Reg No. ……..
Name …….

MODEL EXAMINATION

Part III
CHEMISTRY

HSE II

60 Score
Time:2 Hours
Cool off Time : 15min

General Instruction to Candidates

- There is a 'cool-off time' of 15 minutes in addition to the writing time of 2 Hrs.
- You are not allowed to write your answer or to discuss anything with others during the 'cool off' time.
- Use the 'cool-off' time to get familiar with questions and to plan answers.
- Read questions carefully before answering.
- All questions are compulsory and only internal choice is allowed.
- When you select a question, all the sub- questions must be answered from the same question itself.
- Calculations, figures and graphs should be shown in the answer sheet itself.

1. (a) Ionic solids having Crystal Defects develop colour. Explain the colour of KCl as violet and ZnO as yellow on the basis of Crystal Defects. (2)
   (b) An element with Molecular mass $2.7*10^{-2}Kgmol^{-1}$ forms a cubic unit cell with edge length 405pm. If its density is $2.7*10^{3}$ Kgm^{-3} what is the nature of the cubic unit cell ? (2)
2. (a) In a class room discussion Raju argued that Molarity is temperature dependent whereas Molality is temperature independent.
   (i) Explain your opinion by giving reason. (1)
   (ii)Define Molarity and Molality. (1)
   (b)Calculate the mass of urea (NH_2CONH_3) required in making 2.5kg of 0.25molal aqueous solution. (2)

3. Automobiles use Lead storage Battery.
   . (a) Name the cathode and anode of this battery. (1)
   (b) Write the cell reactions. (2)
   (c) Why it is called a secondary cell. (1)
4. Explain the following terms in connection with kinetics of chemical reactions.
   (a) Order and Molecularity.
   (b) Zero order and pseudo order reactions.
   (c) Collision frequency and Effective collisions.
   (d) Activation energy and Most probable velocity. (4)

5. (a) "Activity and Selectivity are most important features of solid catalysts."Explain this giving one example each. (2)

(b) "Most of the life processes are catalysed by Enzymes."Explain the mechanism of Enzyme catalysis Diagramatically. (2)

6. (a) Extraction of non- metals mainly involve Redox reactions. Explain the Extraction of Chlorine from Brine solution.Write necessary equations. (2)

(b) Ultra pure Germanium is required for using as semi conductor. Which method is used for refining Germanium ? Explain. (2)

7. Give reason for the following.

(a) Nitrogen exhibits +5 oxidation state but does not form penta halides.

(b) Phosphine(PH_3) is used in Holme's signals.

(c) H_3PO_2 shows reducing behavior.

(d) Group 16 elements show low rate of 1^{st} Ionisation Energy than compared to corresponding periods of Group 15. (4)

8. Explain why Transition elements shows the following properties.

(a) Coloured compounds

(b) Complex compounds

(c) Act as Catalysts

(d) Alloy formation (4)

9. Swss Chemist Werner was awarded Nobel Prize in 1913 for his contributions in Co-ordination Chemistry.

(a) List down the important postulates of Werner's Theory of Co- ordination compounds. (2)

(b) Explain the type of Isomerism observed in the following complexes.

(i)$[Co(NH_3)_6][Cr(CN)_6$&$[Cr(NH_3)_6][Co(CN)_6]$

(ii)$[Co(NH_3)_5(NO_2)]Cl_2$

(iii)$[Pt(NH_3)_2Cl_2]$

(iv)$[Co(en)_3]^{3+}$ (4)

10. SN_2 reactions takes place by inversion of configuration whereas SN_1 with recimisation."Comment on the statement taking as examples.

(a) CH_3Cl and OH^-

(b) $(CH_3)_3Br$ and OH^-

Aiso write necessary equations. (4)

11. During the conduction of a lab work with organic compounds, Teacher demonstrated that Phenol shows litmus test just like acids and made students understand why Phenol is otherwise called "Carbolic Acid".

(a)Explain the acidic nature of Phenol on the basis of resonance. (2)

12. Match the columns: (3)

Lucas Test	Aq. $CuSO_4$ & Rochelle salt	Aldehydes
Hinsberg's Test	Freshly prepared ammoniacal $AgNO_3$ soln	Amines
Isocynide Test	Con.HCl &$ZnCl_2$	Aromatic Aldehydes
Tollen's Test	C_2H_5OH &Con.HCl	Primary amines
Ester Test	$CHCl_3$ &ethanolic KOH	Alcohols
Fehling's Test	$C_6H_5SO_2Cl$	Carboxyllic acids

13.Write short note on the following by writing one example and releted equation.
(a) Aldol Condensation
(b) Hoffmann's bromamide degradation reaction
(c) Wurtz- reaction (3)

14. How will you convert
(a) Benzene to Phenol
(b) Aniline to Chlorobenzene
(c) Toluene to Benzaldehyde (3)

15. "In zwitter ionic form amino acids show amphoteric behavior".
(a) Do you agree with this statement. Justify your answer by explaining how zwitter ions are formed. (1)
(b)Represent the zwitter ion of any amino acid. (1)

16.(a) Distinguish between Natural Rubber and Synthetic Rubber- Neoprene by representing their structure. (2)

17.Explain the following related with "Chemistry in everyday life".
(a) Drugs &Medicines
(b) Agonists & Antagonists
(c) Trnquilizers & Analgesics (3)

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SOPHIYA.S
HSST CHEMISTRY
GOVT. HSS KULATHUMMEL
KATTAKKADA
NEYYATTINKARA CLUSTER