This Question Paper contains 8 Printed Pages.

052(E)

(MARCH, 2008)

Time : 3.00 Hours] ***[Maximum Marks : 100***

Instructions :

1. This question paper contains **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 and also write new section on a new page.
3. Write your answer to the point and with essential chemical equation and figure.
4. Use log table or simple calculator for calculations.

Constant value -

(i) $h = 6.626 \times 10^{-27}$ erg-sec.

(ii) R = 8.314 Joule K^{-1} $Mole^{-1}$

(iii) Molar Heat of Vapourisation of Water = 9720 Cal. K^{-1} $mole^{-1}$

(iv) Atomic weight : Na = 23 gm / mole, O = 16 gm / mole.
H = 1 gm / mole.

SECTION - A

*Question Nos. from **1** to **16** are multiple type. Each question carries **1** mark.* **16**
Select the correct option from the following.

1. Which type of structure possesses in Ferrocene ?

(A) Tetrahedral (B) Trigonal bipyramidal
(C) Sandwich (D) Octahedral

2. 2.4 Å =

(A) 2.4×10^{-10} c.m. (B) 0.24 n.m.
(C) 2.4×10^{-8} m. (D) 2.4 n.m.

3. Which type of different crystal forms of same salt of same crystal type contain cation with the same co-ordination number ?

(A) CaF_2 (B) Zinc blende
(C) ZnS (D) Wurtzite

4. If log K is plotted against $\frac{1}{T}$, a straight line graph is obtained, then find out the value of slope from the following.

(A) $\frac{E_a}{2.303\,R}$ (B) $-\frac{E_a}{3.203\,R}$

(C) $-\frac{2.303\,R}{E_a}$ (D) $-\frac{E_a}{2.303\,R}$

5. In Freundlich's adsorption isotherm, the value of x/m does not increase suddenly because

(A) $n < 1$ (B) $n = 0$
(C) $n - 1 = 0$ (D) $n > 1$

6. Which substance is used to get very low temperature by its magnetic effect ?

(A) CeO_2 (B) Lanthanide oxide
(C) Gadolinium sulphate (D) Thulium sulphate

7. What is the theoretical value of magnetic moment of $[Ni(Cl)_4]^{2-}$ complex ion ?

(A) 3.82 B.M. (B) 2.83 B.M.
(C) 4.9 B.M. (D) 1.73 B.M.

8. If in octahedral arrangement, M is metal ion and a and b are two types of Three and Three legands, then which two type of geometrical isomerism results ?

(A) Cis - Trans (B) Leavo-Dextro
(C) Facial-Meridional (D) None of them

9. 1 MeV = ...

(A) 9.6×10^{10} K. Joule Mole $^{-1}$ (B) 9.6×10^{-10} Joule Mole $^{-1}$
(C) 9.6×10^{10} Joule Mole $^{-1}$ (D) 9.6×10^{10} K. Cal. Mole $^{-1}$

10. If a molecule has n different chiral centres, then it will have how many possible stereo-isomers ?

(A) 2^n (B) n^2

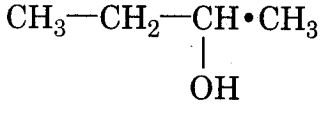
(C) 2^{n+1} (D) 2^{n-1}

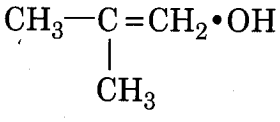
11. What is the general formula of homologous series of Alcohol ?

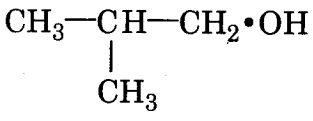
(A) $C_nH_{2n}.OH$ (B) $C_nH_{2n-1}.OH$

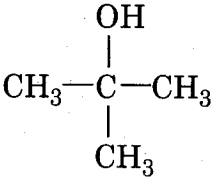
(C) $C_nH_{2n+1}.OH$ (D) $C_nH_{2n+2}.OH$

12. Which is the correct formula of Isobutyl Alcohol ?

(A) 

(B) 

(C) 

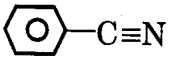
(D) 

13. Which type of hybridization is to be seen between C and N in Cyanides $(R-C\equiv N)$?

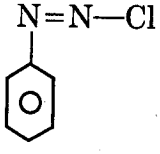
(A) sp^2 (B) sp^3

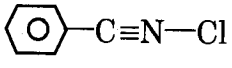
(C) sp (D) dsp^2

14. Which organic compound is formed by the diazotization of Aniline ?

(A) 

(B) 

(C) 

(D) 

15. Corn converts Glucose into which substance ?

(A) Proteins (B) Cellulose

(C) Starch (D) Lactose

16. Which is the biggest communication satellite sent into the space under Metsat-Mission ?

(A) PSLV-C3 (B) PSLV-C2

(C) PSLV-C4 (D) PSLV

SECTION-B

Question Nos. from ***17*** *to* ***32*** *are very short type.* **16**
Each question carries ***one*** *mark. Answer the following in short.*

17. Give the value of $n\lambda$ in Bragg equation.

18. About how many Schottky pairs per cubic c.m. at room temperature are found in the crystals of NaCl ?

19. Find out the % w/w of NaOH, if we make 500 grams of aqueous solution by dissolving 50 grams of NaOH ?

20. The osmotic pressure of a solution prepared by dissolving 2 grams of unknown substance in water and making 2 litres at 27°C temperature is found to be 0.4 atmosphere. Calculate the molecular weight of the substance.

21. State the unit of Equivalent conductance and Molar conductance.

22. Which are the two known theories for the study of Chemical Kinetics ?

23. What is called multi-molecular colloids ?

24. State the characteristics of Ultra filtration. How it can be prepared ?

25. Write the uses of NaF and SnF_2.

26. Give the equation of radioactive decay of Radium $^{226}_{88}Ra$.

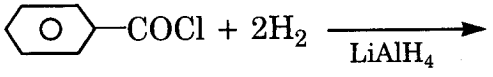
27. Complete the reaction :

$K_2MnO_4 + H_2SO_4 \rightarrow$

28. The photographic film is washed with the aqueous solution of which chemical ?

29. State Reimer Tiemann reaction with equation only.

30. Complete the following reaction with structural formula and name of product.



31. State the structural formula of Aldohexose and Ketohexose.

32. What is called Biomolecules ? Give its illustration.

SECTION - C

Question Nos. from ***33*** *to* ***48*** *are short answer type questions.* **32**
Each carries ***two*** *marks.*

33. A particle having a mass of 1×10^{-4} gram has a velocity of 3600 km/ hour. Calculate the wave-length of the particle in Å unit.

34. Calculate the total numbers of atoms in the body centered (BCC) and face centered (FCC) cubic close packed structure per unit cell.

35. What will be the change in Entropy when two moles of water are converted into its vapour at that temperature by boiling at 100°C ? Also calculate the change of Entropy in SI unit.

36. Draw the figure of Daniell cell with full nomenclature and mention its representation.

OR

State only reactions of anode and cathode in Lead Storage cell and Hydrogen Fuel cell.

37. Explain the types of Catalysis with illustration (any one)

38. Explain the isolation of Silicon from silica sand with chemical equation and give the name of the method to purify it.

39. Explain why the Transition metals and some of their compounds are used as catalysts ?

40. Write the uses of Lanthanide elements (any four).

41. What are called Particle Accelerators ? Give two illustrations of them.

OR

Explain the nuclear fission of Uranium $^{235}_{92}U$.

42. Draw the structural formula of non-super imposable mirror images or a pair of Enantiomers and internally compensated molecule (meso) in tartaric acid.

43. Explain the stereo-selective and stereo-specific reaction of Cis and Trans 2– Butene, when it reacts with Br_2.

44. State the conversion of Methane from Methyl cyanide with essential condition and chemical equation.

45. Give the name of bio-polymers which are very essential for human life, as well as the name of first bio-degradable polymer which was used for post operative stitches.

46. What is meant by Essential Amino acids ? State the classification of amino acids only.

47. Explain Bio-soft and Bio-hard Detergent with examples.

48. Write the uses of Carbon fibres (any four).

OR

What are called preservatives and edible colours ? Give two examples of each.

SECTION - D

*Question Nos. from **49** to **60** are long answer type questions.* **36**
*Each carries **three** marks. Answer the following to the point.*

49. *p* orbitals are directional. Explain it with figure.

OR

Explain hybridization in SF_6 with electronic configuration and geometry.

50. Give proof for Raoult's law and its limitations (any two).

51. Explain Gibb's free energy and useful work.

52. How much electric current must be passed from water to obtain 100 ml. O_2 gas per minute at 27°C temperature and 1 atomsphere, when water is electrolysed?

OR

The potential of a standard electro-chemical cell is 1.10 volt at 25°C temperature. Calculate the equilibrium constant and free energy change ΔG° (in colours) of the following given reaction :

$$Zn_{(s)} + Cu^{2+}_{(aq)} \rightleftharpoons Zn^{2+}_{(aq)} + Cu_{(s)}$$

53. Derive the equation for Rate Constant and Half-life time $\left(t_{1/2}\right)$ for zero order reaction (Graph is essential).

54. Explain industrial manufacture of Sulphuric acid by Contact process with essential equations (figure is not essential) and also give the structural formula of Sulphuric acid.

55. What are Ligands ? Explain its classification with proper examples.

OR

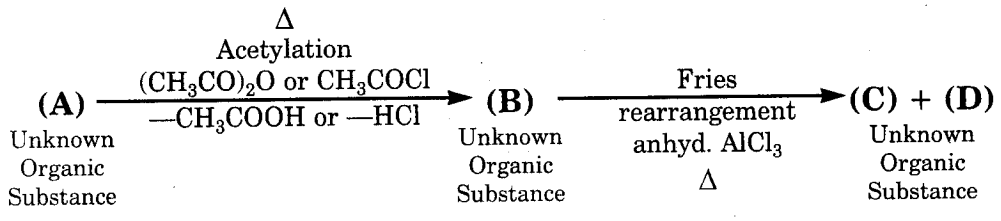
Explain Optical isomerism in $[Cr(C_2O_4)_3]^{3-}$ complex ion with mirror images.

56. What is the characteristic of Radio-isotope ? Write the uses of radio-isotope in Chemistry, Medicine and Agriculture.

OR

In a sample, containing ^{14}C , the radio-activity is found to be 60% as compared to the living sample. If the Half-life period of ^{14}C is 5770 years, then calculate the age of the sample.

57. Find out the 'unknown organic substance, (A, B, C and D) with structural formula and its name in the following given equation.



58. How can you prepare 1°, 2° and 3° alcohol from carbonyl compounds (aldehydes & ketones) by using Grignard reagent ? Explain it with equation.

59. Explain with equation - *(i)* Acetylation of Aniline.

(ii) Diazotization of Aniline.

60. Give industrial production of the following with equations :

(i) Nylon - 66

(ii) Butyl rubber

OR

Explain the modification of properties of Polymer substances.
