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(Pages : 3)

Name.....

Reg. No.....

**SECOND YEAR B.Sc. (POLYMER CHEMISTRY AND INDUSTRIAL CHEMISTRY) DEGREE EXAMINATION, MARCH/APRIL 2009**

Part III—Chemistry

Paper II—ORGANIC CHEMISTRY – I

(Common to Paper II of Industrial Chemistry and Polymer Chemistry)

[Regular]

Time : Three Hours

Maximum : 55 Marks

**Section A**

*Answer any sixteen questions.  
Each question carries 1½ marks.*

1. What are the products formed when HBr is added to 1, 3 butadiene ?
2. Give *one* example each of an absorption chromatography and partition chromatography indicating the stationary phases used in each technique.
3. How would you distinguish between acetic acid and methanol using their IR spectra ?
4. Chlorobenzene cannot be used as the halide component in a Friedel-Crafts reaction. Why ?
5. Draw the structural formula of (R)-2-methyl-1-butanol.
6. Predict the structure of the product of the following reaction :  
Anthracene + Maleic anhydride ?
7. How would you prepare diphenyl methane from benzene ?
8. Give the IUPAC names of :  
(a) allyl chloride ; (b) acrolein.
9. How is benzyl alcohol prepared using a Grignard Reagent ?
10. Phenol is more acidic than cyclohexanol. Why ?
11. How would you separate orthonitrophenol from a mixture of ortho and paranitrophenols ? Explain.
12. Give the structural formulae of Eugenol and phenetole.
13. How is phenol converted to cinnamic acid ?
14. Illustrate Wolff-Kishner reduction.
15. Write the structure and name of the product formed when acetophenone oxime is subjected to Beckmann Reagent.
16. t-Butyl carbocation is more stable than isopropylcarbocation. Why ?
17. What is Borsche's reagent ? Give one of its uses.
18. Draw the structural formula of :  
(Z)-but-2-ene-1,4-dioic acid.

**Turn over**

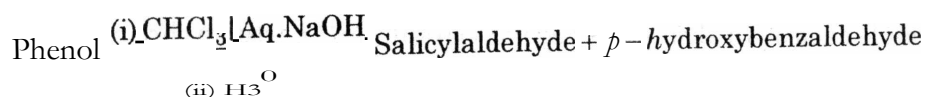
19. Predict the products of the following reaction **1,3-butadiene + acrylonitrile**  $\rightarrow$  ?
20. Exemplify **Wurtz-Fittig** reaction.

(16 x 1½ = 24 marks)

**Section B**

*Answer any four questions.  
Each question carries 4 marks.*

21. Tertiary butylchloride on reaction with 80% aqueous ethanol at 30°C gives substitution products in approximately 80% yield and elimination product in approximately 20% yield. Explain.
22. Nitration of **Chlorobenzene** takes place approximately 33 times slower than that of benzene even though chlorine is an **ortho-para** orienting group. Justify.
23. Explain (i) partial asymmetric synthesis and (ii) absolute asymmetric synthesis.
24. Propose a reasonable mechanism for the following reaction :



25. Illustrate the preparation of n-butane by :  
(i) Kolbe's electrolytic method ; (ii) using a suitable Grignard reagent.
26. Write the Haworth synthesis of naphthalene from benzene.

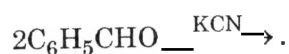
(4 x 4 = 16 marks)

**Section C**

*Answer any two questions.  
Each question carries 7% marks.*

27. (a) Show mechanistically how vanillin could be prepared from guaiacol. (5 marks)  
(b) Illustrate Williamson synthesis for the preparation of phenetole. (2% marks)
28. (a) Predict the major product formed by the addition of HBr to 3-methyl-1-butene. Explain its formation. (5 marks)

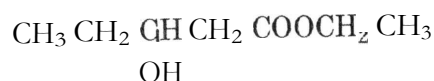
- (b) Identify the product of the following reactions and write the mechanism of its formation



(2% marks)

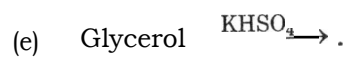
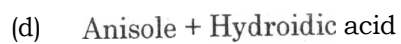
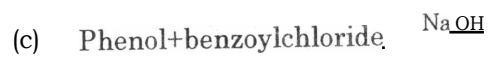
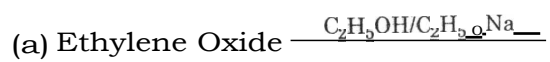
29. (a) What are **1,3-diaxial** interactions ? Explain with reference to methyl cyclo hexane and draw its stable chair conformer. (5 marks)

- (b) Show how you would use **Reformatsky** reaction for the synthesis of :



(2 ½ marks)

30. Predict the products of the following reactions :



(5 x 1% = 7½ marks)

[2 x 7% = 15 marks]