

**A****7035**Register  
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**Part III — CHEMISTRY**

( English Version )

Time Allowed : 3 Hours ]

[ Maximum Marks : 150

Note : Draw diagrams and write equations wherever necessary.

**PART - I**

Note : i) Answer all the questions.

ii) Choose and write the correct answer.  $30 \times 1 = 30$ 

- Which compound is formed when excess of KCN is added to an aqueous solution of copper sulphate ?
  - $\text{Cu}(\text{CN})_2$
  - $\text{K}_2[\text{Cu}(\text{CN})_6]$
  - $\text{K}[\text{Cu}(\text{CN})_2]$
  - $\text{Cu}_2(\text{CN})_2 + (\text{CN})_2$
- Alloys of Lanthanides are called as
  - Mish metals
  - Metalloids
  - Plate metal
  - actinides.
- Lanthanide contraction is due to
  - perfect shielding of 4f electrons
  - imperfect shielding of 4f electrons
  - perfect shielding of 3d electrons
  - imperfect shielding of 3d electrons.
- An example of a chelating ligand is
  - nitro
  - chloro
  - bromo
  - en.

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37. Write the uses of Radio carbon dating.
38. What is molecular crystal ? Give an example.
39. Calculate the maximum % efficiency possible from a thermal engine operating between  $110^{\circ}\text{C}$  and  $25^{\circ}\text{C}$ .
40. Define reaction quotient.
41. What is pseudo first order reaction ? Give example.
42. Write the Arrhenius equation and explain the terms.
43. Write any three general characteristics of catalytic reaction.
44. What is common ion effect ? Give example.
45. Distinguish racemic mixture from mesoform.
46. How can Terylene be prepared ?
47. How is tertiary butyl alcohol converted to isobutylene ?
48. How can acetophenone be prepared by Friedel-Crafts reaction ?
49. What is aspirin ? How is it prepared ?
50. An organic compound A of molecular formula  $\text{C}_2\text{H}_5\text{ON}$  treated with bromine and KOH gives B of molecular formula  $\text{CH}_5\text{N}$ . Identify A and B. Write the equation involved.
51. Write any three characteristics of dyes.

### PART - III

Note : Answer any seven questions choosing at least two questions from each Section. 7 × 5 = 35

### SECTION - A

52. Derive de-Broglie's equation.
53. Explain the extraction of zinc from its ore.
54. Write any five differences between lanthanides and actinides.

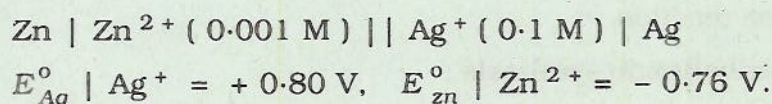


55. For the complex  $K_4 [ Fe ( CN )_6 ]$  mention the following :

- IUPAC name
- Central metal ion
- Ligand
- Co-ordination number
- Charge on the complex ion.

#### SECTION - B

- Write the characteristics of free energy  $G$ .
- Derive the expressions for  $K_c$  and  $K_p$  for decomposition of  $PCl_5$ .
- Write the characteristics of order of reaction.
- Calculate the e.m.f. of the cell :



#### SECTION - C

- Distinguish aliphatic and aromatic ethers.
- How is acetone converted to —
  - mesityl oxide
  - mesitylene ?
- Write the mechanism of esterification reaction.
- Explain briefly on characteristics of rocket propellants.

#### PART - IV

Note : i) Question No. 70 is compulsory and answer any *three* from the remaining questions.

ii) Answer *four* questions in all.

$4 \times 10 = 40$

- How do electronegativity values help to find out the nature of bonding between atoms ?
  - How are noble gases separated by Dewar's method ?

**A**

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65. a) Write the application of VB theory on the following complexes :
- $[\text{Fe}^{\text{II}}(\text{F})_6]^{4-}$
  - $[\text{Fe}^{\text{II}}(\text{CN})_6]^{4-}$ .
- b) Differentiate between chemical reaction and nuclear reaction.
66. a) Write the properties of ionic crystals.
- b) How can colloidal solutions be purified by dialysis ?
67. a) Derive Henderson equation.
- b) Write IUPAC representation of a cell.
68. a) Explain geometrical isomerism with example.
- b) How to do the following conversions ?
- Lactic acid to lactide
  - Salicylic acid to methyl salicylate.
69. a) Write the following reactions :
- Carbylamine reaction
  - Gabriel's phthalimide synthesis .
- b) How are carbohydrates classified ? Give example for each.
70. a) An organic compound A ( $\text{C}_2\text{H}_6\text{O}$ ) liberates hydrogen with sodium metal. A when heated with alumina at 620 K gives an alkene B which when passed through Bayer's reagent gives C ( $\text{C}_2\text{H}_6\text{O}_2$ ). C reacts with  $\text{PI}_3$  and gives back B. Identify A, B and C. Write the reactions.
- b) The chief ore of chromium A on roasting with molten sodium carbonate gives compound B. Compound B on acidification with conc.  $\text{H}_2\text{SO}_4$  gives compound C. Compound C on treatment with KCl gives compound D. Identify A, B, C and D. Explain the reactions.
- OR
- c) An organic compound A ( $\text{C}_7\text{H}_8$ ) on oxidation by air in the presence of  $\text{V}_2\text{O}_5$  at 773 K gives B ( $\text{C}_7\text{H}_6\text{O}$ ), which reduces Tollen's reagent. B when heated with acetic anhydride and sodium acetate gives C ( $\text{C}_9\text{H}_8\text{O}_2$ ). Identify A, B and C. Write the reactions.
- d) Calculate the pH of 0.1 M acetic acid solution. Dissociation constant of acetic acid is  $1.8 \times 10^{-5}$  M.