

Series SMA/2

Roll No.

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Candidates must write the code on the title page of the answer book

- Please check that this question paper contains 4 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer book by the candidate.
- Please check that this question paper contains 26 questions.
- **Please write down the serial number of the question before attempting it.**
- 15 minutes' time has been allotted to read this question paper. The student will read the question paper only and will not write any answer on the answer script during this period.

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First Pre-Board Examination, 2017-2018

Chemistry

Grade: 12

Time: 3 hours

Date: 00.00.0000

Max. Marks: 70

General Instructions:

- All questions are compulsory*
- Marks for each question are indicated against it.*
- Question number 1 to 5 are very short-answer questions and carry 1 mark each.*
- Question numbers 6 to 10 are short-answer questions and carry 2 marks each.*
- Question numbers 11 to 22 are also short-answer questions and carry 3 marks each.*
- Question number 23 is a value based question and carries 4 marks.*
- Question numbers 24 to 26 are long answer questions and carry 5 marks each.*
- Use Log Tables, if necessary. Use of calculators is **not** allowed*

- What makes alkali metal halides sometimes coloured, which is otherwise colourless? (1)
- Name a member of the lanthanoid series which is well known to exhibit +4 oxidation state. (1)
- What do you understand by denaturation of proteins? (1)
- What are biodegradable polymers? Give one example. (1)
- "Drugs designed to cure some ailments in one organ in the body does not harm the other parts"- Give reason. (1)
- Aluminium crystallises in a cubic close packed structure. Its metallic radius is 125pm (2)
 - What is the length of the side of the unit cell?
 - How many unit cells are there in 1cm³ of aluminium?

7. Explain pseudo first order reaction with an example. (2)
8. Discuss the limitations of VB theory. (2)
9. Write the chemistry of recharging the lead storage battery, highlighting all the materials that are involved during recharging. (2)
10. Give chemical test to distinguish between the following pairs of organic compounds (2)
- (i) Ethanamine and N-Ethylethanamine
 - (ii) Benzyl amine and Aniline

OR

Account for the following

- (i) pK_b of aniline is more than that of methylamine
 - (ii) Aniline does not undergo Friedel crafts reaction.
11. The rate constant for a first order reaction is 60 s^{-1} . How much time will it take to reduce the initial concentration of the reactant to its $1/16^{\text{th}}$ value? (3)
12. Give reasons for the following observations: (3)
- (i) A delta is formed at the meeting point of sea water and river water.
 - (ii) NH_3 gas adsorbs more readily than nitrogen gas on surface of charcoal.
 - (iii) Powdered substances are more effective adsorbents
13. Write the mechanism for formation of ethoxyethane from ethanol. (3)

OR

How will you convert the following:

- (i) Phenol to anisole
 - (ii) Aniline to phenol
 - (iii) Cumene to phenol
14. How is cast iron different from pig iron? How will you obtain cast iron from pig iron? (3)
15. Account for the following (3)
- (i) Both NO and ClO_2 are odd electron species but NO dimerises while ClO_2 does not.
 - (ii) Bleaching of flowers by chlorine is permanent while that by sulphur dioxide is temporary.
 - (iii) Sulphur exhibits greater tendency for catenation than oxygen.
16. Write the chemical equation for (3)
- (i) Oxidation of Fe^{2+} by $\text{Cr}_2\text{O}_7^{2-}$ in acidic medium.
 - (ii) Oxidation of $\text{S}_2\text{O}_3^{2-}$ by MnO_4^- in neutral medium.
 - (iii) Oxidation of potassium nitrite by MnO_4^- in acidic medium.
17. Which compound in each of the following pairs will react faster in S_N^2 reaction with OH^- (3)
- (i) CH_3Br or CH_3I
 - (ii) $(\text{CH}_3)_3\text{CCl}$ or CH_3Cl
 - (iii) $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$ or $\text{C}_6\text{H}_5\text{CH}(\text{Cl})\text{C}_6\text{H}_5$
18. Illustrate the following: (3)
- (i) Ammonolysis
 - (ii) Coupling reaction
 - (iii) Hinsberg test

19. Write three behaviours of glucose which cannot be explained by an open chain structure of glucose molecule. (3)
20. A voltaic cell is set up at 25°C with the following half cells (3)
 $\text{Al}/\text{Al}^{3+}(0.001\text{M})$ and $\text{Ni}/\text{Ni}^{2+}(0.50\text{M})$
 Calculate the cell voltage. [$E^{\circ}\text{Ni}^{2+}/\text{Ni} = -0.25\text{V}$, $E^{\circ}\text{Al}^{3+}/\text{Al} = -1.66\text{V}$]
21. Explain the following terms giving a suitable example for each: (3)
 (i) Elastomers
 (ii) Vulcanisation of rubber
 (iii) Thermosetting polymers
22. Low level of noradrenaline is the cause of depression. What type of drugs are needed to cure this problem? Name two drugs. (3)
23. Wasim went to purchase bricks to build his house from a brick manufacturing unit. He was shocked after seeing a lot of smoke, dust, and other gases coming out of the chimney. He observed that these products were leading to pollution in nearby areas too. He decided to do something about it. (4)
 Now answer the following questions:
 (i) What type of colloidal system is smoke?
 (ii) As a chemist, which process will you suggest the manufacturing unit owner to manage smoke and gases.
 (iii) How is artificial rain caused?
 (iv) Write values shown by Wasim.
24. (i) 36g of glucose dissolved per litre of the solution has an osmotic pressure of 4.98 bar at 300K. If the osmotic pressure of the solution is 1.52 bar at the same temperature, what would be its concentration. (5)
 (ii) Will the elevation in boiling point be same if 0.1 mole of sodium chloride or 0.1 mole of sugar is dissolved in 1L of water?

OR

- (i) Vapour pressure of chloroform (CHCl_3) and dichloromethane (CH_2Cl_2) at 298K are 200 mm Hg and 415 mm Hg respectively. Calculate the vapour pressure of the solution prepared by mixing 25.5 g of CHCl_3 and 40g of CH_2Cl_2 at 298K.
- (ii) Mixing of acetone with chloroform takes place with reduction in volume. What type of deviation from Raoult's law is shown in this case?
25. (i) Write the chemical reactions in the manufacture of H_2SO_4 by Contact process. (5)
 (ii) What happens when zinc reacts with concentrated HNO_3 ?
 (iii) Arrange HClO_4 , HClO_3 , HClO_2 and HClO in the order of increasing oxidizing power giving reason.

OR

- (i) Write down the steps involved in the manufacture of HNO_3 by Oswald process.
 (ii) Write the reaction of white phosphorus with NaOH solution.
 (iii) Draw the structure of $\text{H}_2\text{S}_2\text{O}_7$.

26. (i) An organic compound A with molecular formula C_8H_8O gives positive DNP and iodoform tests. It does not reduce Tollen's or Fehling's reagent and does not decolourise bromine water also. On oxidation with chromic acid (H_2CrO_4), it gives a carboxylic acid (B) with molecular formula $C_7H_6O_2$. Deduce the structures of A and B. (5)
- (ii) What happens when
- Phenol reacts with Bromine water.
 - Ethanol reacts with CH_3COCl .
 - Anisole reacts with HI

OR

- (i) An organic compound A having molecular formula C_4H_8O gives orange red precipitate with 2,4-DNP reagent. It does not reduce Tollens reagent but gives yellow precipitate of iodoform on heating with NaOI. Compound A on reduction with $NaBH_4$ gives compound B which undergoes dehydration reaction on heating with concentrated H_2SO_4 to form But-2-ene. Identify the compounds A and B.
- (ii) Why the α -hydrogen atoms of aldehydes and ketones are acidic in nature?
- (iii) Why carboxylic acids are more acidic than phenols?