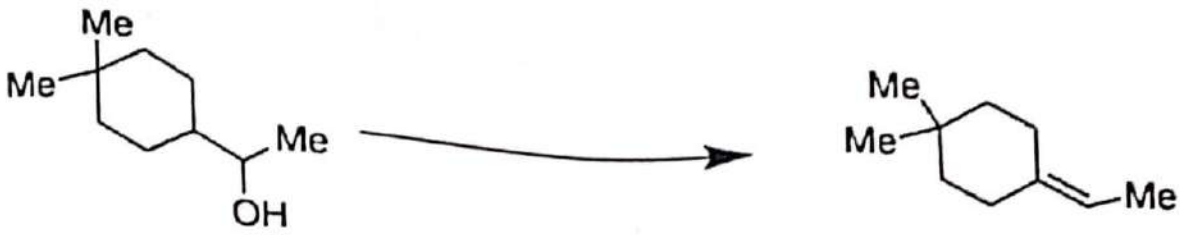
(A) 2-methyl-2-pentene

(B) 4-methyl-1-pentene

(C) 2, 3 -dimethyl-2-butene

(D) 3-methyl-1-pentene

99. Which reagent(s) would best accomplish the following transformation?



(A) H_3O^+ & heat

(B) (i) $HgSO_4$ in H_2O (ii) $NaBH_4$

(C) (i) B_2H_6 in ether (ii) H_2O_2 and base

(D) (i) HOBr, (ii) Mg in ether

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New Delhi

100. Which of the following organic halides will undergo an E2 elimination on heating with KOH in alcohol?

(A) 2, 2-dimethyl-1-bromopropane

(B) 2, 2-dimethyl-1-bromocyclohexane

(C) Benzyl chloride

(D) 2, 5-dimethyl-1-bromobenzene