

**052(E)**  
(MARCH, 2009)

**Time : 3.00 Hours]**

**[Maximum Marks : 100**

**Instructions :**

- (1) This question paper has total **60** questions and **all** are **compulsory**.
- (2) There are four sections A, B, C and D in this question paper. Write your answer in order. *Start writing new section on a new page.*
- (3) Write your answer to the point and with essential chemical equations and figures.
- (4) Use log table for the calculation, which is given by the Board or simple calculator for calculation.

Atomic Wt. (gm / mole) : C = 12, H = 1, O = 16.

$R = 0.082 \text{ Lit} \cdot \text{atm} \cdot \text{mole}^{-1} \cdot \text{K}^{-1}$ .

$R = 1.987 \text{ Calorie/mole-K}$ .

- (5) In this question paper, questions from **1** to **16** are of MCQ type, each of **1** mark belong to **Section-A**. Questions **17** to **32** are of SQ, each carries **1** mark belong to **Section-B**. Questions **33** to **48** are of SQ of **2** marks belong to **Section-C** and Questions **49** to **60** are *long answer type questions* of **3** marks each belong to **Section-D**.

**SECTION - A**

**16**

1. Which substance forms colloidal solution in water ?  
(A) Common salt                      (B) Glucose  
(C) Starch                                (D) Barium Nitrate
2. Which is not an interstitial compound ?  
(A) TiC                                      (B) VC  
(C) WC                                      (D) SiC

3. For which of the following sets of quantum numbers, an electron will have the highest energy ?

	$n$	$l$	$m$	$s$
(A)	3	2	1	$+\frac{1}{2}$
(B)	4	2	1	$+\frac{1}{2}$
(C)	4	1	0	$-\frac{1}{2}$
(D)	5	0	0	$-\frac{1}{2}$

4. Which is the parent element for the Actinium decay series ?

- (A) Thorium - 232                      (B) Plutonium - 241  
 (C) Uranium - 238                      (D) Uranium - 235

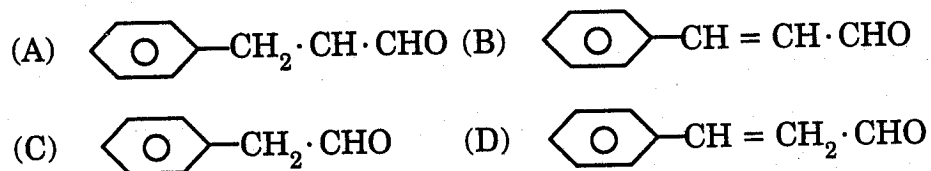
5. Which polymer is used in a safety belt ?

- (A) Dacron                              (B) Neoprene  
 (C) Teflon                                (D) Orlon

6. Useful as an antacid is .....

- (A) Mifepristone                      (B) Promethazine  
 (C) Omeprazole                        (D) Equanil

7. Which is the structural formula of Cinnamaldehyde ?



8. Which radioactive element has long life ?

- (A)  ${}_{100}^{254}\text{Fm}$                               (B)  ${}_{97}^{249}\text{Bk}$   
 (C)  ${}_{92}^{232}\text{U}$                                 (D)  ${}_{95}^{241}\text{Am}$

9. How many number of ions will be released in the aqueous solution of Ferric hexa cyano ferrate (II) ?  
 (A) 4 (B) 5  
 (C) 6 (D) 7
10. How many Oxygen atoms are shared by each  $\text{SiO}_4^{4-}$  units in Berryl mineral ?  
 (A) 2 (B) 3  
 (C) 1 (D) 4
11. Which of the following is the molarity of a solution when the osmotic pressure of a solution is 0.82 atm. at  $27^\circ\text{C}$  temperature ?  
 (A) 0.33 M (B) 0.033 M  
 (C) 3.3 M (D) 0.066 M
12. For the first order reaction, 60 minutes time is required to convert initial concentration of reactant from 0.8 M to 0.1 M, then what will be the  $t_{1/2}$  ?  
 (A) 20 minutes (B) 30 minutes  
 (C) 40 minutes (D) 15 minutes
13. Which of the following substances will not give diazo reaction ?  
 (A) *m* Nitro aniline (B) *o* - Toludine  
 (C) Phenyl methanamine (D) *o* - hydroxy amino benzene
14. Which of the following reactions will not give Chlorine gas as a product ?  
 (A) Oxidation of HCl by  $\text{MnO}_2$ .  
 (B) Oxidation of HCl by  $\text{KMnO}_4$ .  
 (C) Oxidation of  $\text{KClO}_3$  by  $\text{KMnO}_4$ .  
 (D) By electrolysis of concentrated NaCl aqueous solution.
15. Which formula will be useful to find out the change in Entropy, when one mole of an ideal gas expands in vacuum ?  
 (A)  $\Delta S = RT \ln \frac{V_2}{V_1}$  (B)  $\Delta S = nRT \ln \frac{V_2}{V_1}$   
 (C)  $\Delta S = -R \ln \frac{V_2}{V_1}$  (D)  $\Delta S = R \ln \frac{V_2}{V_1}$
16. What will be the equilibrium constant at  $25^\circ\text{C}$ , when standard cell potential of a cell is 0.296 volt and the change of electrons during cell reaction is two ?  
 (A) 10 (B)  $1 \times 10^{10}$   
 (C)  $1 \times 10^{-10}$  (D)  $2.96 \times 10^{-2}$

17. What is meant by Tyndall effect ?
18. On which factor, co-ordination number depends for Crystal lattice ?
19. Write the equation for the non-standard half cell to find out the potential of  $\text{Au}_{(aq)}^{3+} + 3e^- \rightleftharpoons \text{Au}_{(s)}$  reaction.
20. Write the structural formula of the *o*-hydroxy amino ethyl benzoate and also write the relation between the half life period and concentration of reactant for second order reaction.
21. Give the equation when Cinnabar reacts with Quick lime.
22. Give the name and structural formula of neutral Tridentate ligand.
23. By which reaction, isomers of Dicarboxylic acid ( $\text{C}_4\text{H}_4\text{O}_4$ ) can be differentiated ?
24. What is meant by Dia-stereoisomers? Which substance gives these types of isomers ?
25. Give the IUPAC name and molecular formula of a substance which is used as a solvent in paint and in lacquer industries.
26. Write the name and structural formula of a monomer of Butyl rubber.
27. Aluminium is more active metal than the Copper, though Aluminium is more useful for the making of utensils. Why ?
28. Write the equation for the preparation of Melamine polymer.
29. Write the electronic structure of Cyanide and state the type of bond and bond angle in it.
30. Write example of Polypeptide. When its solubility is minimum ?
31. Calculate the mole fraction of Solute in 2.5 molal aqueous solution of Sucrose ( $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ ) .
32. Give example and use of non-ionic Detergent.

33. Give preparation and uses of Perchloric acid.
34. Write equation for the preparation of Copper sulphate and its uses.

35. Write rules of Hume and Rothery for preparation of Alloys.

**OR**

On which factors, various oxidation states of transition elements depend ?

36. Write basic requirements for the formation of Complex compounds.

37. Explain : Moissan electrolytic method.

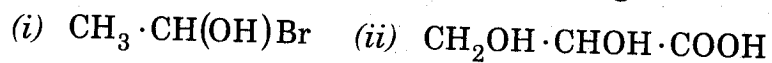
**OR**

Explain : Extraction of Alumina from Bauxite.

38. Write the importance of Stereochemistry. (any four)

39. (a) Which type of isomer of Lactic acid is obtained from muscle?

(b) State R and S configuration of the following substances:-



40. Write only equation for the conversion :

*(Name of substance and structural formula is necessary)*

Cinnamaldehyde from Benzaldehyde.

41. (a) Write the structural formula and IUPAC name of Glycerine.

(b) Solubility of Glycerine is higher than 1-Propanol. Give reason.

42. Write a short note on : Friedel - Crafts' reactions of Methoxybenzene.

43. Write a short note on Carbylamine test of Ethylamine and Aminobenzene.

44. Write conversion in two steps :

*(Name of the product and structural formula is essential)*

Cyanobenzene from Aniline.

**OR**

Acetanilide from Chlorobenzene.

45. Give chemical reactions of Acetic anhydride.
46. Write short note on :  
Self condensation polymerisation polymer of Polyamide group.
47. What is  $\alpha$  - Amino acid ? Write physical properties of Amino acid.
48. By giving equations, prove  $-\text{OH}$  and  $\text{>C}=\text{O}$  groups present in Glucose.

**SECTION - D**

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49. Write a short note on "Werner's theory".
50. Define : Unit cell and write a short note on Diamagnetic substances.
51. Explain : Langmuir adsorption isotherm.

**OR**

Explain : Hardy - Schulze rules in terms of Coagulation.

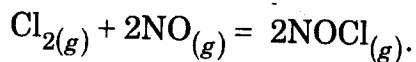
52. Give the classification of Vitamins. Which disease arise due to deficiency of vitamins ?

**OR**

Classify Ceramics and give their uses.

53. What are Carbon fibres ? Give the uses of Carbon fibres (any four).
54. What is meant by HDP and LDP ?  
Explain : Modification in properties of polymer substances.

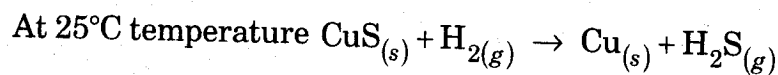
55. At 360°C temperature, the following are the results of three experiments carried out for determination of differential rate of reaction :



- (i) Derive differential rate law of this reaction.  
 (ii) Calculate order of reaction.  
 (iii) Find value of rate constant.

Experiment No.	Initial Concentration (mole / lit)		Initial rate of reaction $-\frac{d[\text{Cl}_2]}{dt}$ mole. lit <sup>-1</sup> . sec <sup>-1</sup>
	Cl <sub>2</sub>	NO	
1.	0.06	0.03	0.0054
2.	0.06	0.08	0.0384
3.	0.02	0.08	0.0128

OR



For this reaction :

- (i) Calculate the equilibrium constant.  
 (ii) On which temperature and at 1 atm. pressure, the value of  $\Delta G^\circ$  will be zero ?

(For this reaction the value of  $\Delta H^\circ$  and  $\Delta S^\circ$  is 7.77 K.Cal. and 10.03 Cal./mole-K respectively)

56. Write a short note on intermolecular attraction forces.  
 Melting point of P<sub>4</sub> is more than that of N<sub>2</sub>. Why ?
57. Half life time of <sup>226</sup>Ra is 1620 years. How many  $\alpha$ -particles will be released per minute from 2.5 gm. <sup>226</sup>Ra sample ? Each <sup>226</sup>Ra nucleus releases one  $\alpha$ -particle.

58. Define : Primary cell and Secondary cell.

Discuss : Hydrogen fuel cell.

**OR**

Explain Faraday's laws of Electrolysis.

59. Write the Second law of Thermodynamics.

Discuss : Free energy and Second law of Thermodynamics.

60. Explain: Henry's law and give its limitations.

**OR**

Define Molal depression constant and derive the equation for Molal depression constant.

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