

Roll No. ....

**053/A**

Total No. of Questions : 26 ]

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[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

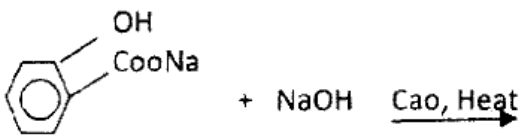
Maximum marks : 70

- Note :**
- (i) You must write the subject code/paper code **053/A** in the box provided on the title page of your answer-book. **psebonline.com**
  - (ii) Make sure that the answer-book contains 30 pages (including title page) and are properly serialized 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. **psebonline.com**
  - (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 ?

( 2 )

2. Define order of reaction. 1
3. Write down IUPAC name of  $\text{CH}_3-\text{NH}-\text{CH}_3$  **psebonline.com** 1
4. Complete the following reaction :- 1
-  + NaOH  $\xrightarrow{\text{CaO, Heat}}$
5. Write down an isomer of  $\text{C}_2\text{H}_5\text{OH}$ . 1
6. What are food preservatives ? 1
7. What are antacids ? 1
8. What are disaccharides ? 1
9. The radius of  $\text{Na}^+$  ion is 95 pm and that of  $\text{Cl}^-$  ion is 181 pm. Predict whether the Co-ordination number of  $\text{Na}^+$  ion is 6 or 4. **psebonline.com** 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  $[\text{Co}(\text{NH}_3)_5\text{NO}_2]\text{Cl}_2$ . 2
14. Write down any two differences between nucleoside and nucleotide. 2
15. Write down carbylamine reaction. **psebonline.com** 2
16. Write down reactions involved in preparation of Potassium dichromate from chromite ore. 2

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  $7.80 \text{ g cm}^{-3}$ . Atomic mass of element = 56 amu. **psebonline.com** 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.  $[R = 0.0821 \text{ L atm.mol}^{-1} \text{ K}^{-1}]$  2

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

or

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

$\text{Ni/Ni}^{2+} (0.01\text{M}) \parallel \text{Cu}^{2+} / \text{Cu} (0.01\text{M})$  **psebonline.com**

Given  $E^\circ (\text{Cu}^{2+} / \text{Cu}) = +0.34\text{V}$ ,  $E^\circ (\text{Ni}^{2+} / \text{Ni}) = -0.22\text{V}$

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  $\text{PCl}_5$  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. **psebonline.com** 1

(ii) Write cross aldol condensation. 1

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

24. (i) Why is  $\text{H}_3\text{PO}_3$  diprotic in nature ? Draw structure. **psebonline.com** 2  
(ii) Why is  $\text{H}_2\text{S}$  less acidic than  $\text{H}_2\text{Te}$  ? 2  
(iii) Give hybridization and draw structure of  $\text{XeF}_6$ . 2

or

- (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  $\text{IF}_7$ . 1
25. (i) Scandium ( $z = 21$ ) is a transition element but zinc ( $z = 30$ ) is not. Explain. 2  
(ii) Calculate equivalent weight of  $\text{KMnO}_4$  in acidic medium. 2  
(iii) What do you mean by Lanthanoid contraction ? 2

or

- (i) Write down any three differences between Lanthanoids and Actinoids. 3  
(ii) The melting and boiling points of  $\text{Zn}$ ,  $\text{Cd}$  and  $\text{Hg}$  are low. Why ? 2  
(iii) Draw the structure of manganate ion. 1

26. Write the following reactions : **psebonline.com**

- (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

or

- (i) Hydrogen atom of chloroform is acidic. Explain. **psebonline.com** 3  
(ii) Why is dehydrohalogenation reaction in haloalkanes termed as Beta-elimination reaction ? 3