

CHEMISTRY

ALL SUBJECTIVE ASSESSMENT TEST ASAT

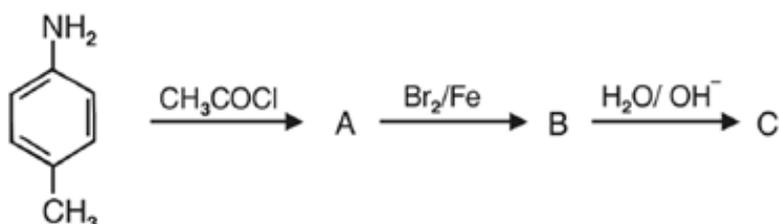
MM MARKS: 70]

[TIME: 3 HOUR

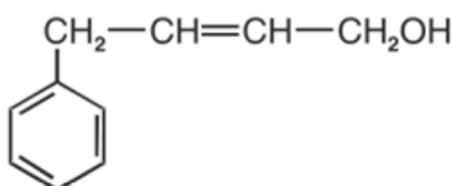
General Instructions:

- Question no. 1 to 8 consist of one marks questions, which are very short answer type questions.
- Question no. 9 to 18 consist of two marks questions, which are short answer type questions.
- Question no. 19 to 27 consists of three marks questions, which are long answer type questions.
- Question no. 28 to 30 consists of five marks question, which are very long answer type question.
- All the questions are compulsory

1. Write the structures of organic compounds A, B and C in the following sequence of reactions. 1



2. Arrange the following antibiotics as bactericidal or bacteriostatic: 1
Erythromycin, Ofloxacin, Penicillin and Tetracycline.
3. Draw the structure of 2, 4-dinitrophenylhydrazone derivative of Benzophenone. 1
4. Chloroform is stored in a closed dark coloured bottles completely filled so that air is kept out. Explain with help of the chemical reaction. 1
5. When a dilute nitric acid is added to phenol at low temperature yields a mixture of ortho and para nitrophenols. This ortho and para isomers can be separated by steam distillation. Which of them is steam volatile? Give reason. 1
6. Arrange the following polymers in increasing order of their intermolecular forces: 1
Nylon 6, 6, Polyvinyl chloride, Neoprene, Buna-S and polythene
7. Write the IUPAC name of the following compound: 1



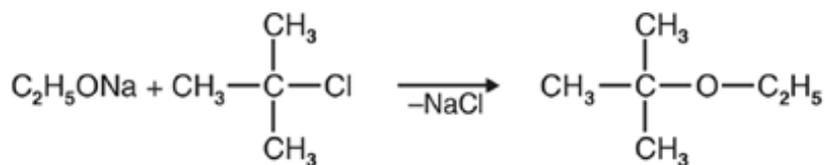
8. What products would be formed when a nucleotide from DNA containing thymine is hydrolysed? 1
9. Give reasons: 2
- (a) Although Chlorine is an electron withdrawing, yet it is ortho p para directing in electrophilic aromatic substitution reaction.
- (b) Haloalkanes react with KCN to form alkyl cyanides as main product while AgCN forms isocyanides as the chief product.

10. Give a point of difference between the following: Also specify the type of bonding. 2

(a) Nucleoside and nucleotide.

(b) Tertiary structure of protein and quaternary structure of protein.

11. The following is not an appropriate method for the preparation of t-butyl ethyl ether: 2



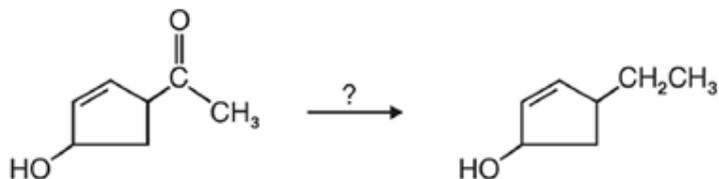
(a) What would be the major product of this reaction?

(b) Write suitable reaction for the preparation of tert-butyl ethyl ether.

12. Cyclohexanone forms Cyanohydrin in good yield but 2, 2, 6 – trimethylcyclohexanone does not. Give reason. 2

You are given four different reagents Zn–Hg/HCl, $\text{NH}_2\text{NH}_2/\text{OH}^-$ in Glycol, H_2/Ni and NaBH_4 .

Select one reagent for the following transformation and Give reasons to justify your answer.



13. Answer the following: 2

(a) While antacids and antiallergic drugs interfere with the function of histamines, why do these not interfere with the function of each other?

(b) Give the composition of Dettol as an antiseptic.

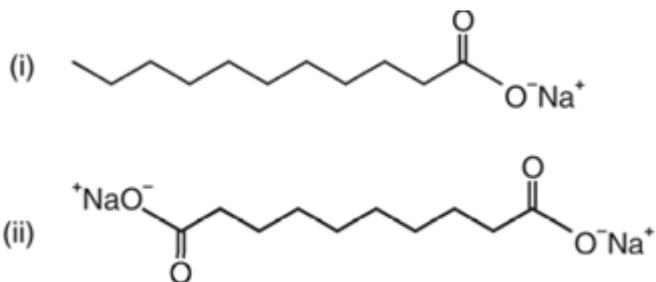
(c) Name a substance which can be used as both antiseptic and disinfectant.

(a) Name the type of a tranquilizer which is used in controlling depression and hypertension.

OR

Answer the following: 2

(a) Which of the following two compounds can be used as a surface agent and why?



(b) Write the structures of soaps obtained by the hydrolysis of following fats:

(i) $(\text{C}_{15}\text{H}_{31}\text{COO})_3\text{C}_3\text{H}_5$ Glyceryl palmitate

(ii) $(\text{C}_{17}\text{H}_{33}\text{COO})_3\text{C}_3\text{H}_5$ Glyceryl oleate.

14. How would you bring out the following conversions: 2

(a) 4-nitrotoluene to 2-bromobenzoic acid.

(b) Ethanamine to methanamine.

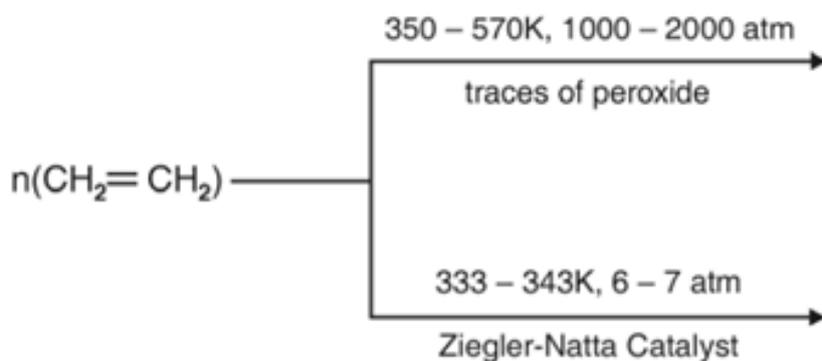
15. Give reasons for the following- 2

(a) On electrolysis in acidic solution amino acids migrate towards cathode, while in alkaline solution these migrate towards anode.

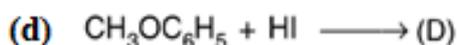
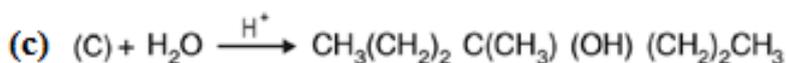
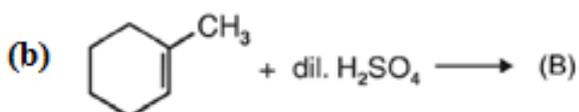
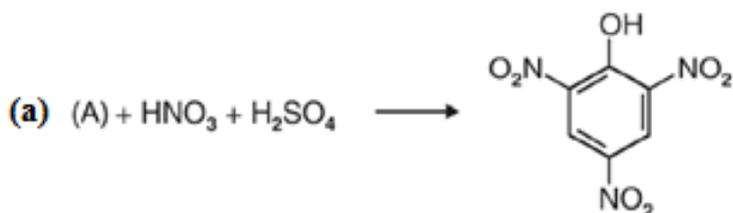
(b) The melting points and solubility in water of amino acids are generally higher than that of the corresponding halo acids.

16. Differentiate between chain growth polymers and step growth polymers? 2

Complete the following reactions:



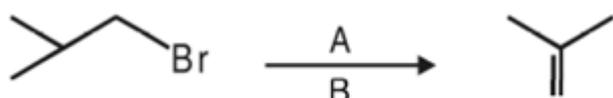
17. Identify the missing reactant or product A to D in the following equations: 2



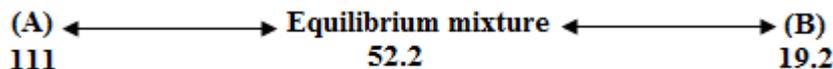
18. Answer the following: 2

(a) Arrange the compounds of each set in order of reactivity towards $\text{S}_{\text{N}}2$ and $\text{S}_{\text{N}}1$ displacement: 1-Bromobutane, 1-Bromo-2, 2-dimethylpropane, 1-Bromo-2-methylbutane and 1-Bromo-3-methylbutane.

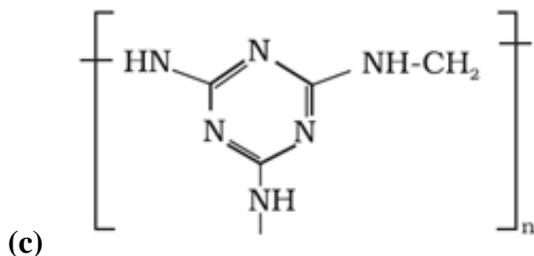
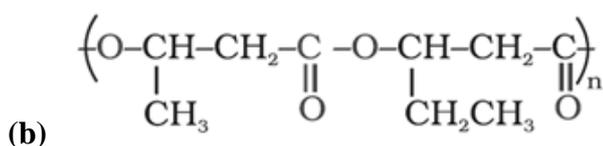
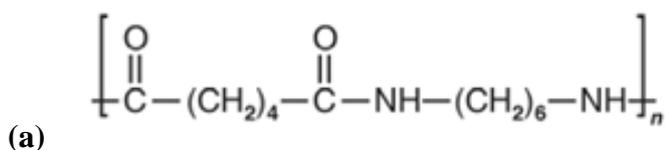
(b) Identify A and B.



19. An optically active compound having molecular formula $C_6H_{12}O_6$ is found in two isomeric forms (A) and (B) in nature. When (A) and (B) are dissolved in water, they show the following equilibrium : 3



- (a) What are such isomers called? Explain.
 (b) Can they be called enantiomers? Justify your answer.
 (c) Draw the Haworth projection of isomer (A).
20. Identify the monomer in the following polymeric structure and hence draw its structure and give any one use. 3



21. Answer the following: 3

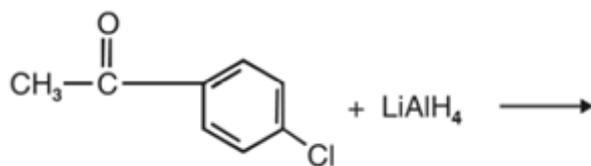
- (a) Grignard reagent should be prepared under anhydrous conditions. Give reason.
 (b) S_N2 reactions of optically active halides are accompanied by inversion of configuration but in the case of S_N1 reactions are accompanied by racemisation. Explain.
 (c) Explain what happens when:
 (i) Methyl chloride is treated with KCN.
 (ii) Methyl chloride is treated with AgCN.

22. Answer the following: 3

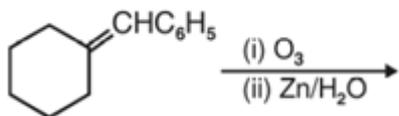
- (a) Arrange the following in the increasing order of given property indicated.
 (i) $C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$ and NH_3 , (Basic strength in aqueous solution).
 (ii) $C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$ and CH_3NH_2 . (Basic strength in gaseous phase).
 (b) The pK_b value of benzeneamine is 9.33 while that of ammonia is 4.75. Explain.
 (c) Write a short note on:
 (a) Hoffmann bromide degradation reaction.
 (b) Carbylamine reaction.

23. Complete the following reactions:

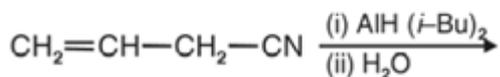
3



(a)



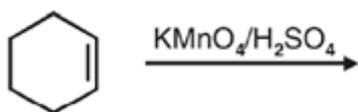
(b)



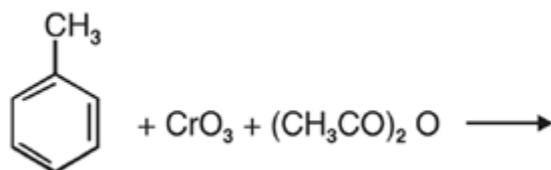
(c)



(d)



(e)

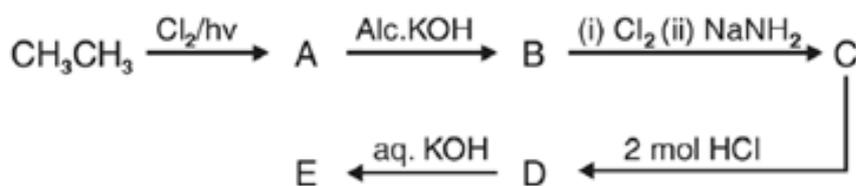


(f)

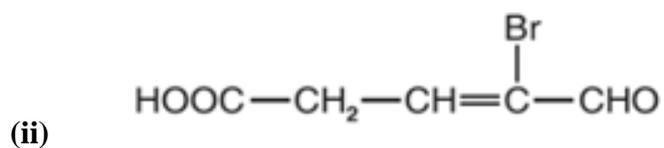
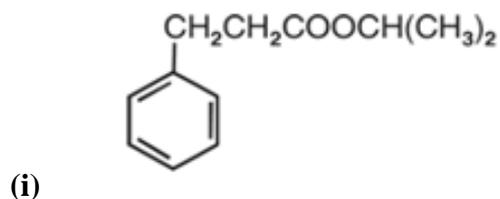
OR

(a) Identify A, B, C, D and E in the following reactions:

3



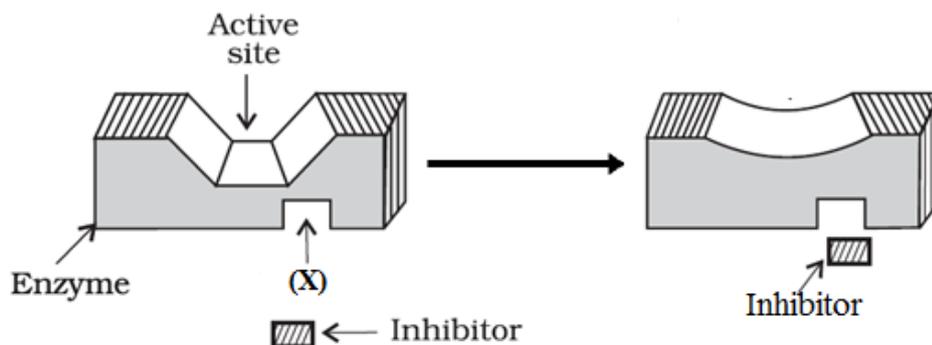
(b) Write the IUPAC name for the following:



24. Answer the following:

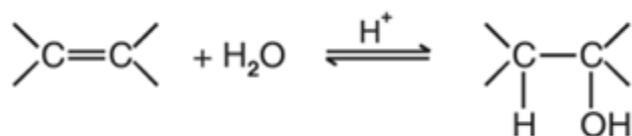
3

- (a) Why is aspartame only limited to cold food and soft drinks?
- (b) Give a point of difference between antagonists and agonists.
- (c) Why are metal hydroxides a better alternative as an antacid for cause of irritation and pain in the stomach?
- (d) Identify the type of site for drug-enzyme interaction and hence explain the mechanism.



25. (a) Write the mechanism for following reactions:

3



(b) What happens when?

- (i) Cumene is oxidized in the presence of air and the product formed is treated with dilute acid.
- (ii) Phenol is treated with chloroform in presence of dilute NaOH.

26. Ravi observed that his classmate Manish was showing a change in behaviour over some time, Manish stayed aloof, did not mix with friends and had become easily irritable. He avoided going to any type of get-together also. Ravi shares his concerns with his class teacher who has also observed these things about Manish. The teacher calls Manish's parents and advises them to consult a doctor. Doctor prescribes antidepressant drugs for him.

3

- (a) Mention the values shown by Ravi.
- (b) Give two examples of anti-depressant drugs.
- (c) Explain how these anti-depressant drugs help in curing a Manish.

27. Answer the following:

3

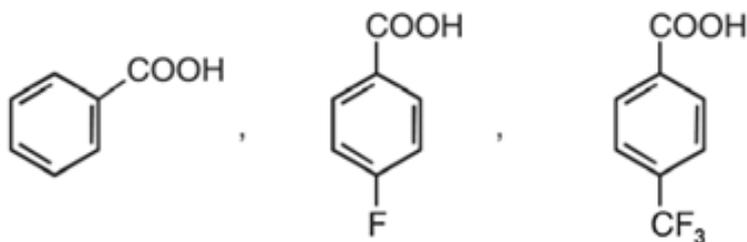
- (a) Give a chemical test to distinguish between aniline and N-methylamine.
- (b) Write the reaction of Dizonium salt ArN_2Cl^- with the following:
 - (i) Copper in presence of hydrogen bromide.
 - (ii) Hydrolysed at 283K.
 - (iii) Heated with fluoroboric acid with aqueous sodium nitrite solution in presence of copper.
 - (iv) Oxidation in presence of ethanol.

28. Answer the following:

5

(a) Write short note on Hell –Volhard-Zelinsky reaction.

(b) Arrange the following acids in the order of increasing acid strength. Give reason:



(c) A compound A (C₂H₄O) on oxidation gives B (C₂H₄O₂). A undergoes iodoform reaction. On treatment with HCN, A forms C which on hydrolysis gives 2-hydroxy propanoic acid.

(i) Write down structures of A, B and C.

(ii) Name the products when A reacts with dil NaOH.

(iii) Write the sequence of the reactions involved.

OR

(a) Give simple chemical test to distinguish between:

5

(i) Benzaldehyde and benzoic acid.

(ii) Acetophenone and benzophenone.

(b) Bring out the following conversions:

(i) Ethanol to 3-hydroxybutanal.

(ii) Benzaldehyde to benzophenone.

(c) Arrange the following in increasing order of their reactivity in nucleophilic addition reactions:

(i) Ethanol, propanal, propanone, butanone.

(ii) Benzaldehyde, p-tolualdehyde, p-nitrobenzaldehyde, acetophenone.

29. Answer the following:

5

(a) How would you synthesize the following alcohols from suitable alkenes:



(b) Bring out the following conversions:

(i) Propan-2-ol from propane.

(ii) Phenol to aspirin.

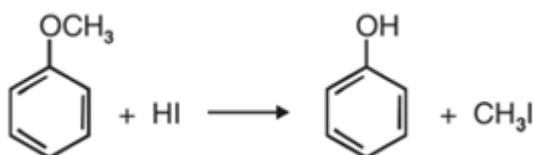
(c) How are the following ethers prepared by Williamson synthesis?

(i) Ethoxybenzene.

(ii) 2-methoxy-2-methylpropane.

OR

- (a) Give a chemical test to distinguish between the following pair of compounds: 5
- (i) Cyclohexanol and phenol.
 - (ii) N-propyl alcohol and isopropyl alcohol.
- (b) Arrange the following in the increasing order of property shown :
- (i) Methanol, ethanol, diethyl ether, ethylene glycol. (Boiling points)
 - (ii) Phenol, o-nitrophenol, m-nitrophenol, p-nitrophenol. (Acid strength)
 - (iii) Dimethylether, ethanol, phenol. (Solubility in water)
 - (iv) N-butanal, 2-methylpropan-1-ol, 2-methylpropan-2-ol. (Basic strength)
- (c) The phenyl methyl ether reacts with HI to form phenol and iodomethane and not iodobenzene and methanol. Give reason:



30. Answer the following: 5
- (a) Differentiate between the following with examples:
- (i) Glycosidic linkage and peptide bond.
 - (ii) Fibrous protein and globular protein.
- (b) Define the following:
- (i) Hypervitaminosis
 - (ii) Avitaminosis
- (c) The two strands in DNA are not identical but complementary. Explain.
- (d) Amino acids behave salts rather than simple amines or carboxylic acids. Explain.

OR

- (a) Complete the following table: 5
- | S.No | Name of the vitamin | Sources | Deficiency disease |
|------|-------------------------|-----------------|----------------------|
| 1 | (A) | Sunflower oil | Coagulation of blood |
| 2 | Vitamin B ₁₂ | (B) | pernicious Anaemia |
| 3 | Vitamin C | Amla | (C) |
| 4 | (D) | Milk , egg yolk | Convulsions |
- (b) Differentiate between the following:
- (i) Essential amino acids and non-essential amino acids.
 - (ii) Amylase and amylopectin.
- (c) If a fragment of DNA molecule has the base sequence CCATGCATG, what is the base sequence of the complementary strand?