Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Petroleum Refinary Engg.) (2013 Onwards) (Sem.–3)

ORGANIC CHEMISTRY

Subject Code : BTPC-301

Paper ID : [A3259]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

(a) Calculate the percentage of expected isomers during mono-bromination of n- butane.

(b) Why is natural rubber tacky? How can this tackiness be removed?

(c) How will you account that alkynes undergo nucleophillic addition reactions but alkenes do not?

(d) What is the main product of dehydration of 3,3-dimethylbutan-2-ol? Explain.

(e) Discuss with the help of mechanism, In what respect sulphonation of benzene differs from its nitration.

(f) Explain why an acetal or ketal can only be formed in acidic solution but not in basic medium?

(g) Why C-O bond lengths in formic acid are 1.23Åand 1.36Å while both the C-O bonds in sodium formate have the same value i.e. 1.27Å?

(h) Do epimers like anomers show mutarotation? Explain.

(i) How would you prepare n-propylamine from n-butyramide? Give reactions.

(j) Discuss the synthesis of alizarin from anthraquinone.

SECTION-B

2. Reaction of 3-methylpentan-l-ol with HC1 in the presence of $ZnCl_2$ yields a mixture of 3-chloro-3-methylpentane and 3-methyl-2-pentene. Account for these results.

3. Discuss the mechanism of halogenation of ketones under acidic and basic conditions. Explain why under acidic conditions, halogenation stops after the introduction of one halogen atom but under basic conditions it continues till all α-hydrogens are substituted?

4. Which 2-ketohexose has an enediol common with D-fructose? Show structurally also.

5. How will you separate a mixture of 1°, 2° and 3° amines using diethyl oxalate? Explain with reactions.

6. How is crystal violet prepared? Explain the color changes when its weakly acidic solution is made strongly acidic and then very strongly acidic.

SECTION-C

7. (a) Discuss briefly free radical substitution at the allylic carbon and electrophilic substitution at the vinylic carbon with suitable examples.

   (b) Explain why benzaldehyde give a positive test with Tollen's reagent but not with Fehling's and Benedict's solutions.

8. (a) Give salient features of electronic theory for color and constitution of dyes.

   (b) Methyl α -D-mannopyranoside upon oxidation with periodic acid give a product X, which upon hydrolysis followed by oxidation with bromine water forms 2 products Y and Z. Give the structures of X, Y and Z.

9. (a) An equimolar mixture of neopentane and ethane yields neopentyl chloride and ethyl chloride in the ratio 2.3:1. How does the reactivity of a primary hydrogen in neopentane compare with that of a primary hydrogen in ethane?

   (b) What are phthalein dyes? Discuss the synthesis and properties of fluorescein.