SS

2117

ANNUAL EXAMINATION SYSTEM

CHEMISTRY (Theory)

(Common for Science and Agriculture Groups)

(English Version)

Time allowed : Three hours
Maximum marks : 70

Note : (i) *You must write the subject-code/paper-code* **053** *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.*
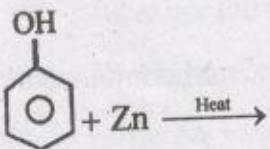
(ix) *Question No.* **9** *to* **16** *will be of two marks each.* **All questions are compulsory.** *They are short answer type questions.*

(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. Define normality of a solution. 1

2. Define activation energy of a reaction. 1

3. What type of drug is penicillin ? 1

4. What are antiseptics ? **1**

5. Mention one important function of carbohydrates in our body. **1**

6. Write down Cannizzaro's reaction. **1**

7. Complete the following reaction : **1**

OH
$$\bigcirc \hspace{-0.5em} \bigcirc + Zn \xrightarrow{Heat}$$

8. Convert aniline to benzonitrile. **1**

9. Atoms of element B form hcp lattice and those of the element A occupy two third (2/3) of the tetrahedral voids. What is the formula of the compound formed by these elements A and B ? **2**

10. The rate law for a reaction of A, B and C has been found to be rate = k [A] [B] [C]^2. How would the rate of reaction change when concentration of A is halved ? **2**

11. Write down the names of any two ores of copper. **2**

12. Write down the name of monomers and one use of Teflon. **2**

13. (i) Define co-ordination number. **1**

    (ii) Write down IUPAC name of Na$_3$ [Co(NO$_2$)$_6$] **1**

14. Write down one main source and one deficiency disease of Vitamin B$_1$. **1+1=2**

15. Why is methylamine stronger base than ammonia ? **2**

16. Why are Mn^{+2} compounds more stable than Fe^{+2} compounds towards oxidation to their +3 state? **2**

17. Lead (II) sulphide crystal has NaCl structure. What is its density ? The edge length of the unit cell of PbS crystal is 500 pm. (Atomic masses : Pb = 207, S = 32). **4**

18. (i) State Henry's Law. **2**

    (ii) 18 g of glucose (C$_6$H$_{12}$O$_6$) is dissolved in 1000g of water. Calculate elevation in boiling point. K$_b$ for water is 0.52 K Kg mol^{-1}. **2**

19. (i) Write any two differences between electrochemical cell and electrolytic cell.   2

(ii) Define resistivity and give its S.I. units.   1+1=2

or

Write down the Nernst equation and calculate e.m.f. of the following cell at 25°C :

$Zn \mid Zn^{+2} (0.01M) \parallel Fe^{+2} (0.005M) \mid Fe$
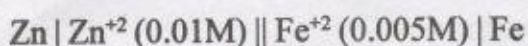
given : $E^\circ_{(Zn^{+2}|Zn)} = -0.763V$

$E^\circ_{(Fe^{+2}|Fe)} = -0.44V$ 4

20. Explain briefly the activity and selectivity of a catalyst.   2+2=4

21. (i) How will ozone oxidise lead sulphide ?   2

(ii) Why is H_2O a liquid and H_2S a gas ?   2

22. (i) Explain Victor Meyer's test for primary (1°) alcohols.   2

(ii) Alcohols are soluble in water while alkyl halides are not, although both are polar compounds. Explain.   2

23. (i) Give one test to distinguish between phenol and benzoic acid.   2

(ii) Write down the reaction between acetic acid and ethyl alcohol in presence of conc. H_2SO_4.   2

or

(i) Why do aldehydes and ketones have high dipole moments ?   2

(ii) How will you convert acetic acid to trichloroacetic acid ?   2

24. (i) H_3PO_4 is triprotic acid explain.   2

(ii) SO_3 has zero dipole moment. Why ?   2

(iii) Why do noble gases form compounds with fluorine and oxygen ?   2

or

(i) Draw diagram in manufacture of sulphuric acid by contact process.   3

(ii) Why are halogens strong oxidising agents ?   2

(iii) Draw structure of thiosulphuric acid ($H_2S_2O_3$).   1

(4)

25. (i) Explain why $ScCl_3$ is colourless while $TiCl_3$ is coloured ?   2

   (ii) Why do transition metals show catalytic properties ?   2

   (iii) Which of $Lu(OH)_3$ and $La(OH)_3$ is more basic and why ?   2

or

   (i) What are the consequences of Lanthanoid contraction ?   3

   (ii) Chromium is a typical hard metal where as mercury is a liquid. Why ?   2

   (iii) Draw the structure of chromate ion :   1

26. Write down the following reactions :

   (i) Haloform reaction   1

   (ii) Sandmeyer's reaction   1

   (iii) Wurtz reaction   1

   (iv) Balz–Schiemann reaction   1

   (v) Carbylamine reaction   1

   (vi) Groove's process.   1

or

   (i) Explain the mechanism of S_N1 reactions of alkyl halides.   3

   (ii) The para isomer of dichlorobenzene has higher melting point than ortho and meta isomer why?   3

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