Roll No. ....

Total No. of Questions : 26]

053/A

[Total No. of Printed Pages : 4

SS

2037

ANNUAL EXAMINATION SYSTEM

CHEMISTRY (Theory)

(Common for Science & Agriculture Groups)

(English Version)

(Evening Session)

Time allowed : Three hours   Maximum marks : 70

Note : (i)   You must write the subject code/paper code **053/A** in the box provided on the title page of your answer-book.

(ii)   Make sure that the answer-book contains 30 pages (including title page) and are properly serialed as soon as you receive it.

(iii)   Question/s attempted after leaving blank page/s in the answer-book would not be evaluated.

(iv)   Log tables may be asked for if needed.

(v)   Use of simple calculator is allowed.

(vi)   Marks allotted to each question are indicated against it.

(vii)   The paper comprises of 26 questions. Attempt total 26 questions. Internal choice is given in Q. No. **19, 23, 24, 25** and **26**.

(viii)   Question No. **1** to **8** carry one mark each. Answer in one line.

(ix)   Question No. **9** to **16** will be of two marks each. All questions are compulsory. They are short answer type questions.

(x)   Question No. **17** to **23** will be of 4 marks each. All questions are compulsory. Internal choice is given for Q. No. **19** and **23**.

(xi)   Question No. **24, 25** and **26** (Three questions) will be of 6 marks each. All questions are compulsory. Full internal choice is given.

All questions are compulsory.

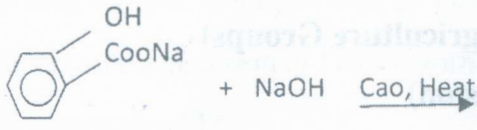1.   Under what conditions the van't Hoff factor is greater than one ?   1

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2. Define order of reaction. 1

3. Write down IUPAC name of $CH_3-NH \overset{CH_3}{|}$ 1

4. Complete the following reaction :– 1

$$\text{(OH)(CooNa)} + NaOH \xrightarrow{Cao, Heat}$$

5. Write down an isomer of C_2H_5OH. 1

6. What are food preservatives ? 1

7. What are antacids ? 1

8. What are disaccharides ? 1

9. The radius of Na^+ ion is 95 pm and that of Cl^- ion is 181 pm. Predict whether the Co-ordination number of Na^+ ion is 6 or 4. 2

10. A first order reaction is 20% complete in 20 minutes. Calculate the time it will take the reaction to complete 80%. 2

11. What is gravity separation method for concentration of ore ? 2

12. Write down differences between terylene fibres and Buna-s rubber (elastomers). 2

13. Express Linkage isomerism in $[Co (NH_3)_5 NO_2]Cl_2$. 2

14. Write down any two differences between nucleoside and nucleotide. 2

15. Write down carbylamine reaction. 2

16. Write down reactions involved in preparation of Potassium dichromate from chromite ore. 2

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17. Determine the type of cubic lattice to which the crystal of the element indicated here belongs. It has an edge length of 290 pm and a density 7.80 g cm^{-3}. Atomic mass of element = 56 amu.   4

18. (i) Prove that osmotic pressure is a colligative property.   2

    (ii) Calculate the molar concentration of urea solution if it exerts an osmotic pressure of 2.45 atmosphere at 300K. [R = 0.0821 L atm.mol^{-1} K^{-1}]   2

19. What is electro chemical theory of rusting of iron and give two methods of prevention of rusting of iron ?   4

<p align="center">or</p>

Write the Nernst equation and calculate the emf of following cell at 298K :–   4

Ni/Ni^{2+} (0.01M) || Cu^{2+} / Cu (0.01M)

Given E° (Cu^{2+} /Cu) = + 0.34V, E°(Ni^{2+} / Ni) = –0.22V

20. Define Tyndall effect. Differentiate between electrophoresis and electroosmosis.   4

21. (i) Why are interhalogen compounds more reactive than halogens ?   2

    (ii) All the five bonds in PCl_5 are not equivalent. Justify.   2

22. (i) Phenol has higher boiling point than toluene. Why ?   2

    (ii) Why alcohols are easily protonated but phenols are not protonated ?   2

23. (i) Write Hell-Volhard-Zelinsky reaction.   1

    (ii) Write cross aldol condensation.   1

    (iii) Ethanoic acid is weaker acid than benzoic acid. Why ?   2

(4)

24. (i)   Why is H_3PO_3 diprotic in nature ? Draw structure.   2

     (ii)   Why is H_2S less acidic than H_2Te ?   2

     (iii) Give hybridization and draw structure of XeF_6.   2

<p align="center">or</p>

     (i)   How is nitric acid manufactured by Ostwald process ?   3

     (ii)   Write down the reaction of Ozone with black lead sulphide.   2

     (iii) Draw structure of IF_7.   1

25. (i)   Scandium ($z = 21$) is a transition element but zinc ($z = 30$) is not. Explain.   2

     (ii)   Calculate equivalent weight of $KMnO_4$ in acidic medium.   2

     (iii) What do you mean by Lanthanoid contraction ?   2

<p align="center">or</p>

     (i)   Write down any three differences between Lanthanoids and Actinoids.   3

     (ii)   The melting and boiling points of Zy, Cd and Hg are low. Why ?   2

     (iii) Draw the structure of manganate ion.   1

26. Write the following reactions :

     (i)   Williamson's synthesis   1

     (ii)   Mendius reaction   1

     (iii) Friedel Craft's Alkylation   1

     (iv) Haloform reaction   1

     (v)   Carbylamine reaction   1

     (vi) Gattermann reaction   1

<p align="center">or</p>

     (i)   Hydrogen atom of chloroform is acidic. Explain.   3

     (ii)   Why is dehydrohalogenation reaction in haloalkanes termed as Beta-elimination reaction ?   3