052(E)

(JULY, 2008)

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

Instructions :

(1) This question paper contains **60** questions. **All** are **compulsory**.

(2) Write each new section with a new page and write answers of the questions in their order.

(3) Write your answers according to instructions pointwise and to the point. Draw figure and give reactions wherever required.

(4) Section-A contains **1** to **16** multiple choice questions, each of **1** mark.

(5) Section-B contains **17** to **32** very short answered questions, each of **1** mark.

(6) Section-C contains **33** to **48** short answered questions, each of **2** marks.

(7) Section-D contains **49** to **60** long answered questions, each of **3** marks.

(8) Use log-table provided by Board, or a simple calculator provided for your calculations.

(9) Use Pencil for figure drawing and Blue-pen for your writing in the Answer Book.

(10) Constants :

$R = 1.987$ Cal./ mole °K.

$= 8.314$ Joule / mole °K.

SECTION-A   16

1.   2 litre of a solution contains 5 mole solute and 45 mole solvent. Mole fraction of solute is ....

    (A)   5.0   (B)   10.0

    (C)   0.5   (D)   0.10

2. The equation to determine the change in free energy alongwith the change in pressure-volume change at constant temperature is ....

(A) $\Delta G = nRT \log \dfrac{P_2}{P_1}$

(B) $\Delta G = nRT \log \dfrac{V_2}{V_1}$

(C) $\Delta G = nRT \, l_n \dfrac{V_1}{V_2}$

(D) $\Delta G = nRT \log \dfrac{P_2}{P_1}$

3. Unit of rate constant of 3rd order reaction is ....

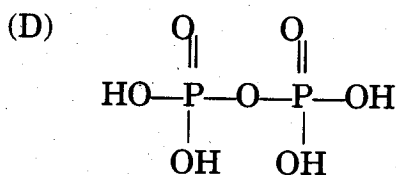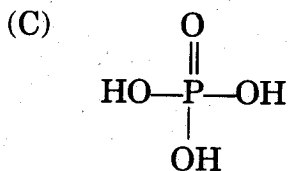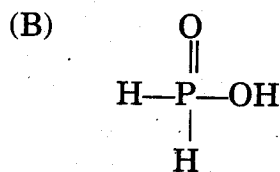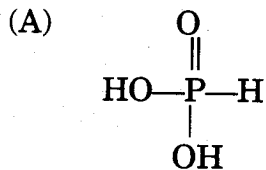(A) $\dfrac{(\text{Litre})^2}{(\text{Mole})^2 \, \sec}$

(B) $\sec.^{-1}$

(C) $\left(\dfrac{\text{Mole}}{\text{Litre}}\right)^{-1} \cdot \sec^{-1}$

(D) $\left(\dfrac{\text{Litre}}{\text{Mole}}\right)^2 \cdot \sec$

4. Catalyst which convert alcohol directly into gasolene.
   (A) ZSM-5
   (B) Zinc stearate
   (C) Zinc Blende
   (D) PHBV

5. Which structure indicate Phosphinic acid?

(A)

O
‖
HO—P—H
|
OH

(B)

O
‖
H—P—OH
|
H

(C)

O
‖
HO—P—OH
|
OH

(D)

O   O
‖   ‖
HO—P—O—P—OH
| |
OH   OH

6. Transition ion of which compound has maximum magnetic moment?
   (A) $MnSO_4$
   (B) $Cr_2(SO_4)_3$
   (C) $FeSO_4$
   (D) $CuSO_4$

7. Which is the structural formula of Sodium tris oxalato ferrate (III) ?
   (A) $Na[Fe(Ox)_3]$
   (B) $Na_2[Fe(Ox)_3]$
   (C) $Na_3[Fe(Ox)_3]$
   (D) $Na_3[Fe(Ox)_3]_2$

8. Which character will exhibit α particles?
    (A) Al foil like thin paper can stop it.
    (B) Only more thick Al strip can stop it.
    (C) 15-20 cm thick Al strip can stop it.
    (D) 15-20 cm thick tin metal strip can stop it.

9. l-Epinephrine is how much more effective to raise blood pressure than its d isomer?
    (A) 500 times   (B) 20 times
    (C) 50 times   (D) 10 times

10. The use of a substance obtained by hydrolysis of ethylene oxide in presence of H_2SO_4 at 80°C is .....
    (A) As a rubber solvent   (B) as a filler
    (C) for Nylon fibres   (D) for terrylene fibres.

11. Which of the following substance undergoes Aldol condensation?
    (A) C_6H_5CHO (B) $CH_3 \cdot CHO$
    (C) $H.CHO$ (D) All of above.

12. Which of the following has highest boiling point?
    (A) Ethanol   (B) Ethanal
    (C) Glycerol   (D) Ethyl amine

13. What type of the polymer Novolac is?
    (A) Branched   (B) Linear
    (C) Cross-linked   (D) Thermoplastic

14. Joining of which Carbon of Glucose unit form Starch?
    (A) C-1 and C-2   (B) C-1 and C-3
    (C) C-1 and C-4   (D) C-1 and C-5

15. Which of the following is LAS?

    (A) $CH_3 \cdot (CH_2)_x - \langle \bigcirc \rangle - SO_3^- Na^+$

    (B) $CH_3 - (CH_2)_{11} - O\ SO_3^- Na^+$

    (C) $CH_3 - (CH_2)_{15} - N^+ (CH_3)_3 \cdot Cl^-$

    (D) $CH_3 \cdot (CH_2)_{10} - CH_2 - O - SO_3^+ - Na^-$

16. The substance having no specific molecular formula but useful in manufacturing of Machinery is ......
   (A) Fe_2S_3
   (B) $FeSO_4$
   (C) $Fe_2(SO_4)_3$
   (D) Fe_3C

SECTION-B

16

17. Who proved the de-Broglie's principle experimentally? How?

18. Draw the structure of Diamond and write its type of hybridization.

19. Define : Colligative properties.
   OR
   Define : Osmosis.

20. What will be the change in entropy, when 18 grams of Water is converted into its vapour at 100°C temperature?
   Heat of Vapourisation of Water is 9720 cal/mole.

21. Define : Cell Potential

22. Write uses of SnO_2 (two).

23. Write any one chemical reaction to prepare Chlorine in laboratory.

24. State the type of classification of ligands exist in complex ion $[Pt(en)_2Cl_2]^{2+}$.

25. Calculate ratio of Neutron and Proton of the element obtained by emission of $\alpha-$ particle from $^{232}_{90}Th$.

26. What are Isomorphous?

27. Write Van't-Hoff rule in terms of Stereo-isomers.

28. Draw electronic structure of Methanol.

29. Write : Decarboxylation reaction of Acetic acid.
   OR
   Write : Reaction to prepare Acetic anhydride from Acetic acid.

30. Diazotisation reaction is carried out at a low temperature. Why?

31. How Dextran is produced? State its use.

32. What are Nucleoside and Nucleotide?

SECTION-C   32

33. Explain the evolution of Spin Quantum Number.

34. Explain Raoult's law for the solution which possess solute gas in a liquid solvent.

35. Write short note on : Substitutional Solid Solution.

36. Write difference between Electro-chemical cell and Electrolytic cell - (state 4 points).

37. Explain the equation of average rate of reaction by graph showing the change in concentration of reactants and products with time.

38. The first order reaction takes 20 minutes to complete 15% of its concentration, calculate what time will be required to complete its 75% concentration?

OR

The rate constant of a reaction is 2.0×10^{-3} min.$^{-1}$ at 27 °C. If the temperature is increased by 20 °C, its value becomes three times. Calculate energy of activation.

39. On which principle the Langmuir adsorption isotherm depends? Write its hypothesis.

40. Uses of adsorption (any four).

41. Give chemical reactions for preparation of K_2Cr_2O7.

OR
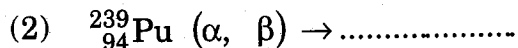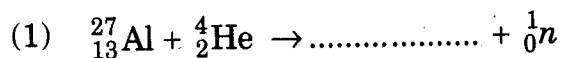
How photographic plate is prepared? Explain the preparation.

42. Explain structure of complex ion in $K_2[Ni(CN)_4]$ on the basis of hybridisation.

OR

State magnetic moment of metal ion present in $[Fe(H_2O)_6]^{3+}$ and $[Fe(CN)_6]^{3-}$. Give reason for their different values.

43. Complete reactions :

(1) $^{27}_{13}\text{Al} + ^{4}_{2}\text{He} \rightarrow$ .... $+ ^{1}_{0}n$

(2) $^{239}_{94}\text{Pu}\ (\alpha,\ \beta) \rightarrow$ ....

44. What is called Nuclides? State the element Z=90 atomic weight with 230 and 228 in the form of nuclides.

45. Write short note on Di-saccharides.

46. Give structural formula of α-amino acid obtained by hydrolysis of Protein. Write names of any two amino-acids occur in nature.

47. Explain : Mordant Dyes.

OR

How Ceramics are obtained? Write names of ceramics used in cutting and grinding tools.

48. Write short note on :

Synthetic Sweetners.

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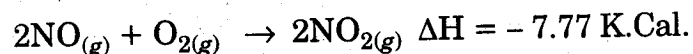**SECTION-D**   **36**

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49. Describe energy band model. Explain the various electrical conductivity observed in substances on the basis of this theory.
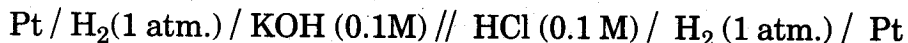
50. Write short note on :

(1) Ferromagnetic substances.

(2) Anti-ferromagnetic substances.

51. At 25°C K_p for the given reaction is 1.792×10^{12}. Calculate its entropy change.

ΔS . R=1.987 Cal./K.

$2NO_{(g)} + O_{2(g)} \rightarrow 2NO_{2(g)}$ $\Delta H = -7.77$ K.Cal.

52. At 25°C, the potential of the following given cell is 0.71 V. Calculate the ionic product of Water (K_w).

Pt / H_2 (1 atm.) / KOH (0.1M) // HCl (0.1 M) / H_2 (1 atm.) / Pt

OR

At 25°C, the potential of the following cell is 1.041 V; calculate the pH of HCl solution. $E^0 Ag^+ / Ag = 0.8$ V.

Pt / H_2 (1 atm.) / HCl (x M) // Ag^+ (0.01 M) / $Ag_{(s)}$.

53. Name the oxy-acids of Phosphorus, giving their molecular and structural formula (any Six).

OR

Describe Contact process for manufacturing of H_2SO_4, stating chemical reactions. Also give electronic structural formula of H_2SO_4.
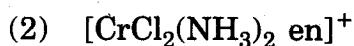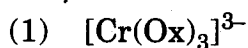
54. Discuss the magnetic properties of Transition ions or compounds. The experimental values of magnetic moment of some compounds differ than their theoretical values. Why?

OR

What is Actinide series ?

State properties and uses of the elements of this series.

55. Define Chelates. Give structures of Optical isomers of the following.

   (1) $[Cr(Ox)_3]^{3-}$

   (2) $[CrCl_2(NH_3)_2 en]^+$

   OR

Write application of Complex compounds.

56. Explain importance of Stereo-chemistry.

57. (i) Aliphatic compounds containing –OH group are neutral but Aromatic compounds containing –OH group are acidic. Why?

   (ii) Explain Reimer-Tiemann reaction.

58. Explain by giving chemical reaction for the intermediate obtained by reaction of Methyl magnesium iodide with Ethanal and Propanone which give alcohols on their hydrolysis.

OR

Explain Condensation reaction of Aldehyde and Ketone compounds by reactions only.

59. *(i)* Write Conversion :

Ethyl acetate from Acetamide.

(ii) Complete the reaction :

$$\text{Propane} \xrightarrow[\text{400° C}]{\text{Fuming HNO}_3}$$
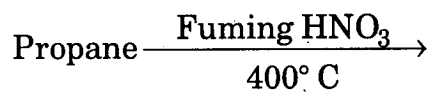
60. Write preparation of Vulcanised rubber. State its properties and uses.

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