B.Tech. Fourth Semester (Food, Pulp & Paper, Oil & Paint & Petro Chem.) (CGS)

11017 : Pulp & Paper Technology-I

4 PT 02

P. Pages : 2
Time : Three Hours

AW - 3077
Max. Marks : 80

Notes :
1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Diagrams and chemical equations should be given wherever necessary.
4. Illustrate your answer necessary with the help of neat sketches.
5. Discuss the reaction, mechanism wherever necessary.

SECTION - A

1. a) What do you understand by the term springwood and summer wood ? **5**

b) Explain the fiber properties of using hemp as a paper making raw material. **4**

c) What do you understand by bark ? Write down the structure of bark. **5**

OR

2. a) Why do you analyse the moisture content of wood ? **5**

b) Explain the fiber properties and end usage of bamboo as a paper making raw material. **5**

c) When you analyse the growth rings in tree, What inferences would you conclude ? **4**

3. a) In a tabular form, write down the various softwood cell types which you would observe. **4**

b) Explain the cell derision and cell enlargement phase during wood formation. **5**

c) When you study physical properties of fibers, what do you understand by Runkel ratio and Muhlethaler ratio ? **4**

OR

4. a) In a tabular form write down the chemical composition of wood. **5**

b) In detail write down the structure and composition of ray cells in gymnosperms. **5**

c) What do you understand by aspect ratio of pulp fibers ? What is it's use ? **3**

5. a) How Muhlethaler model explain the ambiguity of crystalline and amorphous cellulose ? **5**

b) Explain with the help of chemical reaction the alkaline degradation of cellulose. **6**

c) Draw the chemical structure of cellotriose. **2**

OR

6. a) Write down the structure and dimensions of microfibrils found in different plants. 4

b) If you want to measure the viscosity of cellulose then in which chemical would you dissolve it ? Write down it's chemical name and it's chemical structure. 2

c) How would you isolate cellulose from wood ? Write down the various methods of cellulose isolation. 7

SECTION - B

7. a) Write down the structure of hardwood hemicellulose observed in tree. 6

b) Draw the chemical formula of conindrin found in spruce and hemlock trees. 2

c) What do you understand by diterpenoids found in heartwood of tree ? 5

OR

8. a) Explain the various triterperoids found in tree and it's chemical composition. 6

b) Draw the chemical structure of softwood xylon and explain it's chemical properties. 6

c) Which type of hemicellulose exclusively found in hardwood is water soluble ? 1

9. a) Write down in a tabular form the various methods of isolation of lignin. Also discuss the advantages and disadvantages of each. 6

b) Explain lignin carbohydrate bonds. 5

c) Draw the chemical structure of paracoumaryl alcohol. 2

OR

10. a) Explain biosynthesis of lignin precursors also draw the chemical reactions taking place. 9

b) With the help of chemical reaction, explain the solubilization of lignin in an acid catalyzed system from wood. 4

11. a) While analyzing lignin in a quantitative method what are the drawbacks of Klasson's method ? How would you overcome it. 6

b) Explain how lignin can be used as a raw material to generate energy 4

c) With the help of chemical equation, explain lignin degradation with thioacetic acid. 4

OR

12. a) How would you manufacture mercaptan from lignin ? Where would you use it ? 4

b) Explain the use of lignin as a binder. 4

c) Explain microbial degradation of lignin. 6

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