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Part III — CHEMISTRY

(English Version)

Time Allowed : 3 Hours]

[Maximum Marks : 150

- Note :
- i) Answer *all* the questions from **Part - I**.
 - ii) Answer any *fifteen* questions from **Part- II**.
 - iii) Answer any *seven* questions from **Part - III** covering all Sections and choosing at least *two* questions from each Section.
 - iv) Question No. **70** is compulsory. Answer any *three* from the remaining questions in **Part - IV**.
 - v) Draw diagrams and write equations wherever necessary.

PART - I

Note : Answer *all* the questions.

30 × 1 = 30

Choose and write the correct answer :

1. The metal used in galvanising iron sheets is

a) chromium	b) zinc
c) copper	d) silver.

2. Among the Lanthanide elements, with the increase in atomic number the tendency to act as reducing agent

a) increases	b) decreases
c) no change	d) none of these.

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41. Show that for a first order reaction time required for 99% completion is twice the time required for 90% completion of the reaction.
42. What are consecutive reactions ? Give an example.
43. Write a note on auto-catalyst.
44. What is meant by common ion effect ?
45. Mesotartaric acid is optically inactive. Justify.
46. Give a brief account on coupling reaction of phenol with benzene diazonium chloride.
47. Give any three uses of benzyl alcohol.
48. How is urotropine prepared ? Mention its use.
49. Write a note on HVZ reaction.
50. What is Gabriel phthalimide synthesis ?
51. Write a brief note on 'Antiseptic'.

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. How is gold extracted from its ore ?
54. Describe the extraction of lanthanides from monazite sand.
55. For the complex $K_4 [Fe (CN)_6]$

mention

- a) IUPAC name
- b) Central metal ion
- c) Geometry of the complex
- d) Ligand
- e) Co-ordination number.

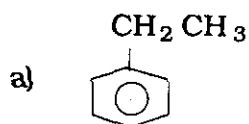
B

SECTION - B

56. State the various statements of second law of thermodynamics.
57. The dissociation equilibrium constant of HI is 2.06×10^{-2} at 458 K. At equilibrium the concentrations of HI and I_2 are 0.36 M and 0.15 M respectively. What is the equilibrium concentration of H_2 at 458 K ?
58. Discuss the characteristics of a first order reaction.
59. Derive Nernst equation.

SECTION - C

60. Distinguish between anisole and diethyl ether.
61. Explain the mechanism of aldol condensation of acetaldehyde.
62. How is benzoic acid obtained from



- b) Phenyl cyanide
- c) Carbon dioxide ?
63. Write a note on anaesthetics.

PART - IV

Note : Question No. 70 is compulsory and answer any *three* from the remaining questions. 4 × 10 = 40

64. a) Explain the various factors that influence electron affinity. 5
- b) Describe in detail how noble gases are isolated from air by Ramsay-Rayleigh's method. 5
65. a) Apply VB theory to find out the geometry of $[Ni(NH_3)_4]^{2+}$ and calculate its magnetic moment. 5
- b) Write about radiocarbon dating. 5

B

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66. a) Explain Bragg's spectrometer method. 5
b) Write any two chemical methods for the preparation of colloids. 5
67. a) Derive Henderson equation. 5
b) Establish a relation between free energy and *e.m.f.* 5
68. a) Distinguish racemic form from Meso form with suitable example. 5
b) Discuss the isomerism exhibited by carboxylic acid. 5
69. a) How are the following conversions carried out ?
i) Nitrobenzene to phenyl hydroxylamine
ii) Aniline to phenyl isocyanide
iii) Benzene diazonium chloride to biphenyl. 5
- b) What is a peptide bond ? Illustrate the formation of a peptide bond in glycyl alanine. Draw the structures of glucose and fructose. 5
70. a) An organic compound A (C_7H_6O) reduces Tollen's reagent. On treating with an alkali compound A forms B and C. B on treating with sodalime forms benzene and C (C_7H_8O) is an antiseptic. Identify compounds A, B and C. Explain the reactions. 5
- b) The sulphide ore of an element of group 12 when roasted gave compound A which on reduction with carbon gave the element B. The carbonate C of this element is used for skin diseases. Identify A, B and C and write the required reaction. 5

OR

- c) An organic compound A of molecular formula C_6H_6O gives violet colouration with neutral $FeCl_3$. Compound A on treatment with metallic Na gives compound B. Compound B on treatment with CO_2 at 400 K under pressure gives C. This product on acidification gives compound D ($C_7H_6O_3$) which is used in medicine. Identify A, B, C and D and explain the reactions. 5
- d) Find the pH of a buffer solution containing 0.2 mole/l of CH_3COONa and 0.15 mole/l of CH_3COOH . K_a for acetic acid is 1.8×10^{-5} . 5