



Indian Association of Chemistry Teachers
NATIONAL STANDARD EXAMINATION IN CHEMISTRY 2009-2010

Date of Examination 22nd November 2009

Time 12.30 to 14.30 Hrs

Instructions to Candidates

01. On the answer sheet, fill up all the entries carefully in the space provided, **ONLY IN BLOCK CAPITALS**. Use only **BLUE or BLACK BALL PEN** for making entries and marking answers. **Incomplete / incorrect / carelessly filled information may disqualify your candidature.**
02. The question paper contains 80 multiple-choice questions. Each question has 4 options, out of which only one is correct. Choose the correct answer and mark a **cross** in the corresponding box on the answer sheet as shown below :

Q.	a	b	c	d
22			X	

03. A correct answer carries 3 marks and 1 mark will be deducted for each wrong answer. No weightage will be given to unattempted questions.
04. All rough work may be done on the blank sheet provided at the end of the question paper.
05. **PLEASE DO NOT MAKE ANY MARK OTHER THAN (X) IN THE SPACE PROVIDED ON THE ANSWER SHEET.**
Answer sheets are evaluated with the help of a machine. Due to this, **CHANGE OF ENTRY IS NOT ALLOWED.**
06. **Scratching or overwriting may result in wrong score.**
DO NOT WRITE ANYTHING ON BACK OF ANSWER SHEET.
07. Use of a calculator is allowed.
08. Periodic table and log table are provided at the end of this question paper.
09. The answers / solutions of this question paper will be available on our website - www.iapt.org.in by 27 th November 2009.

Certificates & Awards

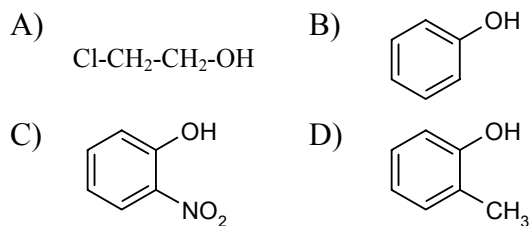
Following certificates are awarded by I.A.C.T. to students successful in NSEC.

- i) Certificates to top 10% students of each centre.
 - ii) Merit certificates to statewise Top 1% students.
 - iii) Merit certificate and a prize in the form of a book to Nationwide Top 1% students.
10. Result sheets and the "centre top 10%" certificates of NSEC are dispatched to the professor in charge of the centre. Thus you will get your marks from the Professor in charge of your centre by January 2010 end.
 11. TOP 300 (or so) students are called for the next examination - Indian National Chemistry Olympiad (INChO). Individual letters are sent to these students ONLY.
 12. Gold medals will be awarded to TOP 35 students in this entire process.
 13. No queries will be entertained in this regard.



ARYAN

1 The most acidic among the following compounds is



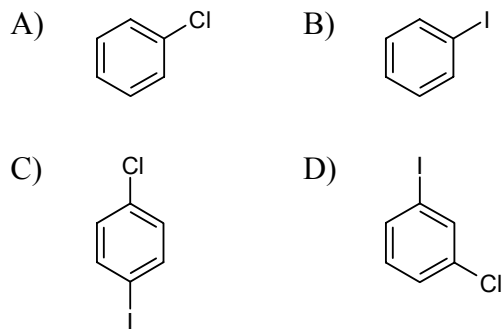
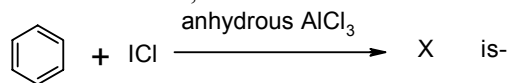
2 The number of ether metamers represented by the molecular formula $\text{C}_4\text{H}_{10}\text{O}$ is-

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

3 An isocyanide on reduction with hydrogen in the presence of platinum gives

- A) amide
- B) primary amine
- C) secondary amine
- D) alcohol

4 The compound X in the reaction,



5 S_N^1 reactivity of the following halides,

- i) $(\text{CH}_3)_3\text{C Br}$ ii) $(\text{C}_6\text{H}_5)_2\text{CH Br}$ iii) $(\text{C}_6\text{H}_5)_2\text{C}(\text{CH}_3)\text{ Br}$.
- iv) $(\text{CH}_3)_2\text{CH Br}$ will be in the order-

- A) iv > i > ii > iii
- B) ii > i > iii > iv
- C) i > iii > ii > iv
- D) iii > ii > i > iv

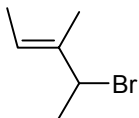
6 An alcohol, an aldehyde and a carboxylic acid of comparable mass will have their boiling points in the order-

- A) alcohol < carboxylic acid < aldehyde
- B) aldehyde < alcohol < carboxylic acid
- C) alcohol < aldehyde < carboxylic acid
- D) carboxylic acid < aldehyde < alcohol

7 The substances used for the preparation of ether by Williamson's synthesis are

- A) $(\text{CH}_3)_3\text{C Br}$ and $\text{CH}_3\text{O Na}$
- B) $(\text{CH}_3)_3\text{C Br}$ and CH_3OH
- C) $\text{CH}_3\text{ Br}$ and $(\text{CH}_3)_3\text{CO Na}$
- D) $\text{CH}_3\text{ Br}$ and $(\text{CH}_3)_3\text{C OH}$

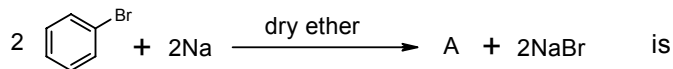
8



The IUPAC name of _____ is-

- A) 2-bromo-3-methylbut-3-ene
- B) 4-bromo-3-methylpent-2-ene
- C) 2-bromo-3-methylpent-3-ene
- D) 4-bromo-2,3-dimethylbut-2-ene

9 The product A in the reaction

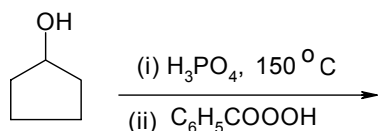



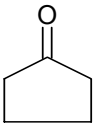
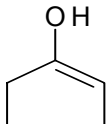
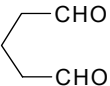
- A)
- B)
- C)
- D)

10 The isomeric alcohol which has a chiral carbon atom is

- A) n-butyl alcohol
- B) iso-butyl alcohol
- C) sec-butyl alcohol
- D) tert-butyl alcohol.

- 11 Geometrical isomerism results because the molecule-
- rotates the plane of polarized light
 - has a plane of symmetry
 - has a centre of symmetry
 - has two dissimilar groups attached to both ends of double bond
- 12 During alcoholic fermentation of sugars, the enzyme which converts glucose (or fructose) into ethanol is-
- zymase
 - invertase
 - maltase
 - urease
- 13 Compound X on treatment with HI gives Y. Y on treatment with ethanolic KOH gives Z (an isomer of X). Ozonolysis of Z (with H_2O_2 workup) gives a two-carbon carboxylic acid and four carbon ketone. Hence, X is-
- 2-methyl-2-pentene
 - 4-methyl-1-pentene
 - 2,3-dimethyl-2-butene
 - 3-methyl-1-pentene
- 14 The reagent which will be suitable to distinguish 1-methoxy-3-methyl-2-butene from isomeric 4-methyl-3-penten-1-ol is-
- bromine in chloroform
 - alkaline potassium permanganate
 - ammoniacal silver nitrate
 - sodium metal suspended in hexane
- 15 The major product of the following reaction is-

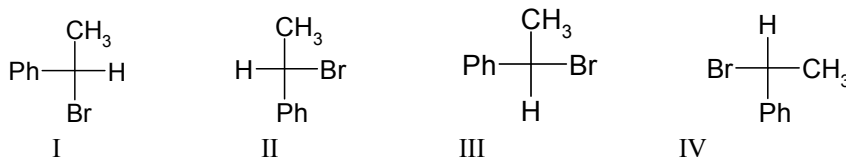


- | | |
|--|--|
| A)  | B)  |
| C)  | D)  |

16 Among the following isomeric chloro compounds, the compound which will undergo S_N2 reaction readily is

- A) 4-chloro-1-butene
- B) 1-chloro-1-butene
- C) 1-chloro-2-butene
- D) 2-chloro-1-butene

17 The pair of enantiomers among the following compounds is-

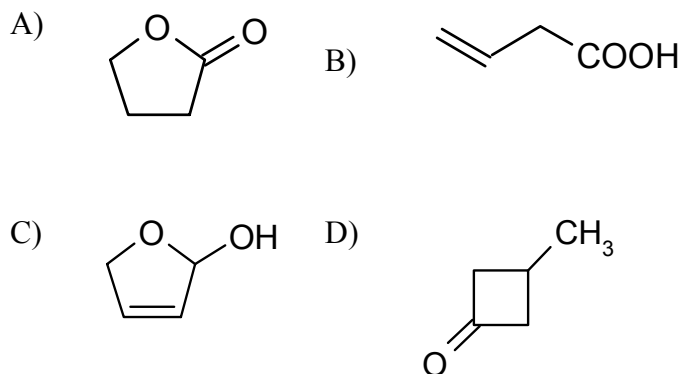


- A) I and IV
- B) II and IV
- C) II and III
- D) I and II

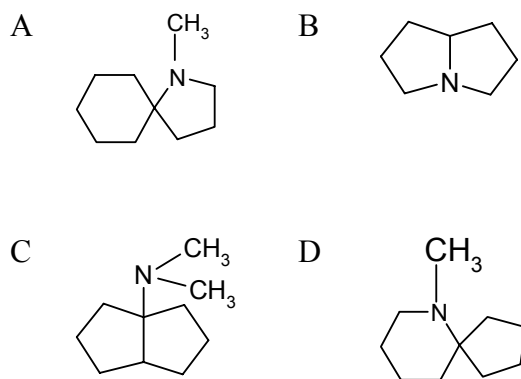
18 Compound X ($C_5H_{10}O$) is a chiral alcohol. It is catalytically hydrogenated to an achiral alcohol Y ($C_5H_{12}O$) and oxidized by activated MnO_2 to an achiral carbonyl compound Z ($C_5H_{10}O$). Compound X is-

- A) 1-pentene-3-ol
- B) 4-penten-2-ol
- C) 3-methyl-2-buten-1-ol
- D) 2-methyl-2-buten-1-ol

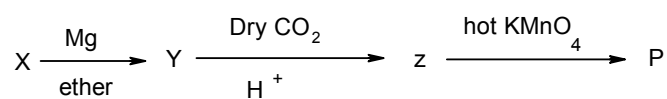
19 4-Oxobutanoic acid is reduced with Na-borohydride and the product is treated with aqueous acid. The final product is -



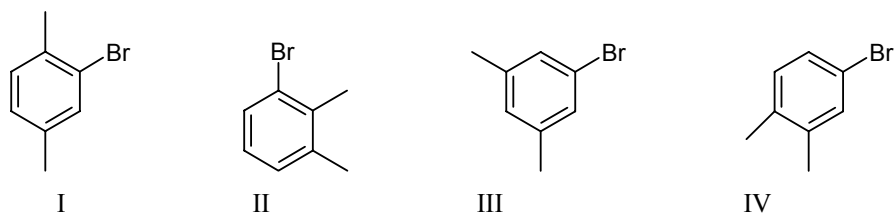
20 The nitrogen atom in the following cyclic compounds can be removed as trimethylamine by successive Hoffmann eliminations (involving exhaustive methylation followed by heating with $AgOH$). The amine which will require a greater number of Hoffmann eliminations is-



21

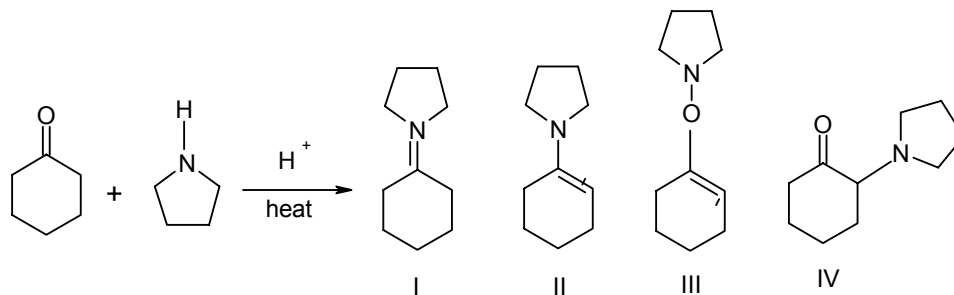


The two isomeric compounds which will give the same tricarboxylic acid after the above sequence of reactions, are-



- A) I and II
 B) III and IV
 C) I and IV
 D) II and III

22 The most favorable product of the following reaction is-



- A) I
 B) II
 C) III
 D) IV

- 23 3.7 dm³ of 1 M NaOH solution is mixed with 5 dm³ of 0.3 M NaOH solution. The molarity of the resulting solution is-
- A) 0.80 M
 B) 0.10 M
 C) 0.73 M
 D) 0.59 M
- 24 An electric current is passed through a silver voltameter connected to a water voltameter. 0.324 g of silver was deposited on the cathode of the silver voltameter. The volume of oxygen evolved at NTP is
- A) 5.6 cm³
 B) 16.8 cm³
 C) 11.2 cm³
 D) 22.4 cm³
- 25 The hydrolysis constant of 0.5M ammonium benzoate is 6.25×10^{-6} . The percentage hydrolysis of the salt is-
- A) 0.25
 B) 0.177
 C) 0.125
 D) 0.50

- 26 For a chemical reaction, $A + B \rightarrow C + D$, the following data was recorded:

Set No.	Initial Concentration of 'A'(mol.dm ⁻³)	Initial Concentration of 'B'(mol.dm ⁻³)	Rate of reaction (mol.dm ⁻³ s ⁻¹)
1	4.00	3.00	0.10
2	12.00	3.00	0.90
3	12.00	6.00	0.90

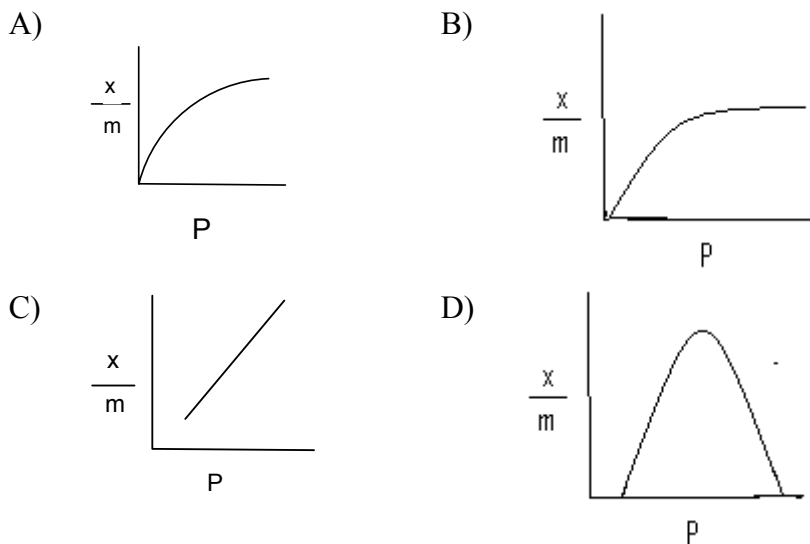
The correct rate expression for the reaction is

- A) rate = $k[A][B]$
 B) rate = $k[A]^2[B]^2$
 C) rate = $k[A]^2$
 D) rate = $k[A][B]^2$



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27 The plot representing Langmuir's adsorption isotherm is



28 For a dilute solution, Raoult's law states that -

- A) the lowering of vapour pressure is equal to the mole fraction of the solute.
- B) the relative lowering of vapour pressure is equal to the mole fraction of the solute
- C) the vapour pressure of solution is equal to the mole fraction of solution.
- D) the relative lowering of vapour pressure is proportional to the amount of solute in the solution.

29 For the reaction $2\text{HI}_{(g)} \rightleftharpoons \text{H}_{2(g)} + \text{I}_{2(g)}$

- A) $K_p = K_c$
- B) $K_p > K_c$
- C) $K_p < K_c$
- D) $K_c = \sqrt{K_p}$

30 If the equilibrium constants of the reactions,



and



are K_1 and K_2 respectively, the correct relation between the two equilibrium constants is,

- A) $K_2 = (K_1)^{-1}$
- B) $K_2 = \sqrt{1/K_1}$
- C) $K_2 = (1/K_1)^2$
- D) $K_2 = \sqrt{K_1}$

31 The amount of copper (At. wt. = 63.54) deposited by passing 0.2 faraday of electricity through copper sulphate is-

- A) 3.175 g
 B) 6.350 g
 C) 31.75 g
 D) 63.35 g
- 32 A radioactive element has half life of 14 hours. The fraction of the radioactive isotope which will disintegrate in 56 hours is-
- A) 0.75
 B) 0.875
 C) 0.9375
 D) 0.60
- 33 The fundamental particle responsible for keeping the nucleus together is,
- A) meson
 B) muon
 C) positron
 D) hyperon
- 34 The maximum number of electrons in $3d_{z^2}$ orbital is-
- A) 2
 B) 4
 C) 5
 D) 10
- 35 The ion which has 18 electrons in the outermost shell is-
- A) Cu^+ ($Z = 29$)
 B) Al^{3+} ($Z = 13$)
 C) K^+ ($Z = 19$)
 D) Th^{4+} ($Z = 90$)
- 36 Heating of a solution does not change-
- A) the normality of the solution
 B) the molarity of the solution
 C) the molality of the solution
 D) the density of the solution
- 37 The equilibrium constant K_c for the reaction,
- $$2 \text{NaHCO}_3(\text{s}) \rightleftharpoons \text{Na}_2\text{CO}_3(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$$
- is represented by-
- A) $K_c = \frac{[\text{Na}_2\text{CO}_3][\text{CO}_2][\text{H}_2\text{O}]}{[\text{NaHCO}_3]^2}$
 B) $K_c = \frac{[\text{Na}_2\text{CO}_3]}{[\text{NaHCO}_3]^2}$
 C) $K_c = [\text{CO}_2][\text{H}_2\text{O}]$
 D) $K_c = p_{\text{CO}_2} \times p_{\text{H}_2\text{O}}$

38 When CO_2 dissolves in water, the following equilibrium is established-



If the equilibrium constant for the reaction is 3.8×10^{-7} and $\text{pH} = 6$, the ratio

$$\frac{[\text{HCO}_3^{1-}]}{[\text{CO}_2]}$$
 will be,

- A) 3.8×10^{-13}
- B) 3.8×10^{-1}
- C) 6.0
- D) 3.0

39 For a zero order reaction, the unit of rate constant is-

- A) s^{-1}
- B) $\text{mol} \cdot \text{dm}^{-3} \text{s}^{-1}$
- C) $\text{dm}^3 \text{mol}^{-1} \text{s}^{-1}$
- D) $\text{mol}^2 \cdot \text{dm}^{-6} \text{s}^{-1}$

40 For the isobaric gaseous reaction, the enthalpy change given by-

- A) $\Delta H = \Delta E + \Delta nRT$
- B) $\Delta H = \Delta E + P\Delta V$
- C) $\Delta H = \Delta E + \Delta nP \Delta V$
- D) $\Delta H = \Delta E + V\Delta P$

41 When aqueous solution of sodium chloride is electrolysed using platinum electrode the cathode reaction is,

- A) $\text{Na}^+ + \text{e}^- \longrightarrow \text{Na}$
- B) $\text{H}_2\text{O} + \text{e}^- \longrightarrow \frac{1}{2} \text{H}_2 + \text{OH}^-$
- C) $\text{Na}^+ + \text{OH}^- \longrightarrow \text{Na}^+ + \text{OH}^- + \text{e}^-$
- D) $\text{Na}^+ + \text{H}_2\text{O} + \text{e}^- \longrightarrow \text{Na} + \text{H}^+ + \text{OH}^-$

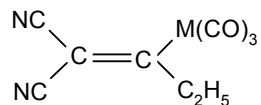
42 0.14 g of a substance when burnt in oxygen yields 0.28 g of oxide. The substance is-

- A) nitrogen
- B) carbon
- C) sulphur
- D) phosphorous

43 Carbonic acid, H_2CO_3 , is a diprotic acid for which $K_1 = 4.2 \times 10^{-7}$, and $K_2 = 4.7 \times 10^{-11}$. The solution which will have a pH closest to 9 is-

- A) 0.1 M H_2CO_3
 B) 0.1 M Na_2CO_3
 C) 0.1 M NaHCO_3
 D) 0.1 M NaHCO_3 + 0.1 M Na_2CO_3
- 44 For a face centered cubic lattice, the unit cell content is-
- A) 1
 B) 2
 C) 3
 D) 4
- 45 The hybridization of the atomic orbitals of sulphur in SO_3 , SO_4^{2-} and SF_4 are respectively-
- A) sp , sp^3 , sp^2
 B) sp , sp^2 , sp^3d
 C) sp^2 , sp , sp^3
 D) sp^2 , sp^3 , sp^3d
- 46 The number of molecules of hydration present in 252mg of oxalic acid is-
- A) 2.68×10^{18}
 B) 2.52×10^{21}
 C) 1.83×10^{24}
 D) 2.4×10^{21}
- 47 The ozone hole in the upper atmosphere of the earth is due to the breakdown of ozone to oxygen. The reaction is catalyzed by-
- A) chlorofluorocarbons
 B) oxygen generated during the reaction
 C) carbon dioxide present in the atmosphere
 D) chlorine formed by the decomposition of chlorofluorocarbons
- 48 The compound with the lowest oxidation state of iron is -
- A) Fe_2O
 B) Fe_3O_4
 C) $\text{K}_3\text{Fe}(\text{CN})_6$
 D) $\text{K}_4\text{Fe}(\text{CN})_6$
- 49 The molecule which does not have a net dipole moment is-
- A) H_2O
 B) NH_3
 C) BF_3
 D) BrF_5

- 50 The electron-pair geometry of the central oxygen atom of ozone is -
- A) linear
 B) trigonal planar
 C) tetrahedral
 D) trigonal bipyramidal
- 51 The molecular geometry for ammonia is-
- A) saw horse
 B) trigonal planar
 C) tetrahedral
 D) pyramidal
- 52 The sequence of molecular orbitals for the carbide ion (C_2^{-2}) is-
- A) $\sigma 1s^2$ $\sigma^* 1s^2$ $\sigma 2s^2$ $\sigma^* 2s^2$ $\pi 2p^4$
 B) $\sigma 1s^2$ $\sigma^* 1s^2$ $\sigma 2s^2$ $\sigma^* 2s^2$ $\pi 2p^4$ $\sigma 2p^2$
 C) $\sigma 1s^2$ $\sigma^* 1s^2$ $\sigma 2s^2$ $\sigma^* 2s^2$ $\pi 2p^4$ $\sigma 2p^2$ $\pi^* 2p^2$
 D) $\sigma 1s^2$ $\sigma^* 1s^2$ $\sigma 2s^2$ $\sigma^* 2s^2$ $\pi 2p^4$ $\sigma 2p^2$ $\pi^* 2p^4$
- 53 The correct balanced chemical equation for the reaction between Al and S is-
- A) $16 Al + 3S_8 \longrightarrow 8 Al_2S_3$
 B) $12 Al + S_8 \longrightarrow 4 Al_3S_2$
 C) $8 Al + S_8 \longrightarrow 8 AlS$
 D) $4 Al + S_8 \longrightarrow 4 AlS_2$
- 54 The standard electrode potential values for four metals K, L, M and N are respectively, -3.05, -1.66, -0.40 and +0.80 V. The best reducing agent is-
- A) L
 B) K
 C) N
 D) M
- 55 The strongest Bronsted base among the following compounds is-
- A) $NaCH_3$
 B) $NaOH$
 C) NaF
 D) $NaNH_2$
- 56 The number of sigma and pi bonds in the following compound is-



- A) 19, 11
 B) 19, 05
 C) 13, 11
 D) 07, 06
- 57 The aqua ion which will be almost colorless is-
- A) Cu^{2+}
 B) Cr^{2+}
 C) Ti^{4+}
 D) Mn^{2+}
- 58 Among the following, the chiral complex is-
- A) $[\text{Cr}(\text{ox})_3]^{3-}$
 B) $\text{cis}[\text{PtCl}_2(\text{en})]$
 C) $\text{cis}[\text{RhCl}_2(\text{NH}_3)_4]^+$
 D) $\text{trans}[\text{PtCl}_2(\text{en})]$
- 59 MnO_4^- is of intense pink colour, though Mn is in +VII oxidation state. This is due -
- A) d-d transition
 B) charge transfer when Mn gives electron to oxygen
 C) charge transfer when oxygen gives its electrons to Mn making it +VI
 D) absorption of IR frequencies
- 60 MgSO_4 on reaction with NH_4OH and Na_2HPO_4 forms a white crystalline precipitate. The formula of the precipitate is-
- A) $\text{Mg}(\text{NH}_4)\text{PO}_4$
 B) $\text{Mg}_3(\text{PO}_4)_2$
 C) $\text{MgCl}_2 \cdot \text{MgSO}_4$
 D) MgSO_4
- 61 The species having tetrahedral shape is -
- A) $[\text{PdCl}_4]^{2-}$
 B) $[\text{Ni}(\text{CN})_4]^{2-}$
 C) $[\text{Pd}(\text{CN})_4]^{2-}$
 D) $[\text{Ni}(\text{Cl})_4]^{2-}$
- 62 The types of isomerism shown by $\text{Co}(\text{NH}_3)_4\text{Br}_2\text{Cl}$ are -
- A) Geometrical and ionization
 B) Optical and ionization
 C) Geometrical and optical
 D) Geometrical only
- 63 The silicates formed from $[\text{SiO}_4]^{4-}$ tetrahedral units by sharing three oxygen atoms are-
- A) Sheet silicates
 B) Pyrosilicates
 C) Linear Chain silicates
 D) Three dimensional silicates

- 64 The species containing the maximum number of lone pairs in the central atom is-
- A) ClO^{3-}
 - B) XeF_4
 - C) SF_4
 - D) I^{3-}
- 65 The nucleic acid which bears a codon in its structure is-
- A) r RNA
 - B) t RNA
 - C) m RNA
 - D) DNA
- 66 Protein synthesis does not involve-
- A) amino acids
 - B) t RNA
 - C) m RNA
 - D) DNA
- 67 The most likely change occurring in a protein sample when treated with 6M HCl is-
- A) formation of disulphide bond
 - B) formation of peptide bond
 - C) hydrolysis of peptide bond
 - D) oxidation of disulphide bond
- 68 The order of the energy released by biological oxidation of equal amounts (moles) of glucose, sucrose and starch is-
- A) starch > sucrose > glucose
 - B) starch > glucose > sucrose
 - C) sucrose > glucose > starch
 - D) glucose > sucrose > starch
- 69 Precipitation of protein from a solution is generally achieved by using ammonium sulphate solution. This could be a result of -
- A) neutralization of the charge of the protein
 - B) increase in hydrophilicity of the protein
 - C) increase in hydrophobicity of the protein
 - D) formation of salt protein complex
- 70 Enzymatic breakdown of cellulose will yield monomers of -
- A) Galactose
 - B) Glucose
 - C) Fructose
 - D) Ribose

- 71 The trend of isoelectric point (pI) of the amino acids glycine, lysine and aspartic acid is-
- A) glycine > lysine > aspartic acid
 - B) aspartic acid > lysine > glycine
 - C) aspartic acid > glycine > lysine
 - D) lysine > aspartic acid > glycine

- 72 The chemical substance which can be used to isolate a protein present inside the cell membrane is
- A) Chelating agent
 - B) Dilute acid
 - C) Detergent
 - D) Urea solution

- 73 The chemical force playing an important role in binding of codon to anticodon is
- A) covalent bond
 - B) co-ordinate bond
 - C) hydrogen bond
 - D) hydrophobic bond

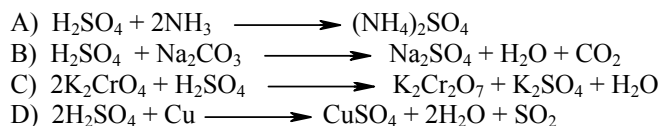
- 74 The ionization of benzoic acid is represented by the equation



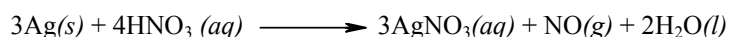
If a 0.045 M solution of benzoic acid has an $[\text{H}^+] = 1.7 \times 10^{-3}$, then, the K_a of benzoic acid is-

- A) 7.7×10^{-5}
 - B) 6.4×10^{-5}
 - C) 3.8×10^{-2}
 - D) 8.4×10^{-1}
- 75 If the K_{sp} of CaF_2 at 25°C is 1.6×10^{-10} , then the number of moles of the salt that must be dissolved in 2.0 L of water at 25°C to form a saturated solution is
- A) 2.6×10^{-2} mol
 - B) 1.3×10^{-3} mol.
 - C) 6.8×10^{-4} mol.
 - D) 3.4×10^{-4} mol.

- 76 The oxidation-reduction reaction among the following is

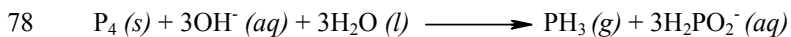


- 77 Silver metal reacts with nitric acid according to the equation



The volume of 1.15 M $\text{HNO}_3(aq)$ required to react with 0.784g of silver is-

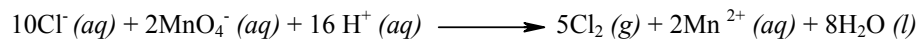
- A) 4.74 mL
- B) 6.32 mL
- C) 8.43 mL
- D) 25.3 mL



In the above equation, the species getting oxidized and reduced respectively are

- A) P_4 and OH^-
- B) OH^- and P_4
- C) P_4 and H_2O
- D) P_4 and P_4

79



The value of E° for the above reaction at 25°C is 0.15V. Hence, the value of K for this reaction is-

- A) 2.4×10^{25}
- B) 4.9×10^{12}
- C) 1.2×10^5
- D) 3.4×10^2

80 The magnetic moment of a transition metal ion is found to be 3.87 Bohr Magnetron (BM). The number of unpaired electrons present in it is

- A) 2
- B) 3
- C) 4
- D) 5



ARYAN

Logarithms

N	Mantissa									
	1	2	3	4	5	6	7	8	9	0
0	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
1	0004	0008	0012	0016	0020	0024	0028	0032	0036	0040
2	0044	0048	0052	0056	0060	0064	0068	0072	0076	0080
3	0084	0088	0092	0096	0100	0104	0108	0112	0116	0120
4	0124	0128	0132	0136	0140	0144	0148	0152	0156	0160
5	0164	0168	0172	0176	0180	0184	0188	0192	0196	0200
6	0204	0208	0212	0216	0220	0224	0228	0232	0236	0240
7	0244	0248	0252	0256	0260	0264	0268	0272	0276	0280
8	0284	0288	0292	0296	0300	0304	0308	0312	0316	0320
9	0324	0328	0332	0336	0340	0344	0348	0352	0356	0360
10	0364	0368	0372	0376	0380	0384	0388	0392	0396	0400
11	0404	0408	0412	0416	0420	0424	0428	0432	0436	0440
12	0444	0448	0452	0456	0460	0464	0468	0472	0476	0480
13	0484	0488	0492	0496	0500	0504	0508	0512	0516	0520
14	0524	0528	0532	0536	0540	0544	0548	0552	0556	0560
15	0564	0568	0572	0576	0580	0584	0588	0592	0596	0600
16	0604	0608	0612	0616	0620	0624	0628	0632	0636	0640
17	0644	0648	0652	0656	0660	0664	0668	0672	0676	0680
18	0684	0688	0692	0696	0700	0704	0708	0712	0716	0720
19	0724	0728	0732	0736	0740	0744	0748	0752	0756	0760
20	0764	0768	0772	0776	0780	0784	0788	0792	0796	0800
21	0804	0808	0812	0816	0820	0824	0828	0832	0836	0840
22	0844	0848	0852	0856	0860	0864	0868	0872	0876	0880
23	0884	0888	0892	0896	0900	0904	0908	0912	0916	0920
24	0924	0928	0932	0936	0940	0944	0948	0952	0956	0960
25	0964	0968	0972	0976	0980	0984	0988	0992	0996	1000
26	0994	0998	1000	1000	1000	1000	1000	1000	1000	1000

log 2 = 0.30103
 log 3 = 0.47712
 log 4 = 0.60206
 log 5 = 0.69897
 log 6 = 0.77815
 log 7 = 0.84509
 log 8 = 0.90309
 log 9 = 0.95424
 log 10 = 1.00000

Logarithms

N	Mantissa									
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