

80 previous-year questions, every one with the official answer and a worked solution.

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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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

4. The enthalpies of decomposition of methane ($\text{CH}_4(\text{g})$) and ethane ($\text{C}_2\text{H}_6(\text{g})$) 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]

ANSWER: B

No solution stored for this question.

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

- (A) $[\text{Co}_3(\text{NH}_3)](\text{NO}_3)_3$ (B) $[\text{Co}_3(\text{NH}_3)_6](\text{NO}_3)_3$
(C) $[\text{Co}(\text{NO}_3)_3] \cdot 6\text{NH}_3$ (D) $[\text{Co}(\text{NH}_3)_6](\text{NO}_3)_3$

[3 marks, -1 for a wrong answer]

ANSWER: D

No solution stored for this question.

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

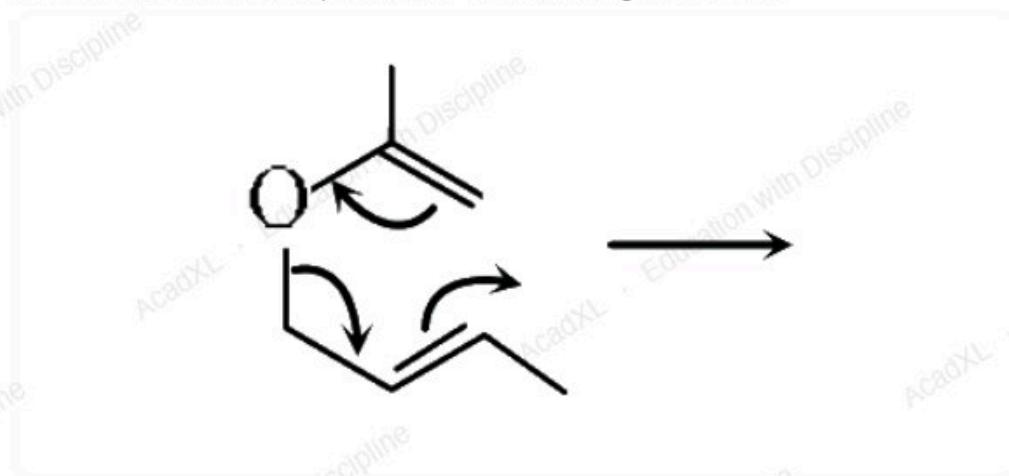
- (A) 4.6×10^{-3} (B) 5.7×10^{-3}
(C) 6.0×10^{-3} (D) 8.3×10^{-3}

[3 marks, -1 for a wrong answer]

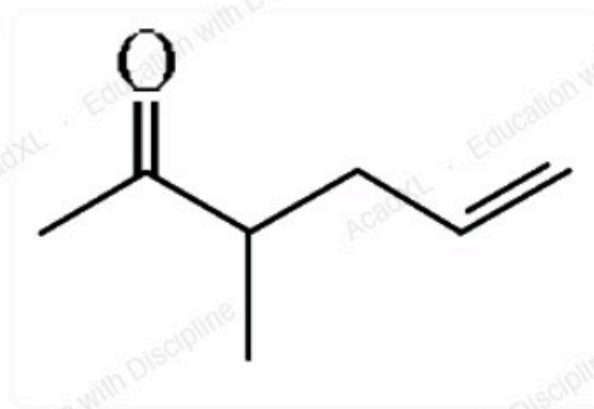
ANSWER: C

No solution stored for this question.

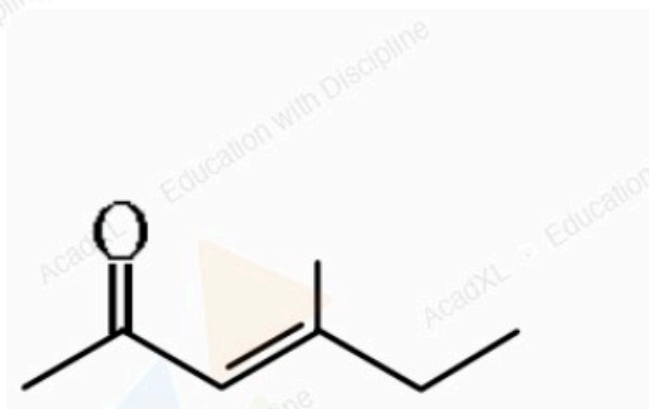
7. Curved arrows are used in Organic chemistry to show the movements of electrons in the mechanism of a reaction. The correct product of the following reaction is -



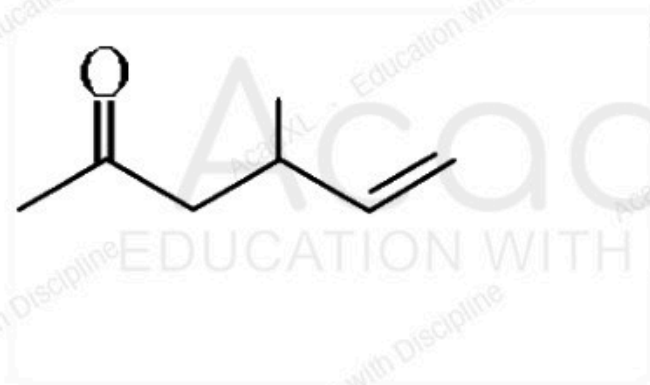
(A)



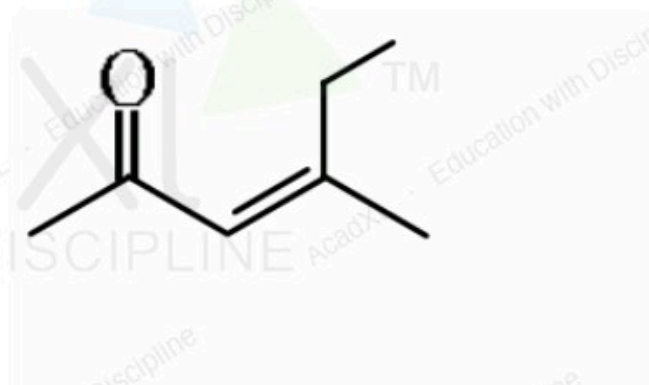
(B)



(C)



(D)



[3 marks, -1 for a wrong answer]

ANSWER: C

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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) C = 0, N = -1, O = +1 (B) C = -1, N = +1, O = -1
(C) C = 0, N = +1, O = -1 (D) C = +1, N = 0, O = -1

[3 marks, -1 for a wrong answer]

ANSWER: C

No solution stored for this question.

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 -

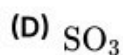
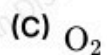
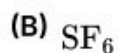
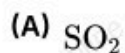
(A) 3 (B) 8
(C) 12 (D) 16

[3 marks, -1 for a wrong answer]

ANSWER: C

No solution stored for this question.

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

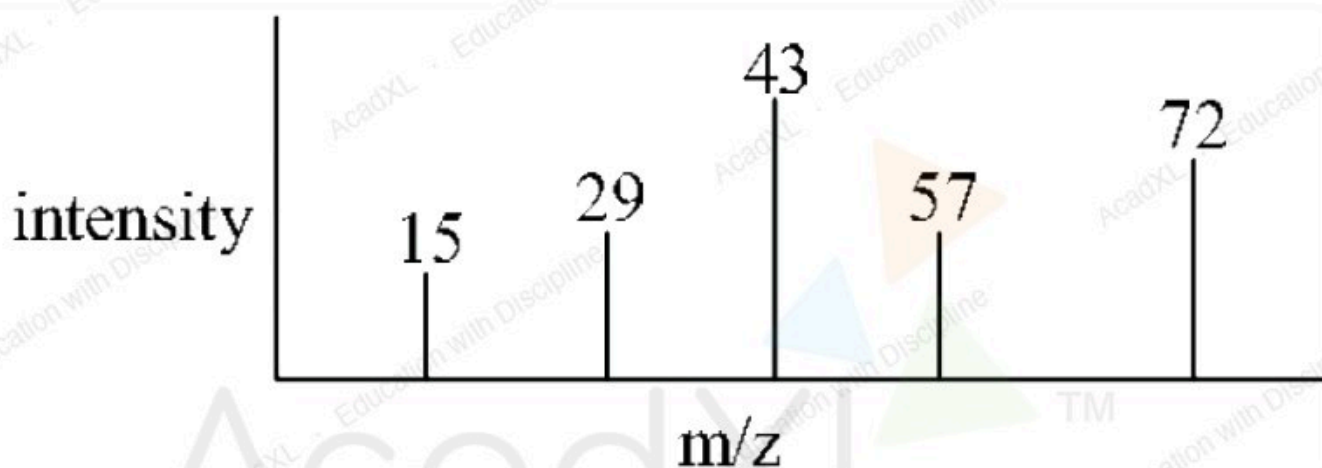


[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

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 -



[3 marks, -1 for a wrong answer]

ANSWER: D

No solution stored for this question.

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]

ANSWER: D

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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

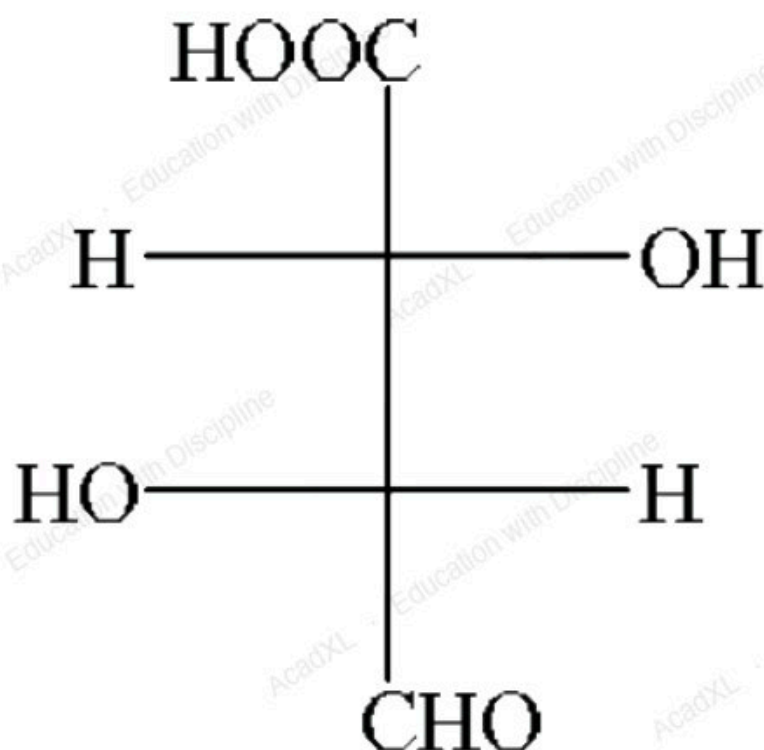
[3 marks, -1 for a wrong answer]

ANSWER: C

No solution stored for this question.

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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]

ANSWER: A

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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 -

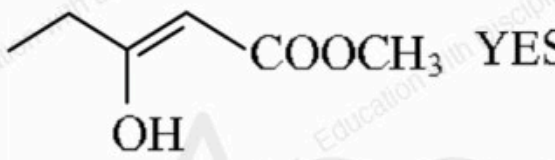
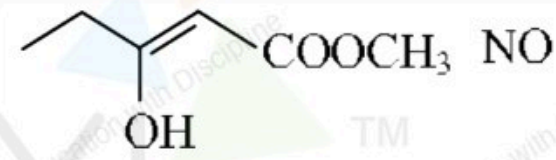
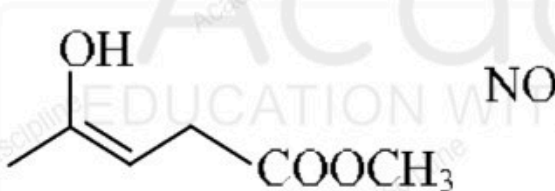
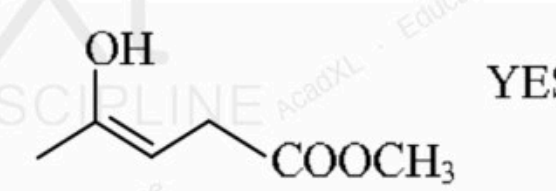
- (A) tyrosine
(B) glutamic acid
(C) lysine
(D) methionine

[3 marks, -1 for a wrong answer]

ANSWER: A

No solution stored for this question.

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 -

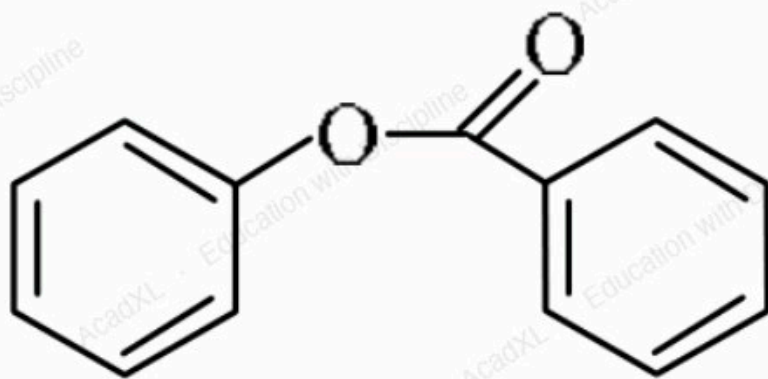
- (A)  YES
(B)  NO
(C)  NO
(D)  YES

[3 marks, -1 for a wrong answer]

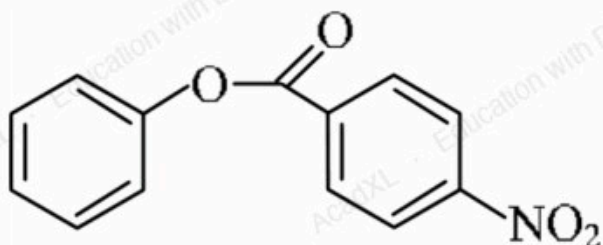
ANSWER: B

No solution stored for this question.

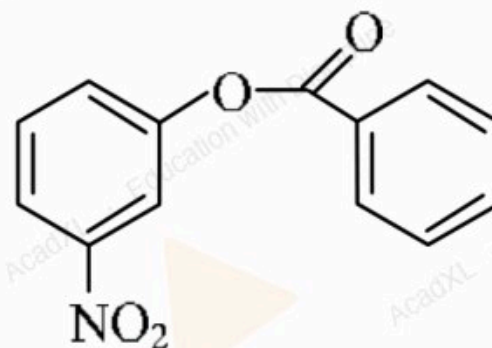
23. Major product of mononitration of the following compound is



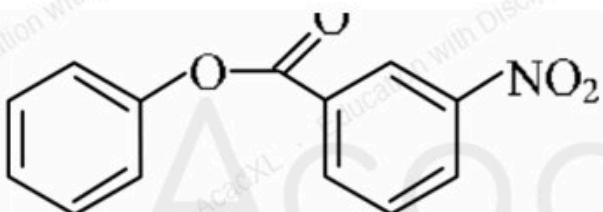
(A)



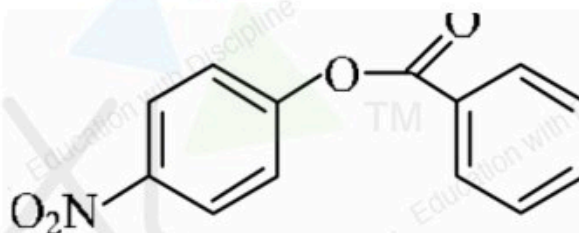
(B)



(C)



(D)



[3 marks, -1 for a wrong answer]

ANSWER: D

No solution stored for this question.

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]

ANSWER: D

No solution stored for this question.

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

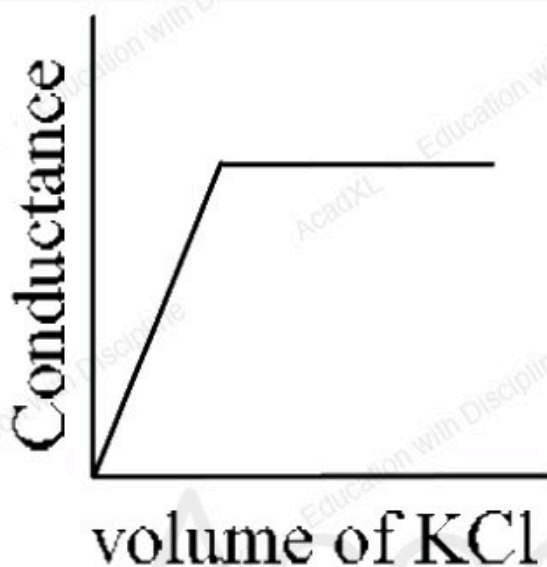
[3 marks, -1 for a wrong answer]

ANSWER: A

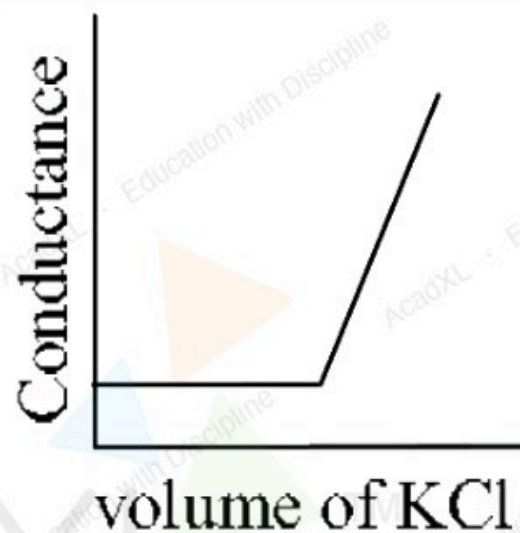
No solution stored for this question.

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

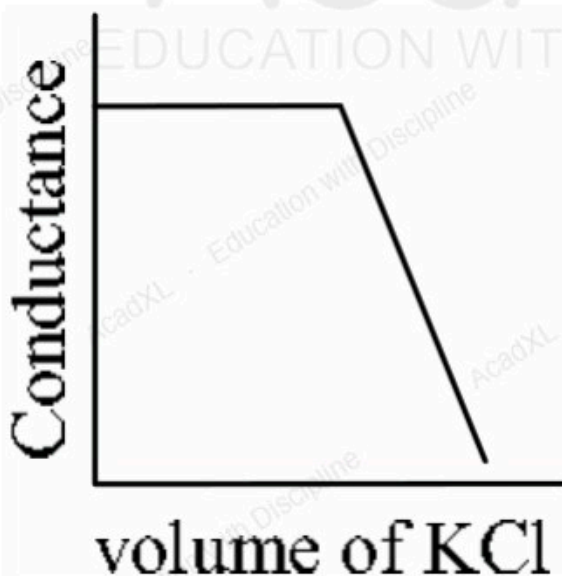
(A)



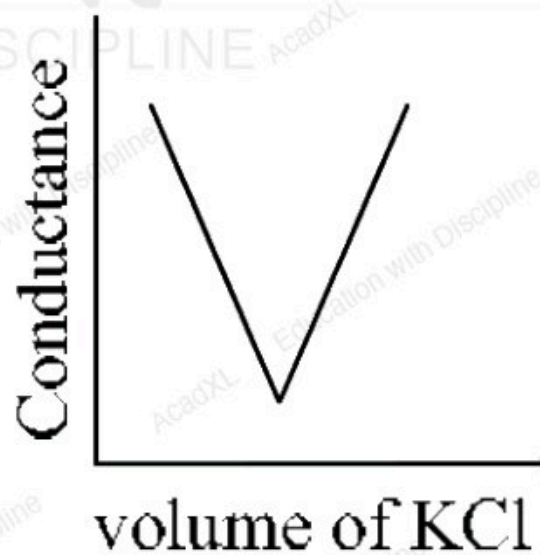
(B)



(C)



(D)

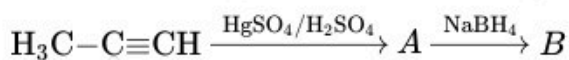


[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: D

No solution stored for this question.

29. The SI units of viscosity is

- (A) Ns m^2 (B) Ns^2m
(C) Ns m^{-2} (D) Ns^{-2}m

[3 marks, -1 for a wrong answer]

ANSWER: C

No solution stored for this question.

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

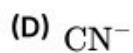
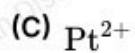
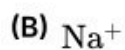
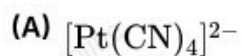
- (A) glycine (B) arginine
(C) histidine (D) proline

[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

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



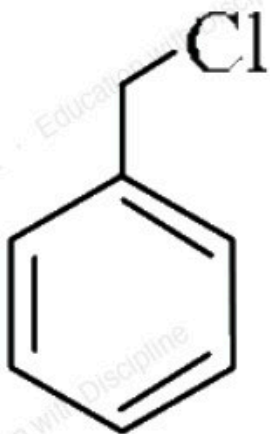
[3 marks, -1 for a wrong answer]

ANSWER: C

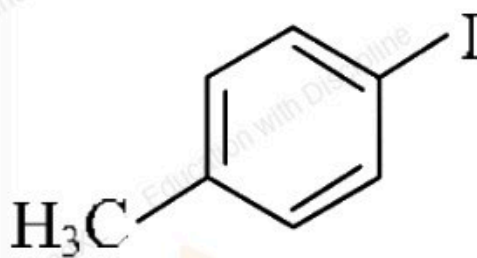
No solution stored for this question.

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

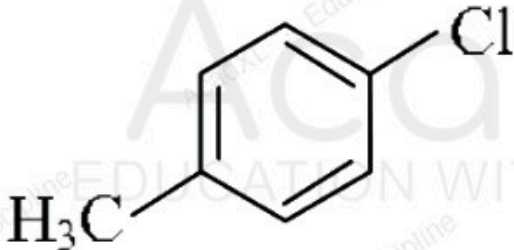
(A)



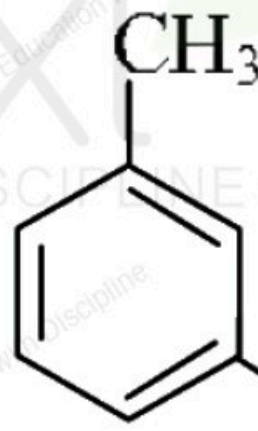
(B)



(C)



(D)

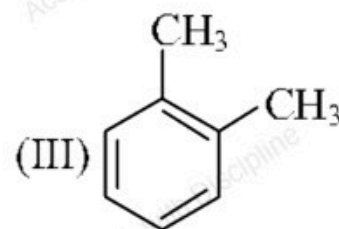
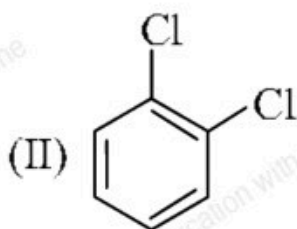
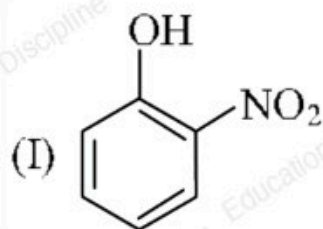


[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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

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

- (A) $+0.33 \text{ V}$ (B) $+0.36 \text{ V}$
(C) $+1.13 \text{ V}$ (D) -0.36 V

[3 marks, -1 for a wrong answer]

ANSWER: C

No solution stored for this question.

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

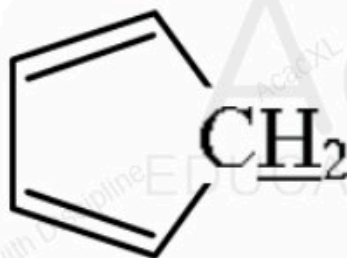
- (A) N_2O (B) NO
(C) NO_2 (D) NH_3

[3 marks, -1 for a wrong answer]

ANSWER: D

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

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]

ANSWER: D

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: D

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

48. The formula of the isothiocyanate ion is -

(A) OCN^-

(B) SCN^-

(C) ONC^-

(D) CN^-

[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: D

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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

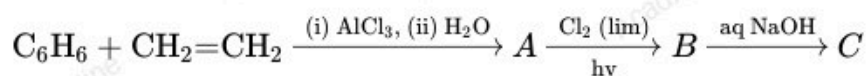
- (A) 50%
- (B) 25%
- (C) 33%
- (D) 40%

[3 marks, -1 for a wrong answer]

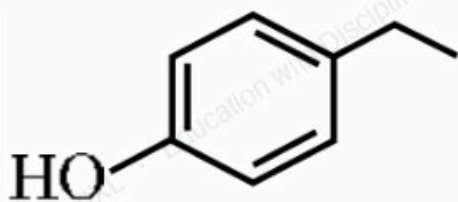
ANSWER: B

No solution stored for this question.

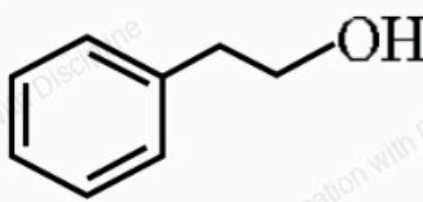
56. The product (C) of the following sequence of reactions is



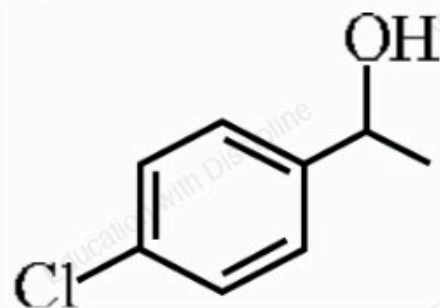
(A)



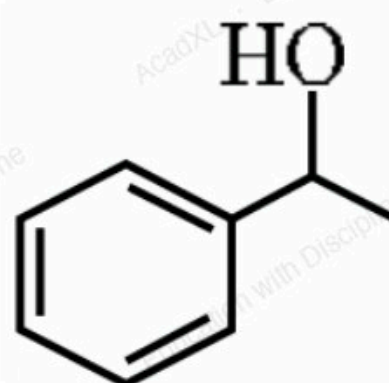
(B)



(C)



(D)



[3 marks, -1 for a wrong answer]

ANSWER: D

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

58. Radioactive inert gas is -

(A) technetium

(B) radon

(C) xenon

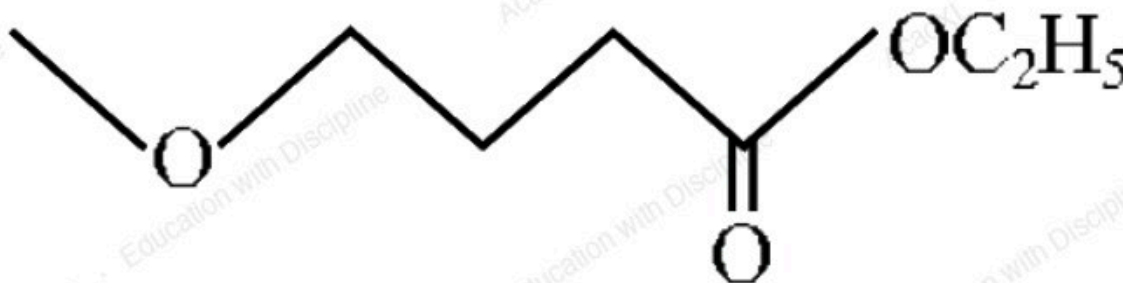
(D) curium

[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

59. The IUPAC name of the following compound is -



(A) 3-methoxy ethylpropanoate

(B) ethyl 4-methoxybutanoate

(C) 1, 4-diethoxybutane

(D) ethoxy 3-methoxybutyrate

[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

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

(B) 0.35 g

(C) 0.50 g

(D) 0.75 g

[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

61. The best nucleophile among the following is -

(A) H_2O

(B) CH_3SH

(C) Cl^-

(D) NH_3

[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

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

- (A) 2.0×10^{-6} (B) 1.0×10^{-3}
(C) 4.0×10^{-3} (D) 2.0×10^{-3}

[3 marks, -1 for a wrong answer]

ANSWER: D

No solution stored for this question.

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

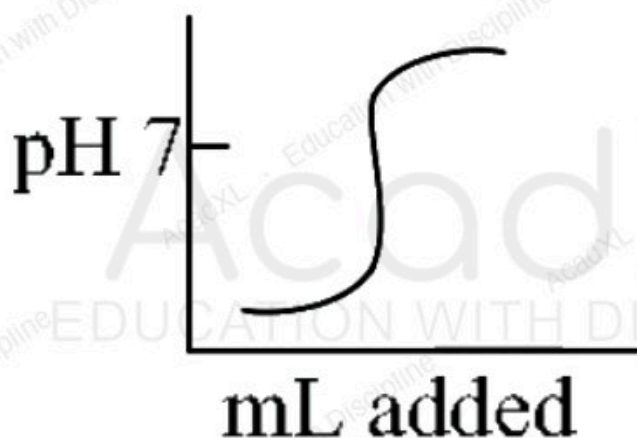
- (A) covalent bond (B) ionic bond
(C) co-ordinate bond (D) hydrogen bond

[3 marks, -1 for a wrong answer]

ANSWER: D

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

65. The element with the lowest electronegativity is -

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

[3 marks, -1 for a wrong answer]

ANSWER: C

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

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]

ANSWER: C

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

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]

ANSWER: A

No solution stored for this question.

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]

ANSWER: B

No solution stored for this question.

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 [$H=1$, $Br=80$, 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

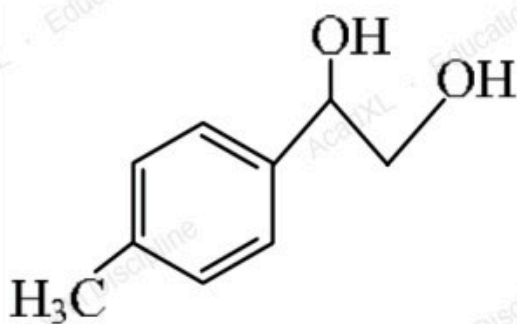
[3 marks, -1 for a wrong answer]

ANSWER: B

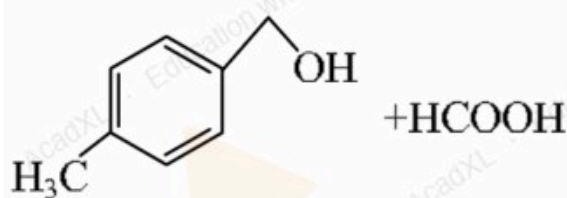
No solution stored for this question.

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

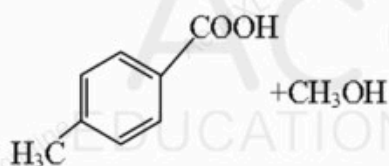
(A)



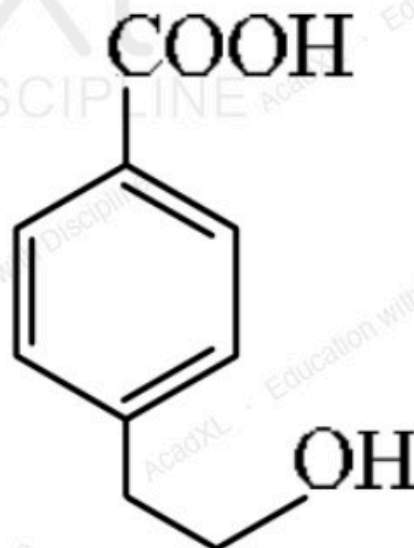
(B)



(C)



(D)



[3 marks, -1 for a wrong answer]

ANSWER: B

No solution stored for this question.

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 $= 0.00050 \text{ M s}^{-1}$; Experiment 2: $[\text{Cr}_2\text{O}_7^{2-}] = 0.010 \text{ M}$, $[\text{I}^-] = 0.0125 \text{ M}$, Rate $= 0.0010 \text{ M s}^{-1}$; Experiment 3: $[\text{Cr}_2\text{O}_7^{2-}] = 0.0150 \text{ M}$, $[\text{I}^-] = 0.0250 \text{ M}$, Rate $= 0.0060 \text{ M s}^{-1}$

- (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]

ANSWER: D

No solution stored for this question.

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: D

No solution stored for this question.

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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