

**INDIAN ASSOCIATION OF PHYSICS TEACHERS  
NATIONAL STANDARD EXAMINATION IN CHEMISTRY 2014 -15**

**Date of Examination: 23<sup>rd</sup> November, 2014**

**Time: 1230 to 1430 Hrs**

**Q. Paper Code: C 244**

***Write the question paper code mentioned above on YOUR answer sheet (in the space provided), otherwise your answer sheet will NOT be assessed. Note that the same Q. P. Code appears on each page of the question paper.***

**Instructions to Candidates –**

1. Use of mobile phones, smartphones, ipads during examination is **STRICTLY PROHIBITED**.
2. In addition to this question paper, you are given answer sheet along with Candidate's copy.
3. On the answer sheet, make all the entries carefully in the space provided **ONLY** in **BLOCK CAPITALS** as well as by properly darkening the appropriate bubbles.  
**Incomplete/ incorrect/carelessly filled information may disqualify your candidature.**
4. On the answer sheet, use only **BLUE or BLACK BALL POINT PEN** for making entries and filling the bubbles.
5. Question paper has 80 multiple choice questions. Each question has four alternatives, out of which **only one** is correct. Choose the correct alternative and fill the appropriate bubble, as shown.

Q. No. 22    ☐ a    ☒ b    ☐ c    ☐ d

6. A correct answer carries 3 marks whereas 1 mark will be deducted for each wrong answer.
7. Any rough work should be done only in the space provided.
8. Periodic Table is provided at the end of the question paper.
9. Use of **non-programmable** calculator is allowed.
10. No candidate should leave the examination hall before the completion of the examination.
11. After submitting your answer paper, take away the Candidate's copy for your reference.

**Please DO NOT make any mark other than filling the appropriate bubbles properly in the space provided on the answer sheet.**

**Answer sheets are evaluated using machine, hence CHANGE OF ENTRY IS NOT ALLOWED.**

**Scratching or overwriting may result in a wrong score.**

**DO NOT WRITE ON THE BACK SIDE OF THE ANSWER SHEET.**

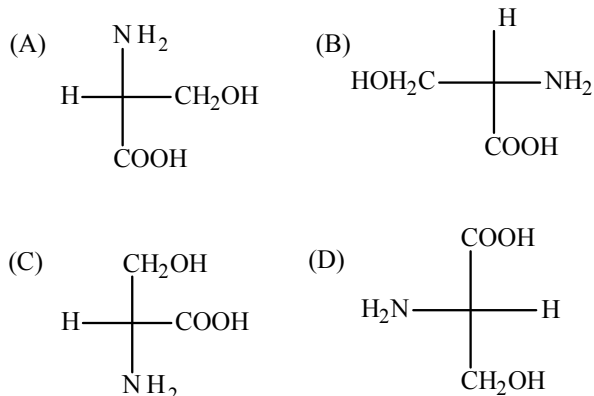
**Instructions to Candidates (continued)–**

*Read the following instructions after submitting the answer sheet.*

12. Comments regarding this question paper, if any, may be sent by email only to [iaptpune@gmail.com](mailto:iaptpune@gmail.com) till 25<sup>th</sup> November, 2014.
13. The answers/solutions to this question paper will be available on our website – [www.iapt.org.in](http://www.iapt.org.in) by 3<sup>rd</sup> December, 2014.
14. **CERTIFICATES and AWARDS –**  
Following certificates are awarded by the IAPT to students successful in NSEs
  - (i) Certificates to “Centre Top 10%” students
  - (ii) Merit Certificates to “Statewise Top 1%” students
  - (iii) Merit Certificates and a book prize to “National Top 1%” students
15. Result sheets and the “Centre Top 10%” certificates will be dispatched to the Prof-in-charge of the centre by January, 2015.
16. List of students (with centre number and roll number only) having score above MAS will be displayed on our website ([www.iapt.org.in](http://www.iapt.org.in)) by 22<sup>nd</sup> December, 2014. See the **Eligibility Clause** in the Student’s brochure on our website.
17. Students eligible for the INO Examination on the basis of selection criteria mentioned in Student’s brochure will be informed accordingly.
18. Gold medals will be awarded to TOP 35 students in the entire process.

## National Standard Examination in Chemistry 2014

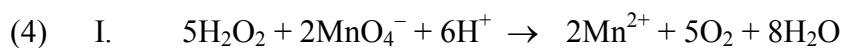
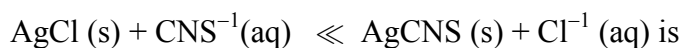
- (1) Serine ( $\text{HOCH}_2\text{CH}(\text{NH}_2)\text{COOH}$ ) is an essential amino acid. The correct Fischer projection of serine is



- (2) The complex having zero crystal field stabilization energy is



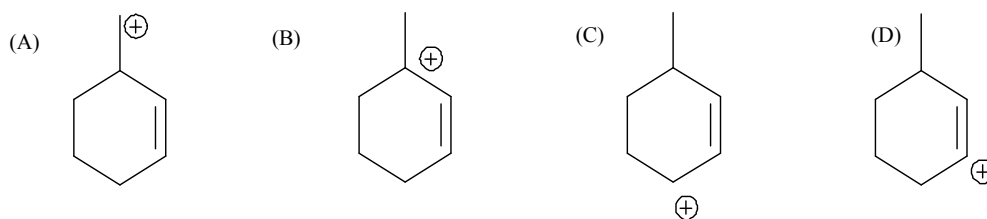
- (3) Solubility products of silver chloride and silver thiocyanate are  $1.2 \times 10^{-10}$  and  $7.1 \times 10^{-13}$  respectively. The equilibrium constant for the reaction



The role of hydrogen peroxide in the above reactions is

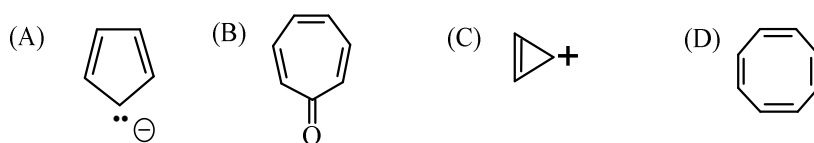
- (A) oxidising in I and reducing in II (B) reducing in I and oxidising in II  
 (C) reducing in I as well as in II (D) oxidising in I as well as in II

- (5) The most stable carbocation is



- (6) Helium can be singly ionized by losing one electron to become the  $\text{He}^+$  cation. Which of the following statements is true concerning this helium cation?
- (A) The line spectrum of this helium cation will resemble the line spectrum of a hydrogen atom.
- (B) The line spectrum of this helium cation will resemble the line spectrum of a lithium cation.
- (C) The line spectrum of this helium cation will remain the same as for unionized helium.
- (D) The line spectrum of this helium cation will resemble the line spectrum of a hydrogen ion.
- (7) Of the following, the ion with the largest size is
- (A)  $\text{O}^{2-}$                       (B)  $\text{Na}^+$                       (C)  $\text{F}^-$                       (D)  $\text{Al}^{3+}$
- (8) The colourless salt that gives white precipitate with  $\text{BaCl}_2$  in aqueous  $\text{HCl}$  is
- (A)  $\text{K}_2\text{SO}_4$                       (B)  $\text{K}_2\text{SO}_3$                       (C)  $\text{KNO}_3$                       (D)  $\text{KBr}$
- (9) The **heat of formation** of ethanol, from the following data is
- $$\text{C}_2\text{H}_5\text{OH}(l) + 3 \text{O}_2(g) \rightarrow 2 \text{CO}_2(g) + 3 \text{H}_2\text{O}(l) \quad -1368 \text{ kJ}$$
- $\Delta H_f \text{ CO}_2(g) = -393.5 \text{ kJ/mol}; \quad \Delta H_f \text{ H}_2\text{O}(l) = -286 \text{ kJ/mol}.$
- (A)  $-277 \text{ kJ/mol}$                       (B)  $-1260.5 \text{ kJ/mol}$
- (C)  $-688.5 \text{ kJ/mol}$                       (D)  $-3013 \text{ kJ/mol}$
- (10) Osmotic pressure of a 2% w/v solution of glucose is same as 5% w/v solution of a nonvolatile non-electrolyte solute. The molar mass of the solute is
- (A) 180                      (B) 450                      (C) 72                      (D) 45
- (11) 50 g of sucrose is hydrolysed to a mixture of glucose and fructose. Sucrose is dextrorotatory, however the mixture formed is laevorotatory. This is because
- (A) more amount of  $\beta$ -D-fructose is formed than that of  $\beta$ -D-glucose
- (B)  $\beta$ -D-glucose undergoes inversion of configuration
- (C)  $\beta$ -D-fructose and  $\beta$ -D-glucose undergo inversion to their  $\alpha$ -anomers
- (D) laevorotation of  $\beta$ -D-fructose is more than dextrorotation of  $\beta$ -D-glucose.

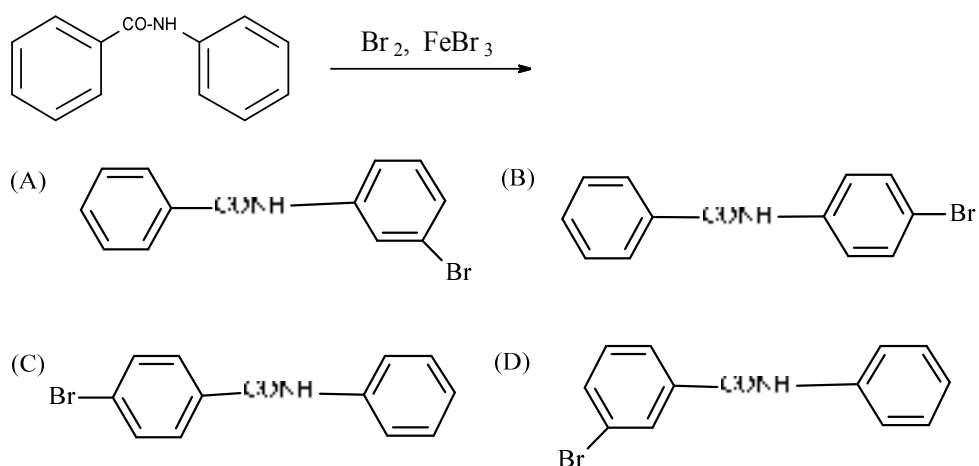
(12) Among the following the compound that is **not** aromatic is



(13) The magnetic moment of a divalent ion of an element with atomic number 24 in an aqueous solution is

- (A) 4.90 BM (B) 2.45 BM (C) 2.83 BM (D) 1.73 BM

(14) The major product of the following reaction is



(15) The correct order of stability for the following species is

- (A)  $\text{Li}_2 < \text{He}_2^+ < \text{O}_2^+ < \text{C}_2$  (B)  $\text{C}_2 < \text{O}_2^+ < \text{Li}_2 < \text{He}_2^+$   
 (C)  $\text{He}_2^+ < \text{Li}_2 < \text{C}_2 < \text{O}_2^+$  (D)  $\text{O}_2^+ < \text{C}_2 < \text{Li}_2 < \text{He}_2^+$

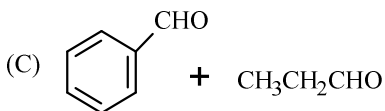
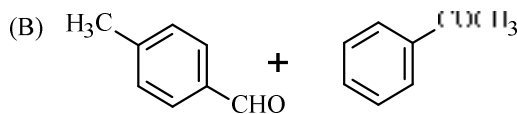
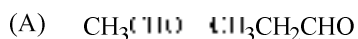
(16) The colligative property used in the determination of molar mass of a polymer is

- (A) lowering of the vapour pressure (B) elevation in the boiling point  
 (C) depression in the freezing point (D) osmotic pressure

(17) From the following the species that are isoelectronic are

- (I)  $\text{NH}_3$ , (II)  $\text{CH}_3^+$ , (III)  $\text{NH}_2^-$ , (IV)  $\text{NH}_4^+$   
 (A) (I), (II), (III) (B) (II), (III), (IV)  
 (C) (I), (II), (IV) (D) (I), (III), (IV)

- (18) The pair of equimolar compounds that would give a **single** condensation product when treated with an alkali is



- (19) In electrophoresis,

- (A) the colloidal particles migrate in an applied electric field.  
 (B) the medium migrates in an applied electric field.  
 (C) both colloidal particles and the medium migrate.  
 (D) neither the particles nor the medium migrate.

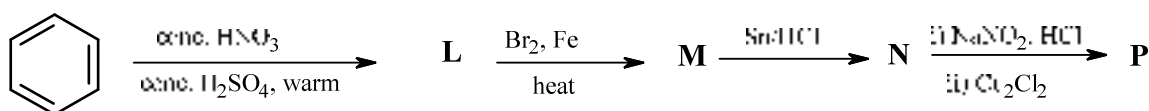
- (20) When a person suffers from typhoid, the metabolic process stimulated in the body to fight against this disease is synthesis of

- (A) Lipid (B) carbohydrate (C) Protein (D) DNA

- (21) If a weak base has the dissociation constant,  $K_b$ , then the value of the dissociation constant,  $K_a$ , of its conjugate acid is given by

- (A)  $1/K_b$  (B)  $K_w/K_b$  (C)  $K_b/K_w$  (D)  $K_wK_b$

- (22) The product **P** obtained through the following sequence of reactions is



- (A) 3-chloroaniline (B) 4-bromochlorobenzene  
 (C) 3-bromochlorobenzene (D) 3-bromoaniline

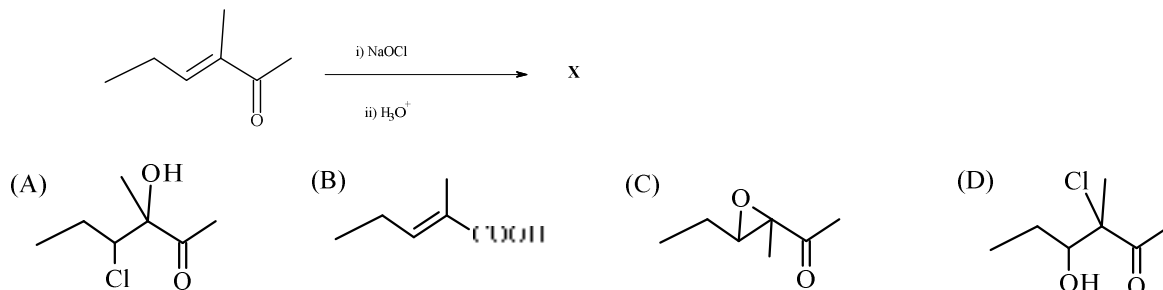
- (23) Real gases behave ideally at

- (A) low pressure and low temperature (B) high pressure and low temperature  
 (C) low pressure and high temperature (D) high pressure and high temperature

(24) In the cyanide extraction process of silver from Argentite ore, the oxidizing and the reducing agents used are respectively

- (A)  $O_2$  and CO (B)  $O_2$  and Zn dust  
(C)  $HNO_3$  and Zn dust (D)  $HNO_3$  and CO

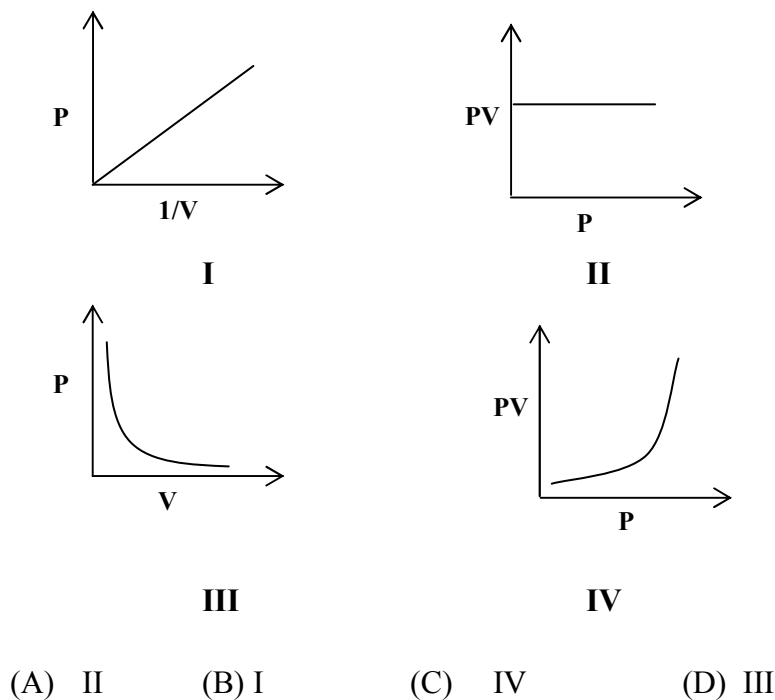
(25) The main product **X** formed in the following reactions is



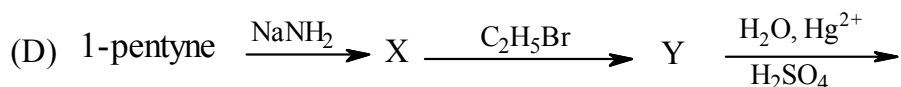
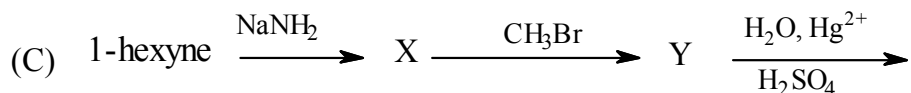
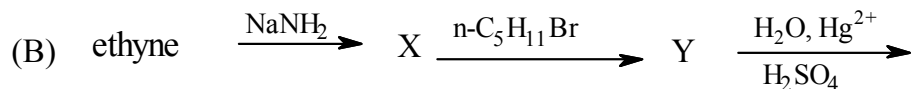
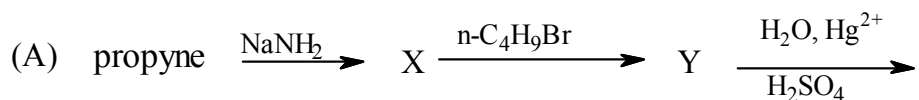
(26) Out of the following metal extraction processes, those in which carbon-based reduction methods are not used are

- (I) Sn from  $SnO_2$  (II) Fe from  $Fe_2O_3$   
(III) Al from  $Al_2O_3$  (IV) Mg from  $MgCO_3 \cdot CaCO_3$   
(A) (I) and (IV) (B) (II) and (III) (C) (III) and (IV) (D) (II) and (IV)

(27) The graph that **wrongly** represents the Boyle's law for an ideal gas is



(28) The best sequence of reactions to prepare 2-heptanone is



(29) Approximate numbers of moles of hydrogen atoms in  $1.006 \times 10^{23}$  molecules of diethyl ether are

- (A) 0.16                      (B) 6                      (C) 1.67                      (D) 3

(30) Upon long standing, concentrated  $\text{HNO}_3$

- (A) remains colourless, but gives out NO  
 (B) turns yellow brown due to formation of  $\text{NO}_2$   
 (C) turns yellow brown due to the formation of  $\text{N}_2\text{O}_4$   
 (D) remains colourless, but gives  $\text{N}_2\text{O}$

(31) The sugars that are produced on hydrolysis of DNA and RNA are

- (A) epimers                      (B) two different sugars  
 (C) positional isomers                      (D) diastereomers

(32) When a nucleophile attacks a carbonyl group to form an intermediate, the hybridisation of the carbon atom changes from

- (A)  $\text{sp}^3$  to  $\text{sp}^2$                       (B)  $\text{sp}^2$  to  $\text{sp}$                       (C)  $\text{sp}$  to  $\text{sp}^2$                       (D)  $\text{sp}^2$  to  $\text{sp}^3$

(33) Aluminum carbide ( $\text{Al}_4\text{C}_3$ ) liberates methane on treatment with water. The grams of aluminum carbide required to produce 11.2 L of methane under STP conditions is [Given Al = 27]

- (A) 48                      (B) 72                      (C) 144                      (D) 24

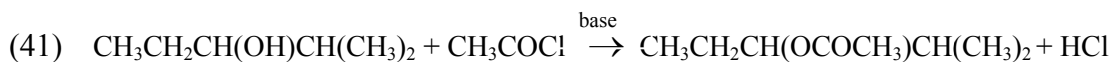


- (34) The correct statement for crystalline  $\text{CsI}_3$  is  
 (A) it contains  $\text{Cs}^+$ ,  $\text{I}^-$  and molecular  $\text{I}_2$  (B) it is a covalent compound  
 (C) it contains  $\text{Cs}^+$  and  $\text{I}_3^-$  (D) it contains  $\text{Cs}^{3+}$  and  $\text{I}^-$
- (35) The product **X** formed in the following reaction is  
 $\text{C}_6\text{H}_5\text{MgBr} + \text{CH}_3\text{OH} \rightarrow \text{X}$   
 (A) benzene (B) methoxybenzene (C) phenol (D) toluene
- (36) Ionic salt **AX** grows in face centered cubic lattice with cell length 'a'. The ratio  $r_{\text{A}^+} / r_{\text{X}^-}$  for this salt will be:  
 (A) 0.155 (B) 0.225 (C) 0.414 (D) 0.732
- (37) The hybridization of boron in the stable borane having the lowest molecular weight is-  
 (A)  $\text{sp}^2$  (B)  $\text{sp}^3$  (C)  $\text{sp}$  (D)  $\text{sp}^3\text{d}$
- (38) The product 'N' of the following reaction is
- 
- (A)

(B)

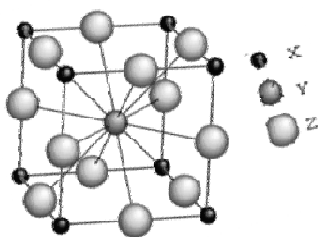
(C)

(D)
- (39) The specific gravity of a  $\text{HNO}_3$  solution is 1.42 and it is 70% w/w. The molar concentration of  $\text{HNO}_3$  is  
 (A) 15.8 (B) 31.6 (C) 11.1 (D) 14.2
- (40) Bleaching powder contains a salt of an oxoacid as one of its components. The anhydride of that acid is  
 (A)  $\text{Cl}_2\text{O}$  (B)  $\text{Cl}_2\text{O}_7$  (C)  $\text{ClO}_2$  (D)  $\text{Cl}_2\text{O}_6$



In the above reaction, if the reactant alcohol is a pure R-isomer, the product would

- (A) have configuration inverted at the chiral atom  
 (B) be a racemic mixture  
 (C) have the same configuration at the chiral atom  
 (D) be optically inactive
- (42) The unit cell of a compound made up of the three elements X, Y and Z is given below.



The formula of this compound is:

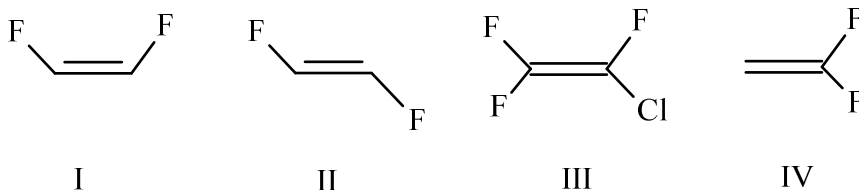
- (A)  $\text{X}_2\text{YZ}_3$                       (B)  $\text{XY}_3\text{Z}$                       (C)  $\text{XYZ}_3$                       (D)  $\text{X}_3\text{YZ}_2$
- (43)  $\text{N}_2$  gas stored in a cylinder, fixed with a movable piston, undergoes adiabatic expansion. The statement that is true for the given situation is
- (A)  $q = w$                       (B)  $\Delta U = w$                       (C)  $\Delta U = 0$                       (D)  $\Delta U = q$

- (44) For the following cell at  $25^\circ\text{C}$  the E.M.F. is, (if  $E^\circ_{\text{M}^{2+}/\text{M}} = 0.347\text{V}$ )

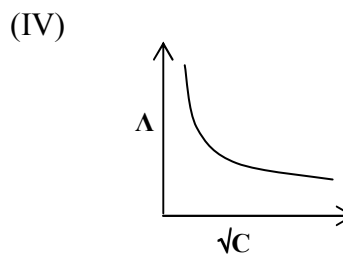
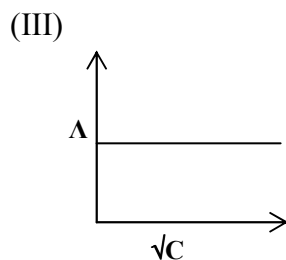
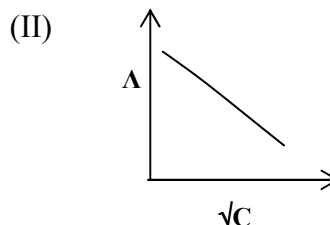
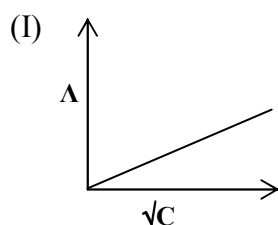


- (A) 0.089V                      (B) 0.598V                      (C) 0.251V                      (D) 0.764 V
- (45) Which of the following hydrogen halides react with  $\text{AgNO}_3$  to give a precipitate that dissolves in hypo solution?
- (I) HCl                      (II) HF                      (III) HI                      (IV) HBr
- (A) (III), (I), (II)                      (B) (I), (III), (IV)  
 (C) (IV), (II), (I)                      (D) (II), (IV), (III)

- (46) The correct order of dipole moment for the following molecules is



- (A)  $IV > I > III > II$                       (B)  $I > IV > III > II$   
 (C)  $III > I > II > IV$                       (D)  $II > III > IV > I$
- (47) The compound that is most reactive with alcoholic KOH is  
 (A)  $CH_2=CH-Br$                       (B)  $CH_3CH_2Br$   
 (C)  $(CH_3)_2CH-Br$                       (D)  $CH_3COCH_2CH_2Br$
- (48) The enthalpy of vaporization of benzene is  $+35.3 \text{ kJ/mol}$  at its boiling point of  $80^\circ\text{C}$ .  
 The entropy change in the transition of vapour to liquid at its boiling point is  
 (A)  $-100$                       (B)  $+100$                       (C)  $+342$                       (D)  $-342$
- (49) For a strong electrolyte, the change in the molar conductance with concentration is represented by

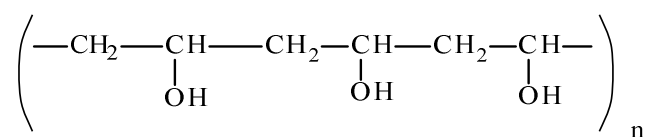


- (A) I                      (B) II                      (C) III                      (D) IV
- (50) The order of basicity is  
 (I)  $Ph-CONH_2$                       (II)  $Ph-NH_2$                       (III)  $Ph-CH_2-NH_2$                       (IV)  $p-OCH_3Ph-NH_2$   
 (A)  $II > IV > I > III$                       (B)  $III > II > IV > I$   
 (C)  $III > IV > II > I$                       (D)  $I > II > IV > III$

- (51) The specific conductance of 0.01M solution of the weak monobasic acid is  $0.20 \times 10^{-3} \text{ S cm}^{-1}$ . The dissociation constant of the acid is:  
 Given:  $\Lambda_{0 \text{ HA}} = 400 \text{ S cm}^2 \text{ mol}^{-1}$   
 (A)  $5 \times 10^{-2}$  (B)  $2.5 \times 10^{-5}$  (C)  $5 \times 10^{-4}$  (D)  $2.5 \times 10^{-11}$

- (52) The set of quantum numbers that **cannot** be allotted to an electron in an atom is  
 (A)  $n = 3, l = 2, m_l = +2, m_s = -1/2$  (B)  $n = 2, l = 0, m_l = +1, m_s = +1/2$   
 (C)  $n = 1, l = 0, m_l = 0, m_s = +1/2$  (D)  $n = 4, l = 3, m_l = 0, m_s = -1/2$

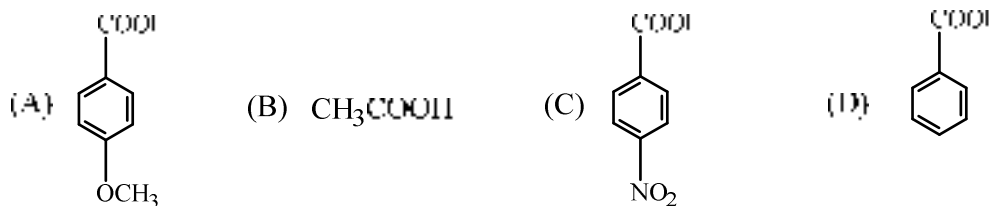
- (53) Polyvinyl alcohol is an important polymer. The structure is given below



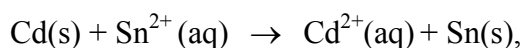
It is prepared by polymerization of

- (A)  $\text{CH}_2=\text{CH-OH}$   
 (B)  $\text{CH}_2=\text{CH-OCOCH}_3$ , followed by hydrolysis  
 (C)  $\text{CH}_2=\text{CH-CN}$ , followed by hydrolysis  
 (D)  $\text{CH}_2=\text{CH-COOCH}_3$ , followed by hydrolysis
- (54) For  $\text{SF}_4$ , the molecular geometry and hybridization of the central atom respectively are  
 (A) Square planar,  $\text{dsp}^2$  (B) Tetrahedral,  $\text{sp}^3$   
 (C) Seesaw,  $\text{sp}^3\text{d}$  (D) Square pyramid,  $\text{sp}^3\text{d}$
- (55) If the energy of an electron in the 1<sup>st</sup> and 2<sup>nd</sup> energy levels of an H atom are  $-13.6 \text{ eV}$  and  $-3.4 \text{ eV}$ , respectively, the energy required in eV to excite an electron from the 1<sup>st</sup> to the 2<sup>nd</sup> energy level is  
 (A) 17.0 (B)  $-17.0$  (C) 10.2 (D)  $-10.2$

- (56) The pK<sub>a</sub> values of the acids A to D are found to be 4.19, 3.41, 4.46 and 4.76. The acid having pK<sub>a</sub> of 3.41 is



- (57) The reaction given below is the cell reaction in a galvanic cell.



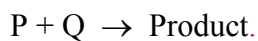
Where,  $[\text{Cd}^{2+}] = 0.1\text{M}$  and  $[\text{Sn}^{2+}] = 0.025\text{M}$

Given:  $E^0_{\text{Cd}^{2+}/\text{Cd}} = -0.403\text{V}$        $E^0_{\text{Sn}^{2+}/\text{Sn}} = -0.136\text{V}$ ,  $F = 96485 \text{ C mol}^{-1}$

At 25°C, the free energy change for this reaction is

- (A) - 48.05 KJ      (B) - 54.96 KJ      (C) - 100.58KJ      (D) - 107.46 KJ
- (58) Triethylamine is reacted with a peracid to obtain X. The nitrogen atom in X has formal charge
- (A) 0      (B) +1      (C) -1      (D) +2
- (59) The species that cannot exist is
- (A) SiF<sub>6</sub><sup>2-</sup>      (B) BF<sub>6</sub><sup>3-</sup>      (C) SF<sub>6</sub>      (D) AlF<sub>6</sub><sup>3-</sup>

- (60) The experimental observations for the following reaction are given below



[P]/ M	[Q]/ M	Initial Rate/mol s <sup>-1</sup>
0.2	0.5	8x10 <sup>-3</sup>
0.4	0.5	3.2 x10 <sup>-2</sup>
0.2	0.25	4x10 <sup>-3</sup>

The order of this reaction is:

- (A) Zero      (B) One      (C) Two      (D) Three

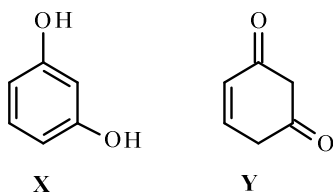
- (61) Absorbance of a chlorophyll solution measured at 660 nm at 25°C using a 1 cm cell was found to be 0.4. The same solution is heated up to 35°C and absorbance is measured once again under the same condition. The observed absorbance will be

(A) 0.2 (B) 0.4 (C) 0.6 (D) 0.8

- (62) The species which is unable to show disproportionation reaction is

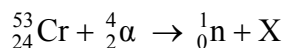
(A)  $\text{ClO}_3^-$  (B)  $\text{ClO}_4^-$  (C)  $\text{ClO}_2^-$  (D)  $\text{ClO}^-$

- (63) At normal temperature, X and Y are



(A) resonance structures (B) tautomers  
(C) functional isomers (D) positional isomers

- (64) The element X formed in the following nuclear reaction is



(A)  ${}_{26}^{56}\text{Fe}$  (B)  ${}_{25}^{55}\text{Mn}$  (C)  ${}_{25}^{56}\text{Mn}$  (D)  ${}_{26}^{55}\text{Fe}$

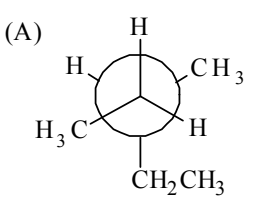
- (65) As part of a diagnostic procedure for a thyroid disorder, a patient is given a certain amount of iodine-131. The half life of this radioactive iodine-131 is 8.0 days. The percent fraction of iodine-131 that will remain in the body after 32 days, if there is no elimination of iodine through the body is

(A) 6.25 (B) 0.0625 (C) 2.77 (D) 25

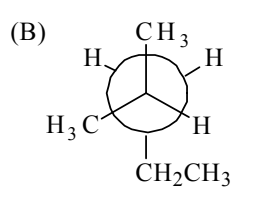
- (66) 1-Phenoxypropane is treated with excess of conc. HI at 0°C and the mixture of products is treated with thionyl chloride. The products formed are-

(A) n-propanol + Chlorobenzene (B) Phenol + n-propyl iodide  
(C) n-propyl chloride + Chlorobenzene (D) n-propyl chloride + Phenol

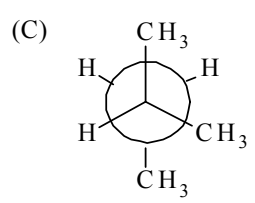
- (67) The compound which undergoes hydrolysis on just warming with water and forms the corresponding hydroxyl derivative is  
 (A) 2,4,6-trinitrochlorobenzene (B) 2-chloro-1-butene  
 (C) 2-chloro-2 methylbutane (D) 2,4-dimethoxychlorobenzene
- (68) The pair of compounds that **will not** react with each other in an aqueous solution, at room temperature is  
 (A)  $\text{FeCl}_3$ ,  $\text{SnCl}_2$  (B)  $\text{HgCl}_2$ ,  $\text{SnCl}_2$   
 (C)  $\text{FeCl}_2$ ,  $\text{SnCl}_2$  (D)  $\text{FeCl}_3$ ,  $\text{KI}$
- (69) At 700K, for the reaction  $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$  the  $K_p$  is  $3.2 \times 10^4$ . At the same temperature the  $K_p$  for the reaction  $\text{SO}_3(\text{g}) \rightleftharpoons \text{SO}_2(\text{g}) + 0.5\text{O}_2(\text{g})$  is  
 (A)  $3.125 \times 10^{-5}$  (B)  $5.59 \times 10^{-3}$   
 (C)  $1.79 \times 10^4$  (D)  $1.79 \times 10^{-2}$
- (70) Amylose and cellulose are polymers of glucose in which glucose units are joined to each other respectively by linkages of the type  
 (A)  $\alpha$ ,  $\beta$  (B)  $\beta$ ,  $\beta$  (C)  $\alpha$ ,  $\alpha$  (D)  $\alpha\beta$ ,  $\beta$
- (71) 2-methylpentane is
- (A)



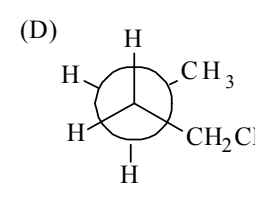
(B)



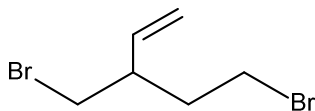
(C)



(D)


- (72) The molecule having the highest dipole moment is  
 (A)  $\text{CO}_2$  (B)  $\text{CH}_4$  (C)  $\text{NH}_3$  (D)  $\text{NF}_3$

- (73) Two samples **A** and **B** of an ideal gas, initially at same temperature and pressure, are compressed from volume  $V$  to  $V/2$ , isothermally for **A** and adiabatically for **B**. The final pressure of **A** will be
- (A) greater than that of **B**                      (B) less than that of **B**  
 (C) twice that of **B**                              (D) equal to that at **B**
- (74) A nitrile **X** is treated with  $\text{LiAlH}_4$  to obtain compound **Y** ( $\text{C}_2\text{H}_7\text{N}$ ). In a separate reaction **X** is hydrolyzed in an acid medium to obtain **Z**. The product obtained after mixing **Y** and **Z** will be
- (A)  $\text{CH}_3\text{CONHCH}_2\text{CH}_3$                       (B)  $\text{CH}_3\text{CH}_2\text{CONHCH}_2\text{CH}_3$   
 (C)  $(\text{CH}_3\text{COO}^-)(\text{CH}_3\text{CH}_2\text{NH}_3^+)$       (D)  $(\text{CH}_3\text{CH}_2\text{COO}^-)(\text{CH}_3\text{NH}_3^+)$
- (75) pH of a saturated solution of magnesium hydroxide in water at 298K is 10.5. The solubility of the hydroxide in water at 298 K is
- (A)  $1.58 \times 10^{-4} \text{ mol L}^{-1}$                       (B)  $1.58 \times 10^{-11} \text{ mol L}^{-1}$   
 (C)  $3.16 \times 10^{-4} \text{ mol L}^{-1}$                       (D)  $9.98 \times 10^{-8} \text{ mol L}^{-1}$
- (76) The species which has triangular planar geometry is
- (A)  $\text{NF}_3$                       (B)  $\text{NO}_3^-$                       (C)  $\text{AlCl}_3$                       (D)  $\text{SbH}_3$
- (77) The order of acidity in aqueous solution for the following acids is
- (A)  $\text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$                       (B)  $\text{H}_2\text{Se} < \text{H}_2\text{S} < \text{H}_2\text{Te}$   
 (C)  $\text{H}_2\text{Te} < \text{H}_2\text{S} < \text{H}_2\text{Se}$                       (D)  $\text{H}_2\text{Se} < \text{H}_2\text{Te} < \text{H}_2\text{S}$
- (78) The IUPAC name of the following compound is



- (A) 5-bromo-3-(bromomethyl)pent-1-ene  
 (B) 3-(1-bromopropyl)-4-bromobut-1-ene  
 (C) 1,4-dibromo-3-ethenylbutane  
 (D) 1-bromo-3-(bromomethyl)but-4-ene



(79) To a solution containing one mole  $\text{MCl}_3 \cdot 4\text{NH}_3$ , on addition of excess silver nitrate solution, it was found that two moles of  $\text{AgCl}$  are precipitated. This observation suggests that the secondary valence of **M** in this complex is

- (A) 3                      (B) 5                      (C) 6                      (D) 2

(80) (i) chlorobenzene is mono-nitrated to **M**

(ii) nitrobenzene is mono-chlorinated to **N**

(iii) anisole is mono-nitrated to **P**

(iv) 2-nitrochlorobenzene is mono-nitrated to **Q**

Out of **M**, **N**, **P** and **Q** the compound that undergoes reaction with aq.  $\text{NaOH}$  **fastest** is

- (A) M                      (B) N                      (C) P                      (D) Q

1																		2																	
H																		He																	
1.008																		4.003																	
3																		10																	
Li Be																		Ne																	
6.941 9.012																		20.180																	
9																		18																	
Na Mg																		Ar																	
22.990 24.305																		39.948																	
19																		36																	
K Ca																		Kr																	
39.098 40.078																		83.80																	
37																		54																	
Rb Sr																		Xe																	
85.468 87.62																		131.29																	
55																		86																	
Cs Ba																		Rn																	
132.91 137.33																		222																	
87																																			
Fr Ra																																			
223 226																																			

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