

80 previous-year questions, questions only — solve them first. The official answer key is on the last page.

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NSEC 2011

Time: 120 minutes · Maximum marks: 240 · Questions: 80

1. The number of water molecules present in 0.20 g sample of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ (molar mass = 249.7) is -

(A) 1.2×10^{21} (B) 2.14×10^{21}
(C) 2.14×10^{22} (D) 1.2×10^{23}

[3 marks, -1 for a wrong answer]

2. The group that has the species correctly listed in the order of decreasing radius is -

(A) Cu^{2+} , Cu^+ , Cu (B) V , V^{2+} , V^{3+}
(C) F^- , Br^- , I^- (D) B , Be , Li

[3 marks, -1 for a wrong answer]

3. The number of isomers of dibromobiphenyl (Biphenyl = $\text{C}_6\text{H}_5-\text{C}_6\text{H}_5$) is -

(A) 8 (B) 10
(C) 12 (D) 14

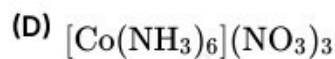
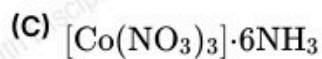
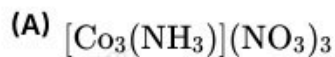
[3 marks, -1 for a wrong answer]

4. The enthalpies of decomposition of methane (CH_4)(g) and ethane (C_2H_6)(g) are 400 and 670 kJ mol^{-1} , respectively. The $\Delta H_{\text{C-C}}$ in kJ mol^{-1} is -

(A) 270 (B) 70
(C) 200 (D) 240

[3 marks, -1 for a wrong answer]

5. The correct formula for hexaaminecobalt (III) nitrate is -



[3 marks, -1 for a wrong answer]

6. For the reaction $\text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g}) \rightleftharpoons \text{PCl}_5(\text{g})$, K_c is 26 at 250°C . K_p at the same temperature is - (

$R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)

(A) 4.6×10^{-3}

(B) 5.7×10^{-3}

(C) 6.0×10^{-3}

(D) 8.3×10^{-3}

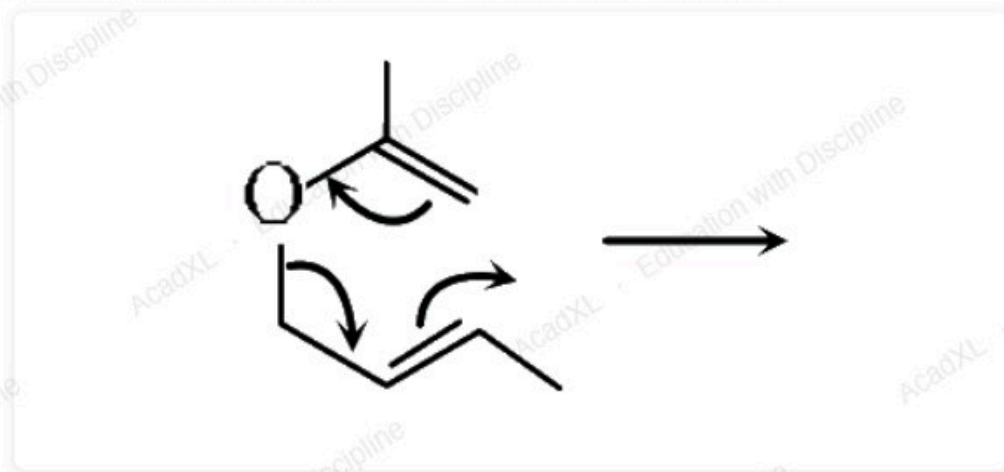
[3 marks, -1 for a wrong answer]

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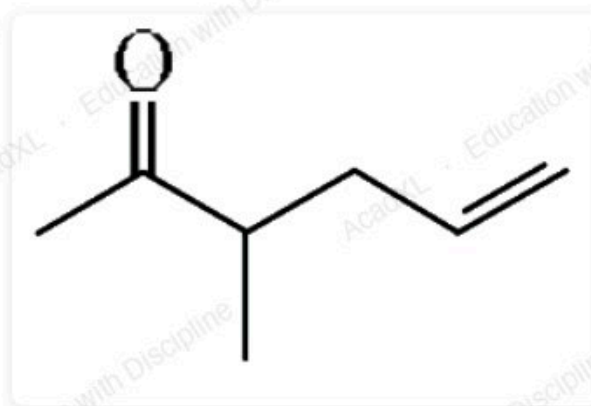
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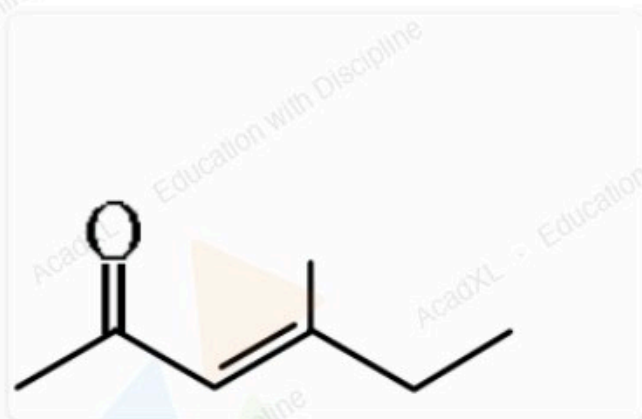
7. Curved arrows are used in Organic chemistry to show the movements of electrons in the mechanism of a reaction. The correct product of the following reaction is -



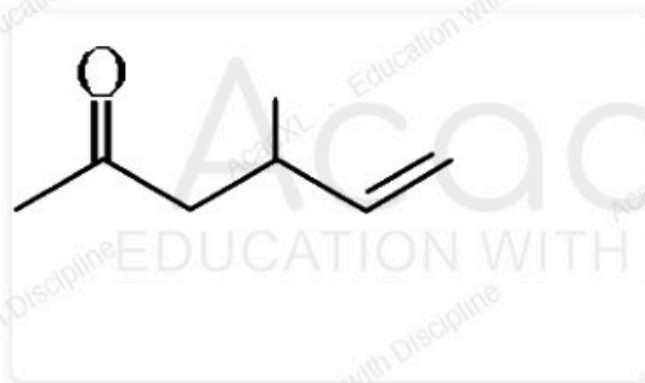
(A)



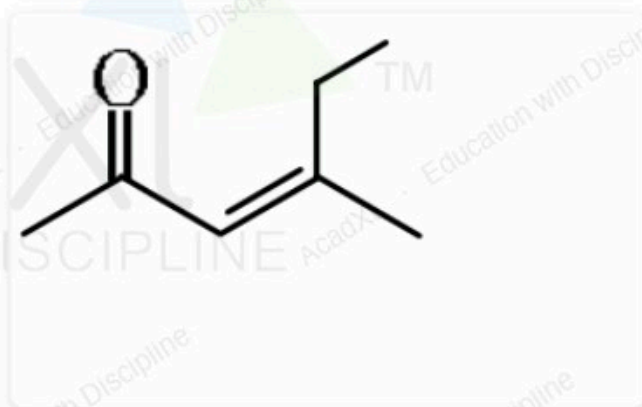
(B)



(C)



(D)



[3 marks, -1 for a wrong answer]

8. Denaturation of protein due to change in pH could be due to -

(A) loss of van der Waal's interaction

(B) hydrophobic interaction

(C) change in ionic interaction

(D) breaking of covalent bonds

[3 marks, -1 for a wrong answer]

9. The initial activity of a radionuclide is 9750 counts per min and 975 counts after 5 min. The decay constant of the radionuclide in min^{-1} is about -

(A) 0.23

(B) 0.46

(C) 0.69

(D) 0.99

[3 marks, -1 for a wrong answer]

10. According to VSEPR theory the shape of IF_5 molecule will be -

(A) tetrahedral

(B) trigonal bipyramid

(C) square pyramid

(D) trigonal planar

[3 marks, -1 for a wrong answer]

11. The formal charges on the atoms underlined are - $\text{C}_6\text{H}_5-\underline{\text{C}}\equiv\underline{\text{N}}-\underline{\text{O}}$

(A) $\text{C} = 0, \text{N} = -1, \text{O} = +1$

(B) $\text{C} = -1, \text{N} = +1, \text{O} = -1$

(C) $\text{C} = 0, \text{N} = +1, \text{O} = -1$

(D) $\text{C} = +1, \text{N} = 0, \text{O} = -1$

[3 marks, -1 for a wrong answer]

12. The number of α -particles emitted per second by a radioactive element reduces to 6.25% if the original value is 48 days. The half-life period of the element in days is -

(A) 3

(B) 8

(C) 12

(D) 16

[3 marks, -1 for a wrong answer]

13. The compound that does not have a π -bond is -

(A) SO_2

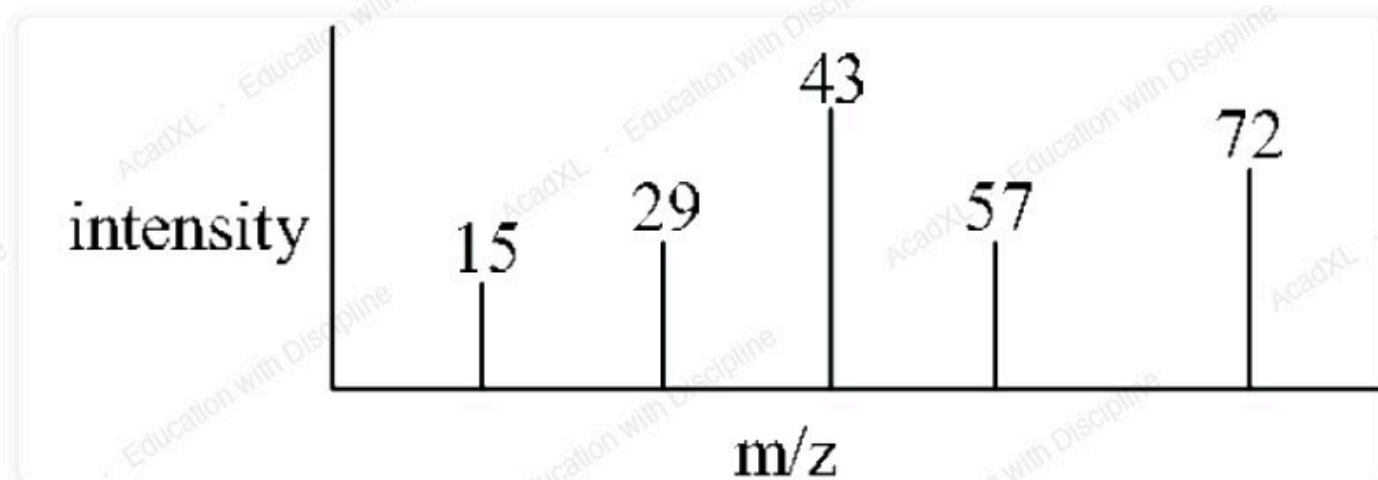
(B) SF_6

(C) O_2

(D) SO_3

[3 marks, -1 for a wrong answer]

14. In mass spectrometry a compound is bombarded with high energy electrons to break it into smaller fragments, which are recorded in the form of their masses (m/z). For example butane gives fragments like m/z 58, 43, 29, 15, etc. The mass spectrum of an unknown compound is shown below (peaks at m/z 15, 29, 43, 57, 72). The likely compound among the following is -



- (A) CH_3COCl (B) $\text{CH}_2=\text{CH}-\text{CH}_2\text{CH}_2\text{OH}$
(C) $\text{CH}_3\text{CH}_2\text{COOH}$ (D) $\text{CH}_3\text{COCH}_2\text{CH}_3$

[3 marks, -1 for a wrong answer]

15. The solubility of calcium phosphate is $S \text{ mol dm}^{-3}$. Hence, the solubility product is -

- (A) S^5 (B) $27S^3$
(C) $54S^4$ (D) $108S^5$

[3 marks, -1 for a wrong answer]

16. The number of valence electrons in an atom with the configuration $1s^2 2s^2 2p^6 3s^2 3p^2$ is -

- (A) 6 (B) 5
(C) 4 (D) 2

[3 marks, -1 for a wrong answer]

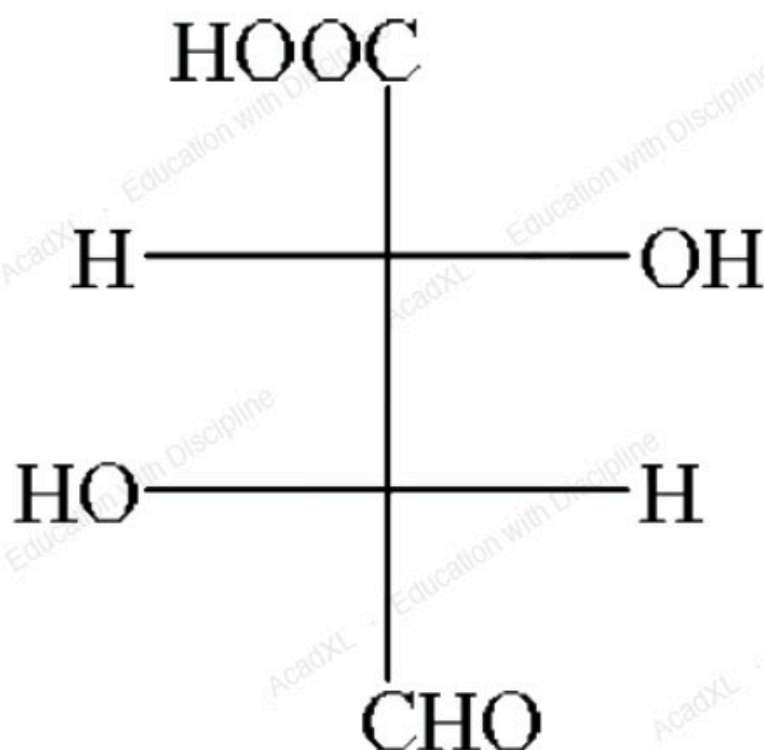
17. The elevation in boiling point of a solution containing 13.44 g of CuCl_2 in 1 kg of water is (

$$K_b = 0.52 \text{ K/kg mol}^{-1})$$

- (A) 0.05 (B) 0.10
(C) 0.16 (D) 0.21

[3 marks, -1 for a wrong answer]

18. The configuration of the carbon atoms C_2 and C_3 in the following compound are respectively -



(A) R, R

(B) S, S

(C) R, S

(D) S, R

[3 marks, -1 for a wrong answer]

19. 0.1 dm^3 of 0.1 M acetic acid is titrated against 0.1 M NaOH . When 50 cm^3 of 0.1 M NaOH are added, the pH of the solution will be ($pK_a = 4.74$)

(A) 2.37

(B) 4.74

(C) 1.34

(D) 5.74

[3 marks, -1 for a wrong answer]

20. The IUPAC name of complex $[\text{Cu}(\text{en})_2(\text{H}_2\text{O})_2]^+$ is -

(A) ethylene diamine Cu(II) dihydrate

(B) diaquobis(ethylenediamine) Cu(II) ion

(C) diaquobisdiethylamine Cu(II) ion

(D) diaquobis(ethylenediamine) cuprate (II)

[3 marks, -1 for a wrong answer]

21. Two protein molecules with the same average molecular mass (molecular weight) can absorb different amount of ultraviolet radiation due to difference in the content of -

(A) tyrosine

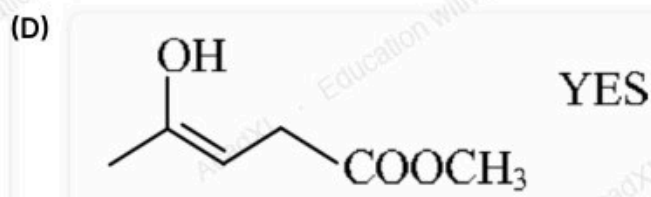
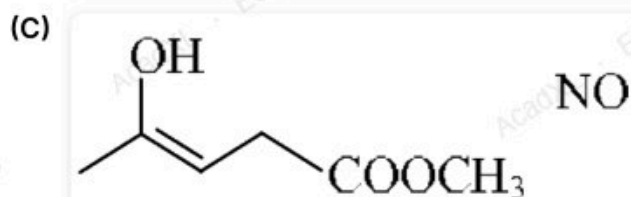
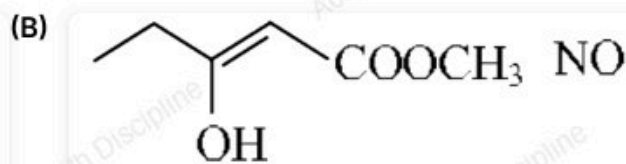
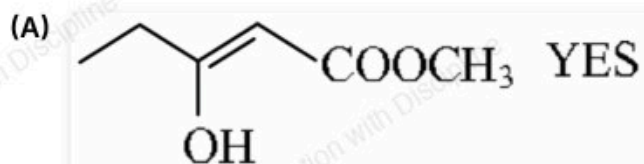
(B) glutamic acid

(C) lysine

(D) methionine

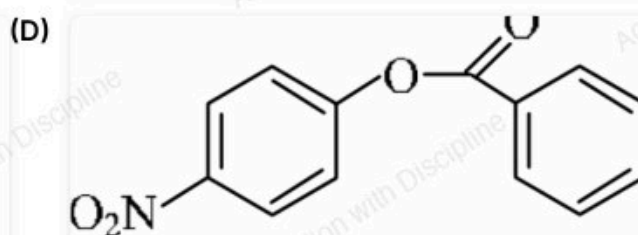
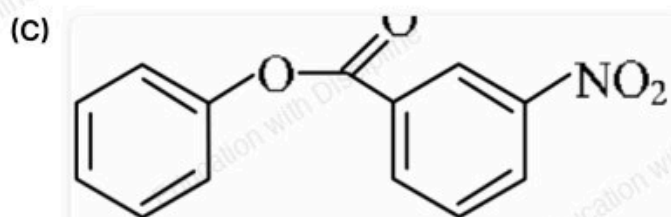
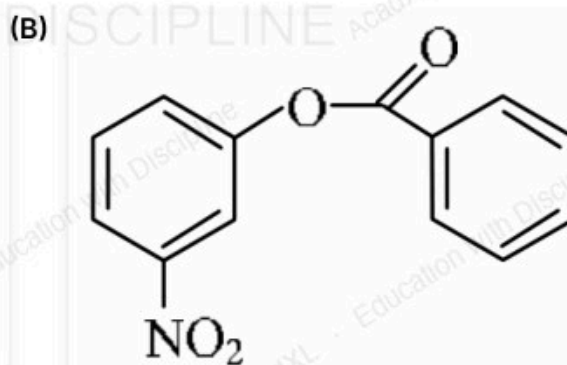
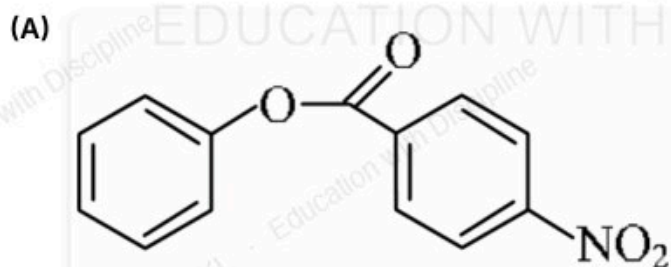
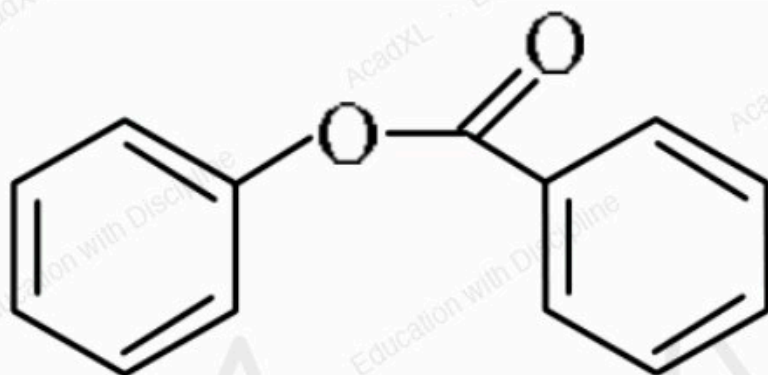
[3 marks, -1 for a wrong answer]

22. Each of the following options contains a structure and a description indicating the existence of given structure. The correct option for methyl 3-hydroxypent-2-enoate is -



[3 marks, -1 for a wrong answer]

23. Major product of mononitration of the following compound is



[3 marks, -1 for a wrong answer]

24. If $a \neq b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$, the crystal system is -

(A) monoclinic

(B) triclinic

(C) hexagonal

(D) orthorhombic

[3 marks, -1 for a wrong answer]

25. The electronic spectrum of $[\text{Ni}(\text{H}_2\text{O})_6]^{++}$ shows a band at 8500 cm^{-1} due to d-d transition.

$[\text{Ph}_4\text{As}]_2[\text{NiCl}_4]$ will have such a transition in cm^{-1} at -

(A) 3778

(B) 8500

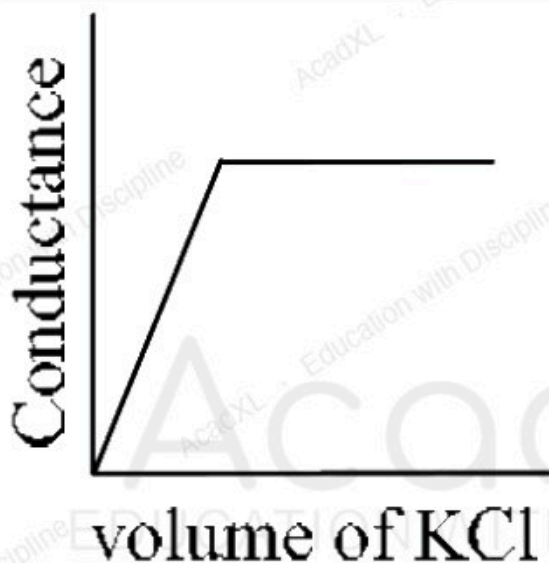
(C) 4250

(D) 850

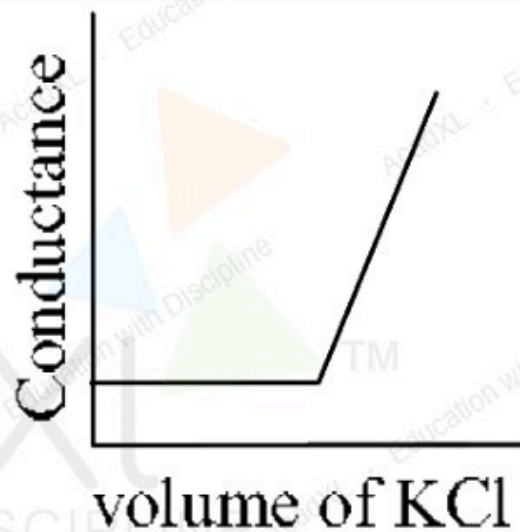
[3 marks, -1 for a wrong answer]

26. In the conductometric titration of silver nitrate against KCl, the graph obtained is -

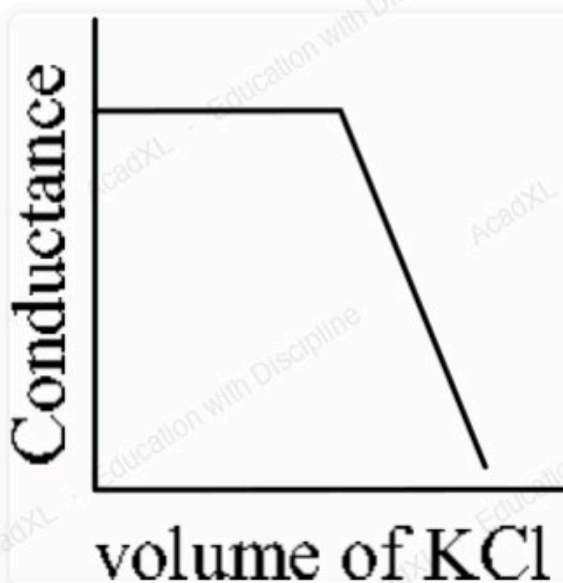
(A)



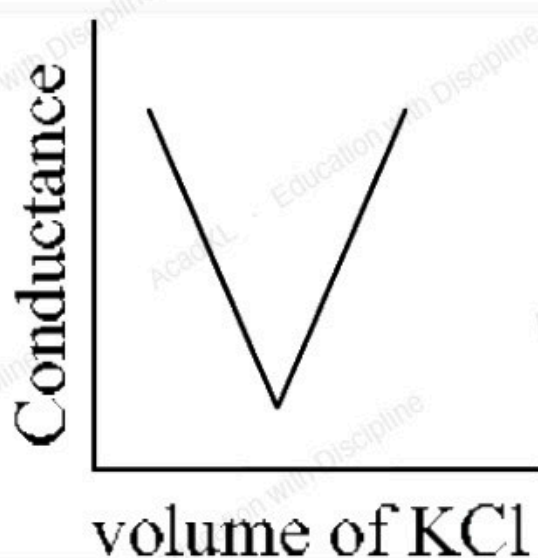
(B)



(C)

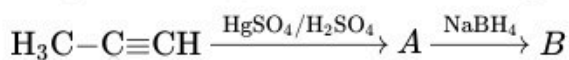


(D)



[3 marks, -1 for a wrong answer]

27. The product obtained from the following sequence of reactions is -



(A) propanal

(B) 2-propanol

(C) 1-propanol

(D) propane

[3 marks, -1 for a wrong answer]

28. The compound in which Mn has oxidation state of +3 is

(A) KMnO_4

(B) $\text{K}_2[\text{Mn}(\text{CN})_6]$

(C) MnSO_4

(D) $\text{CsMn}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$

[3 marks, -1 for a wrong answer]

29. The SI units of viscosity is

(A) Nsm^2

(B) Ns^2m

(C) Nsm^{-2}

(D) Ns^{-2}m

[3 marks, -1 for a wrong answer]

30. If titration of an amino acid present in the solution yielded pI (isoelectric point) value of 10.80, the amino acid present in the solution may be

(A) glycine

(B) arginine

(C) histidine

(D) proline

[3 marks, -1 for a wrong answer]

31. In the coordination compound, $\text{Na}_2[\text{Pt}(\text{CN})_4]$, the Lewis acid is -

(A) $[\text{Pt}(\text{CN})_4]^{2-}$

(B) Na^+

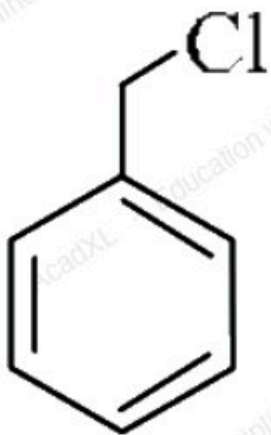
(C) Pt^{2+}

(D) CN^-

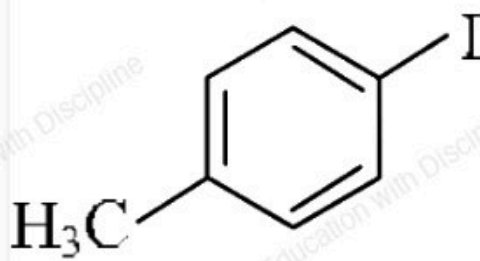
[3 marks, -1 for a wrong answer]

32. The product (P) of the following reaction is (toluene + $\text{ICl} \xrightarrow{\text{Lewis acid}} P$)

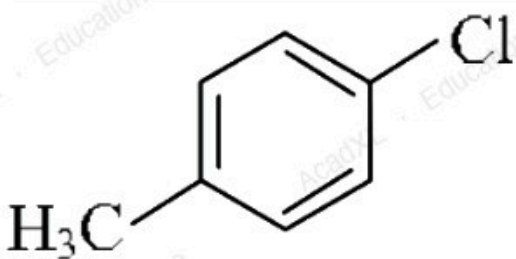
(A)



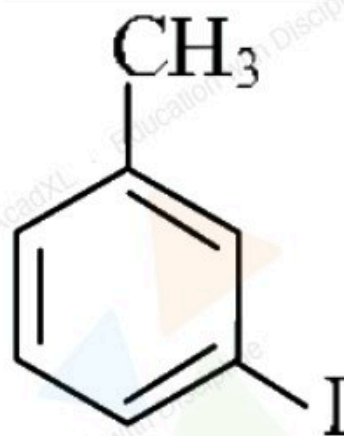
(B)



(C)

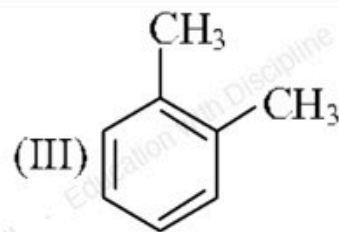
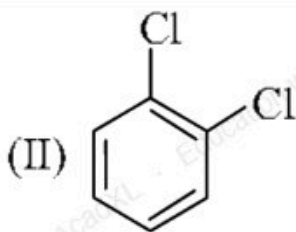
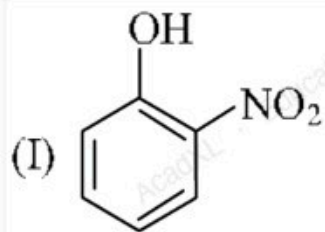


(D)



[3 marks, -1 for a wrong answer]

33. The correct order of dipole moment for the following molecules is - (I) 2-nitrophenol, (II) 1,2-dichlorobenzene, (III) 1,2-dimethylbenzene (o-xylene)



(A) $I = II = III$

(B) $I < II < III$

(C) $I > II > III$

(D) $II < III < I$

[3 marks, -1 for a wrong answer]

34. Lead dissolves most readily in dilute -

(A) acetic acid

(B) sulphuric acid

(C) phosphoric acid

(D) sodium hydroxide

[3 marks, -1 for a wrong answer]

35. The degrees of freedom for the system $\text{CaCO}_3(\text{s}) \rightleftharpoons \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$ are -

- (A) 1 (B) 2
(C) 3 (D) 4

[3 marks, -1 for a wrong answer]

36. Semipermeable nature of the cell membrane can be attributed to the presence of -

- (A) protein and DNA (B) lipid and protein
(C) polysaccharide and lipid (D) DNA and lipid

[3 marks, -1 for a wrong answer]

37. The emf of the cell $(\text{Zn} | \text{ZnSO}_4 (0.1\text{M}) || \text{CdSO}_4 (0.01\text{M}) | \text{Cd})$ is ($E^\circ_{\text{Zn}^{2+}|\text{Zn}} = -0.76 \text{ V}$,

$E^\circ_{\text{Cd}^{2+}|\text{Cd}} = 0.40 \text{ V}$ at 298 K)

- (A) +0.33 V (B) +0.36 V
(C) +1.13 V (D) -0.36 V

[3 marks, -1 for a wrong answer]

38. The nitrogen compound formed when $\text{Ca}(\text{CN})_2$ reacts with steam or hot water is

- (A) N_2O (B) NO
(C) NO_2 (D) NH_3

[3 marks, -1 for a wrong answer]

39. The order of acidities of the H-atoms underlined in the following compounds is in the order - (I)

$\text{Ph}-\underline{\text{CH}_2}-\text{CH}_3$ (II) $\text{Ph}-\text{C}\equiv\underline{\text{CH}}$ (III) $\text{Ph}-\text{CH}=\underline{\text{CH}_2}$ (IV) cyclopentadiene ($\underline{\text{CH}_2}$)



- (A) $IV > II > I > III$ (B) $II > IV > III > I$
(C) $III > IV > I > II$ (D) $I > III > II > IV$

[3 marks, -1 for a wrong answer]

40. The half time for a second order reaction with equal concentrations of the reactants is 35 seconds.

99% reaction will be completed in

(A) 69 s

(B) 138 s

(C) 1733 s

(D) 3465 s

[3 marks, -1 for a wrong answer]

41. The 'd' orbitals will be split under square planar geometry into -

(A) two levels

(B) three levels

(C) four levels

(D) five levels

[3 marks, -1 for a wrong answer]

42. Rotational spectra of molecules are observed in -

(A) UV region

(B) Visible region

(C) Near infrared region

(D) Far infrared region

[3 marks, -1 for a wrong answer]

43. The pair of cations which **cannot** be separated by H_2S in a 0.3 N acid solution is -

(A) Al^{+++} , Hg^{++}

(B) Bi^{+++} , Pb^{++}

(C) Zn^{++} , Cu^{++}

(D) Ni^{++} , Cd^{++}

[3 marks, -1 for a wrong answer]

44. Structural features of proteins secreted outside the cells may be stabilised by presence of -

(A) hydrogen bond

(B) disulfide bond

(C) hydrophobic force

(D) phospho-diester bond

[3 marks, -1 for a wrong answer]

45. The C—O—C bond angle in dimethyl ether is -

(A) $109^\circ 28'$

(B) 110°

(C) 120°

(D) 180°

[3 marks, -1 for a wrong answer]

46. Dimethyl glyoxime forms a square planar complex with Ni^{2+} . This complex should be

(A) diamagnetic

(B) paramagnetic having 1 unpaired electron

(C) paramagnetic having 2 unpaired electrons

(D) ferromagnetic

[3 marks, -1 for a wrong answer]

47. A 0.056 M solution of benzoic acid, $\text{C}_6\text{H}_5\text{COOH}$, is titrated with a strong base. $[\text{H}^+]$ of the solution when half of the solution is titrated before the equivalence point is (K_a of benzoic acid = 6.3×10^{-5})

(A) $6.3 \times 10^{-5} \text{ M}$

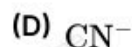
(B) $1.8 \times 10^{-3} \text{ M}$

(C) $7.9 \times 10^{-3} \text{ M}$

(D) $2.6 \times 10^{-2} \text{ M}$

[3 marks, -1 for a wrong answer]

48. The formula of the isothiocyanate ion is -



[3 marks, -1 for a wrong answer]

49. The compound that is chiral is -

(A) 3-methyl-3-hexene

(B) 4-chloro-1-methylcyclohexane

(C) 2-phenylpentane

(D) 1, 3-diisopropylbenzene

[3 marks, -1 for a wrong answer]

50. The monomer/s of the following polymer is/are



(A) ethylene

(B) propylene

(C) 2-butene

(D) ethylene + propylene

[3 marks, -1 for a wrong answer]

51. Of the interhalogen compounds, ClF_3 is more reactive than BrF_3 , but BrF_3 has higher conductance in the liquid state. The reason is that

(A) BrF_3 has higher molecular weight

(B) ClF_3 is volatile

(C) BrF_3 dissociates into BrF_2^- and BrF_4^- more easily

(D) ClF_3 is most reactive

[3 marks, -1 for a wrong answer]

52. An element X is found to combine with oxygen to form X_4O_6 . If 8.40 g of this element combine with 6.50 g of oxygen, the atomic weight of the element in grams is -

(A) 24.0

(B) 31.0

(C) 50.4

(D) 118.7

[3 marks, -1 for a wrong answer]

53. Synthesis of RNA in a cell would be affected adversely due to shortage of

- (A) sulfate (B) acetate
(C) oxalate (D) phosphate

[3 marks, -1 for a wrong answer]

54. The most abundant element in the earth's crust is -

- (A) aluminium (B) oxygen
(C) silicon (D) iron

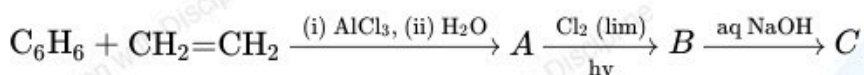
[3 marks, -1 for a wrong answer]

55. A beaker is heated from 27°C to 127°C , the percentage of air originally present in beaker that is expelled is

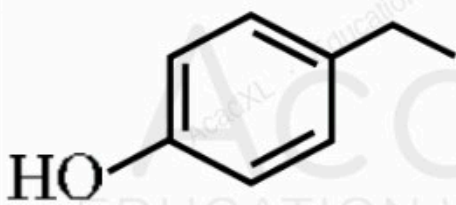
- (A) 50% (B) 25%
(C) 33% (D) 40%

[3 marks, -1 for a wrong answer]

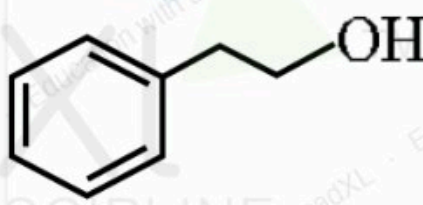
56. The product (C) of the following sequence of reactions is



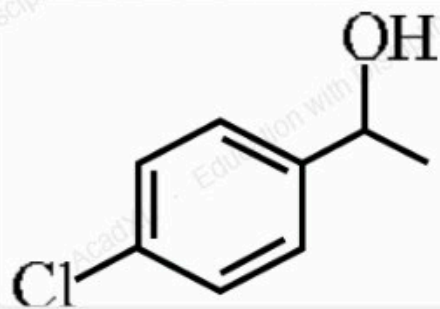
(A)



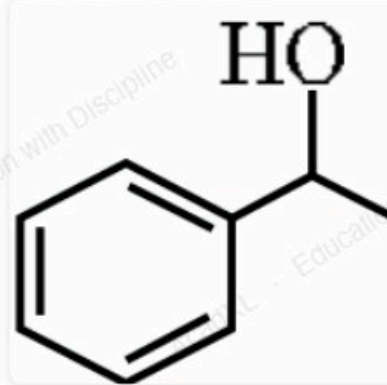
(B)



(C)



(D)



[3 marks, -1 for a wrong answer]

57. The strongest, but the most reactive bond among the following is -

- (A) $\text{C}=\text{N}$ (B) $\text{C}=\text{C}$
(C) $\text{C}\equiv\text{C}$ (D) $\text{C}=\text{O}$

[3 marks, -1 for a wrong answer]

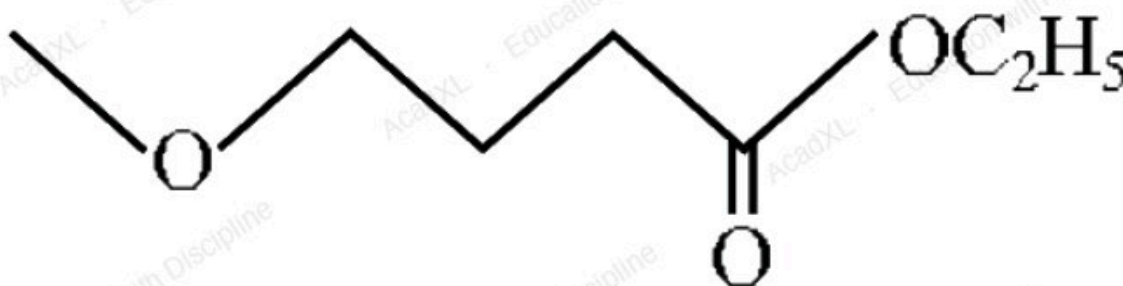
58. Radioactive inert gas is -

- (A) technetium
(C) xenon

- (B) radon
(D) curium

[3 marks, -1 for a wrong answer]

59. The IUPAC name of the following compound is -



- (A) 3-methoxy ethylpropanoate
(C) 1, 4-diethoxybutane

- (B) ethyl 4-methoxybutanoate
(D) ethoxy 3-methoxybutyrate

[3 marks, -1 for a wrong answer]

60. Excess of silver nitrate is added to a water sample to determine the amount of chloride ion present in the sample. 1.4 g of silver chloride is precipitated. The mass of chloride ion present in the sample is.

Molar masses (g mol^{-1}): AgNO_3 169.91, AgCl 143.25

- (A) 0.25 g
(C) 0.50 g

- (B) 0.35 g
(D) 0.75 g

[3 marks, -1 for a wrong answer]

61. The best nucleophile among the following is -

- (A) H_2O
(C) Cl^-

- (B) CH_3SH
(D) NH_3

[3 marks, -1 for a wrong answer]

62. The wavelength of a moving body mass 0.1 mg is 3.31×10^{-29} m. The kinetic energy of the body in J would be -

- (A) 2.0×10^{-6}
(C) 4.0×10^{-3}

- (B) 1.0×10^{-3}
(D) 2.0×10^{-3}

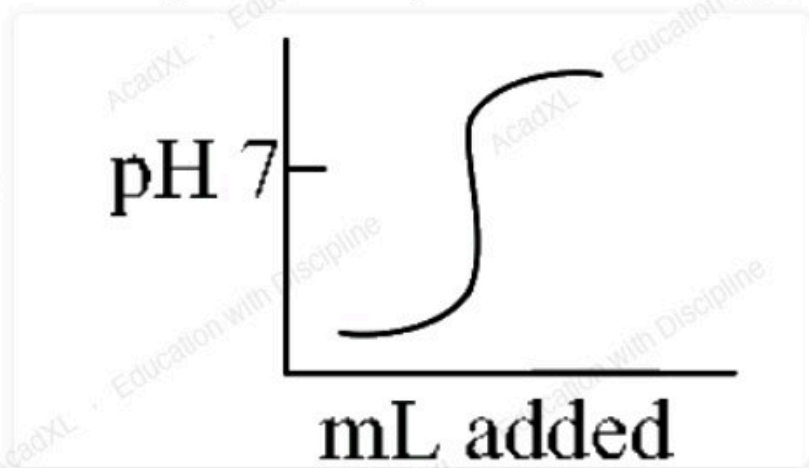
[3 marks, -1 for a wrong answer]

63. Secondary structures could be formed in nucleic acid similar to protein due to formation of -

- (A) covalent bond
- (B) ionic bond
- (C) co-ordinate bond
- (D) hydrogen bond

[3 marks, -1 for a wrong answer]

64. The following titration curve represents the titration of a {}_____ acid with a {}_____ base -



- (A) strong, strong
- (B) weak, strong
- (C) strong, weak
- (D) weak, weak

[3 marks, -1 for a wrong answer]

65. The element with the lowest electronegativity is -

- (A) S
- (B) I
- (C) Ba
- (D) Al

[3 marks, -1 for a wrong answer]

66. Oxalic acid, $\text{H}_2\text{C}_2\text{O}_4$, reacts with permanganate ion according to the balanced equation

$5\text{H}_2\text{C}_2\text{O}_4(\text{aq}) + 2\text{MnO}_4^-(\text{aq}) + 6\text{H}^+(\text{aq}) \rightleftharpoons 2\text{Mn}^{2+}(\text{aq}) + 10\text{CO}_2(\text{g}) + 8\text{H}_2\text{O}(\text{l})$. The volume in mL of 0.0162 M KMnO_4 solution required to react with 25.0 mL of 0.022 M $\text{H}_2\text{C}_2\text{O}_4$ solution is-

- (A) 13.6
- (B) 18.5
- (C) 33.8
- (D) 84.4

[3 marks, -1 for a wrong answer]

67. The element that has the highest tendency to catenate is -

- (A) silicon
- (B) germanium
- (C) sulphur
- (D) boron

[3 marks, -1 for a wrong answer]

68. The isotope of carbon which is used in carbon dating (a method to estimate the age of an ancient sample containing carbon) is -

(A) carbon-12

(B) carbon-13

(C) carbon-14

(D) carbon-15

[3 marks, -1 for a wrong answer]

69. Electronic configurations for the atoms of four elements are given below. The configuration that indicates colourless aqueous solution is -

(A) 2, 8, 14, 2

(B) 2, 8, 16, 2

(C) 2, 8, 18, 2

(D) 2, 8, 13, 1

[3 marks, -1 for a wrong answer]

70. The number of stereoisomers of compound $\text{CH}_3 - \text{CH}=\text{CH} - \text{CH}(\text{Br})\text{CH}_3$ is -

(A) 2

(B) 3

(C) 4

(D) 6

[3 marks, -1 for a wrong answer]

71. At 445°C , K_c for the following reaction is 0.020. $2\text{HI}(\text{g}) \rightleftharpoons \text{H}_2(\text{g}) + \text{I}_2(\text{g})$. A mixture of H_2 , I_2 and HI in a vessel at 445°C has the following concentrations : $[\text{HI}] = 2.0 \text{ M}$, $[\text{H}_2] = 0.50 \text{ M}$, $[\text{I}_2] = 0.10 \text{ M}$.

The statement that is true concerning the reaction quotient, Q_c is -

(A) $Q_c = K_c$; the system is at equilibrium

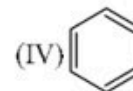
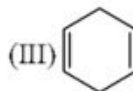
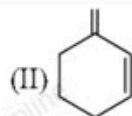
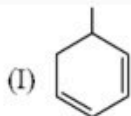
(B) Q_c is less than K_c ; more H_2 and I_2 will be produced

(C) Q_c is less than K_c ; more HI will be produced

(D) Q_c is greater than K_c ; more H_2 and I_2 will be produced

[3 marks, -1 for a wrong answer]

72. The order of decreasing stability is -



(A) $\text{IV} > \text{I} > \text{II} > \text{III}$

(B) $\text{I} > \text{IV} > \text{III} > \text{II}$

(C) $\text{I} > \text{II} > \text{IV} > \text{III}$

(D) $\text{IV} > \text{II} > \text{I} > \text{III}$

[3 marks, -1 for a wrong answer]

73. The number of amino acid residues found in a protein that is synthesized from a RNA molecule with 120 nucleotides is -

(A) 120

(B) 80

(C) 40

(D) 60

[3 marks, -1 for a wrong answer]

74. Hypochlorous acid ionizes as - $\text{HOCl}(\text{aq}) \rightleftharpoons \text{H}^+(\text{aq}) + \text{OCl}^-(\text{aq})$.

$\text{OCl}^-(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{HOCl}(\text{aq}) + \text{OH}^-(\text{aq})$. K_a for this reaction at 25°C is 3.0×10^{-8} ($K_w = 1.0 \times 10^{-14}$ at 25°C). Hence, K_h for HOCl is -

(A) 3.3×10^{-7}

(B) 3.0×10^{-8}

(C) 3.0×10^{-6}

(D) 3.3×10^{-6}

[3 marks, -1 for a wrong answer]

75. Einsteinium has 11 electrons in the 4f subshell. The number of unpaired electrons in the subshell is -

(A) 3

(B) 4

(C) 7

(D) 11

[3 marks, -1 for a wrong answer]

76. The order of reactivity of ammonia with the following compounds is - (I) $\text{CH}_2=\text{CHBr}$ (II)

$\text{CH}_3 - \text{CH}_2 - \text{COCl}$ (III) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{Cl}$ (IV) $(\text{CH}_3)_3\text{C} - \text{Br}$

(A) $\text{IV} > \text{II} > \text{I} > \text{III}$

(B) $\text{II} > \text{IV} > \text{III} > \text{I}$

(C) $\text{III} > \text{IV} > \text{II} > \text{I}$

(D) $\text{I} > \text{IV} > \text{II} > \text{III}$

[3 marks, -1 for a wrong answer]

77. The freezing point of a solution containing 8.1 g of HBr in 100 g of water, assuming the acid to be 90% ionized is [$\text{H}=1$, $\text{Br}=80$, K_f for water = $1.86 \text{ K kg mol}^{-1}$]

(A) 0.85°C

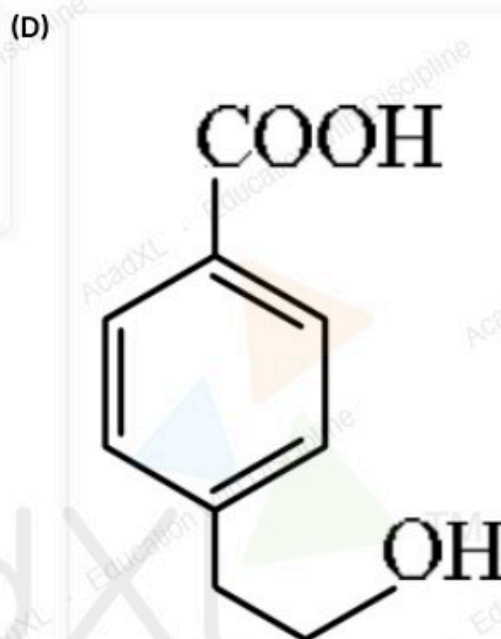
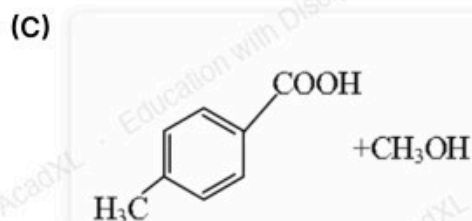
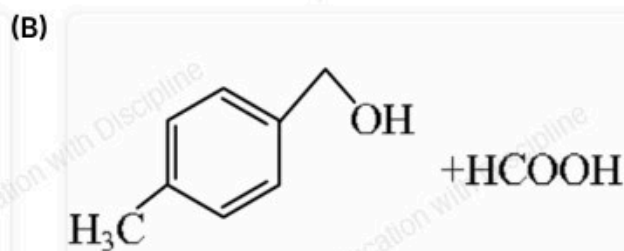
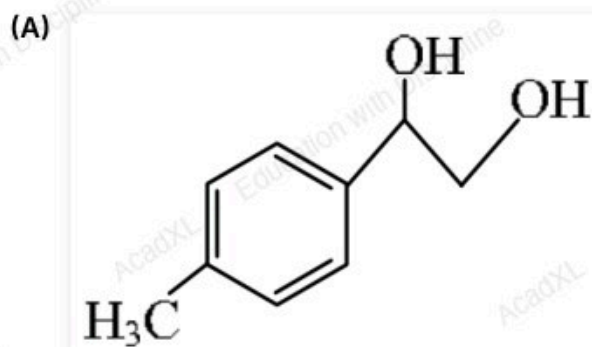
(B) -3.53°C

(C) 0°C

(D) -0.35°C

[3 marks, -1 for a wrong answer]

78. The reaction of 50% aq KOH on an equimolar mixture of 4-methylbenzaldehyde and formaldehyde followed by acidification gives -



[3 marks, -1 for a wrong answer]

79. Iodide ion is oxidized by acidified dichromate ions as shown in this equation.

$\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 9\text{I}^-(\text{aq}) + 14\text{H}^+(\text{aq}) \rightarrow 2\text{Cr}^{3+}(\text{aq}) + 3\text{I}_3^-(\text{aq}) + 7\text{H}_2\text{O}(\text{l})$. These data were obtained when the reaction was studied at a constant pH. The order of the reaction with respect to $\text{Cr}_2\text{O}_7^{2-}(\text{aq})$ and $\text{I}^-(\text{aq})$ are - Experiment 1: $[\text{Cr}_2\text{O}_7^{2-}] = 0.0050 \text{ M}$, $[\text{I}^-] = 0.0125 \text{ M}$, Rate = 0.00050 M s^{-1} ; Experiment 2: $[\text{Cr}_2\text{O}_7^{2-}] = 0.010 \text{ M}$, $[\text{I}^-] = 0.0125 \text{ M}$, Rate = 0.0010 M s^{-1} ; Experiment 3: $[\text{Cr}_2\text{O}_7^{2-}] = 0.0150 \text{ M}$, $[\text{I}^-] = 0.0250 \text{ M}$, Rate = 0.0060 M s^{-1}

- (A) first order with respect to both $\text{Cr}_2\text{O}_7^{2-}$ and I^- (B) second order with respect to both $\text{Cr}_2\text{O}_7^{2-}$ and I^-
 (C) second order with respect to $\text{Cr}_2\text{O}_7^{2-}$ and first order with respect to I^- (D) first order with respect to $\text{Cr}_2\text{O}_7^{2-}$ and second order with respect to I^-

[3 marks, -1 for a wrong answer]

80. The number of atoms per unit cell and the number of the nearest neighbours in a body centred cubic structure are -

(A) 4, 12

(B) 2, 6

(C) 9, 6

(D) 2, 8

[3 marks, -1 for a wrong answer]



Answer key

1. B	2. B	3. C	4. B	5. D	6. C
7. C	8. C	9. B	10. C	11. C	12. C
13. B	14. D	15. D	16. C	17. C	18. A
19. B	20. B	21. A	22. B	23. D	24. D
25. A	26. B	27. B	28. D	29. C	30. B
31. C	32. B	33. C	34. A	35. A	36. B
37. C	38. D	39. A	40. D	41. C	42. D
43. B	44. B	45. B	46. A	47. A	48. B
49. C	50. B	51. C	52. B	53. D	54. B
55. B	56. D	57. C	58. B	59. B	60. B
61. B	62. D	63. D	64. A	65. C	66. A
67. C	68. C	69. C	70. C	71. B	72. A
73. C	74. A	75. A	76. B	77. B	78. B
79. D	80. D				

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