

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086  
(For candidates admitted from the academic year 2019-20) & thereafter

B.Sc. DEGREE EXAMINATION, APRIL 2024  
BRANCH IV - CHEMISTRY  
FOURTH SEMESTER

COURSE : MAJOR – CORE  
PAPER : ORGANIC CHEMISTRY – II  
SUBJECT CODE : 19CH/MC/OC44  
TIME : 3 HOURS

MAX. MARKS : 100

SECTION – A

ANSWER ALL THE QUESTIONS.

(30x1=30)

I Choose the correct answer.

- The correct decreasing order for acid strength is  
a)  $\text{FCH}_2\text{COOH} > \text{NCCH}_2\text{COOH} > \text{NO}_2\text{CH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$   
b)  $\text{CNCH}_2\text{COOH} > \text{O}_2\text{NCH}_2\text{COOH} > \text{FCH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$   
c)  $\text{NO}_2\text{CH}_2\text{COOH} > \text{NCCH}_2\text{COOH} > \text{FCH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$   
d)  $\text{NO}_2\text{CH}_2\text{COOH} > \text{FCH}_2\text{COOH} > \text{CNCH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$
- Which of the following reagents would not be a good choice for reducing an aryl nitro compound to an amine?  
a)  $\text{H}_2$  (excess)/Pt      b)  $\text{LiAlH}_4$  in ether      c) Fe and HCl      d) Sn and HCl
- When  $\text{CH}_2 = \text{CH}-\text{COOH}$  is reduced with  $\text{LiAlH}_4$ , the compound obtained will be  
a)  $\text{CH}_2 = \text{CH}-\text{CH}_2\text{OH}$       b)  $\text{CH}_3-\text{CH}_2-\text{CHOH}$       c)  $\text{CH}_3-\text{CH}-\text{CHO}$       d)  $\text{CH}_3-\text{CH}_2-\text{COOH}$
- Indigo is a \_\_\_\_\_  
a) Vat dyes      b) Mordant dyes      c) Substantive dyes      d) Reactive dyes
- Which of the following is the most reactive in dilute aqueous NaOH?  
a)  $\text{CH}_3\text{COOEt}$       b)  $\text{CH}_3\text{COCl}$       c)  $\text{CH}_3\text{CON}(\text{Me})_2$       d)  $(\text{CH}_3\text{CO})_2\text{O}$
- Esters are reduced to primary alcohol using  
a)  $\text{NaBH}_4$       b)  $\text{LiAlH}_4$       c)  $\text{KMnO}_4$       d)  $\text{K}_2\text{Cr}_2\text{O}_7$
- Ethanoyl chloride reacts with ammonia to form  
a) ethyl amine      b) ethanamide      c) ethanoic acid      d) ethanol
- The product obtained by the action of heat on succinic acid is  
a) CO      b)  $\text{CH}_3\text{COOH}$       c)  $\text{CH}_3\text{CH}_2\text{OH}$       d)  $\text{CH}_3\text{COCH}_3$
- The number of alpha hydrogens present in ethyl ethanoate is \_\_\_\_\_  
a) one      b) two      c) three      d) four
- Which among the following is a primary alcohol?  
a) phenol      b) benzyl alcohol      c) 2-butanol      d) 2-methyl-2-butanol

**II Fill in the blanks:**

11. Nitro alkanes exhibit \_\_\_\_\_
12. The electrophile in Sandmeyer reaction is \_\_\_\_\_
13. The diazotisation is done using \_\_\_\_\_ and \_\_\_\_\_
14. Base catalysed hydrolysis of esters is called \_\_\_\_\_
15. Primary amide with thionyl chloride forms \_\_\_\_\_
16. Hinsberg reagent is \_\_\_\_\_
17. Resonance structure of diazomethane \_\_\_\_\_
18. Phthalic acid reacts with ammonia to form \_\_\_\_\_
19. Epoxides on nucleophilic reaction with HCl forms \_\_\_\_\_
20. The chromophore present in methyl orange dye is \_\_\_\_\_

**III State whether true or false:**

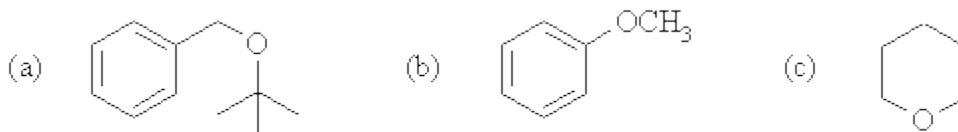
21. Nitrobenzene is reduced to hydroxylamine in the presence of Zn and ammonium chloride.  
True/False
22. Carboxylic acids have low boiling points due to hydrogen bonding. True/False
23. Aliphatic amines are more basic than aromatic amines. True/False
24. Crystal violet is a phthalein dye. True/False
25. Acetetoacetic acid is an active methylene compound. True/False

**IV Answer in a line or two:**

26. What is Gomberg reaction?
27. Draw the structure of malachite green dye.
28. Predict the product of reaction of benzamide with sodium hydroxide.
29. Name the alcohol that is popularly used in hand sanitizers.
30. What is an active methylene compound?

**Section – B****Answer any five questions.****(5 x 6 = 30)**

31. Predict the starting materials for the synthesis of the following ethers and give reasons for the same.



32. Predict the product of action of heat on  $\alpha$ ,  $\beta$  and  $\gamma$ - hydroxy acid.
33. How are a mixture of amines separated by Hinseberg method?
34. Predict the reagent for carrying out the following conversions:
  - (i) Phenol to benzoquinone
  - (ii) Anisole to p-bromoanisole
  - (iii) Phenol to 2,4,6-tribromophenol

35. How are the following dyes prepared and give two uses? a) Methyl orange b) Fluorescein  
36. Predict the electrolytic reduction of nitrobenzene in acidic medium and alkaline medium.  
37. Explain trans-esterification reaction using suitable example.

**Section – C****Answer any two questions.****(2 x 20 = 40)**

38. (a) Account for the following: t-butyl chloride on heating with sodium methoxide gives 2-methylpropene instead of t-butylmethyl ether. (4 marks)  
(b) Write the reaction mechanism for the following: (8 marks)  
(i) Reimer-Tiemann reaction (ii) Friedel-Crafts Alkylation of Phenol  
(c). Write any two synthetic applications of i) Diazomethane ii) malonic ester (8 marks)
39. a) Explain the basicity of primary, secondary and tertiary amines in gaseous state and in aqueous solution. (7 marks)  
b) Write the preparation and uses of the following dyes;  
i) Bismarck Brown ii) Para- rosaniline dye (8 marks)  
c) How are dyes classified based on application? (5 marks)
40. a) Explain the stereospecific addition reaction of maleic and fumaric acids. (7 marks)  
b) Write any two applications of cyanoacetic acid. (6 marks)  
c) Explain ascent and descent in series of amines with respect to methylamine and ethylamine? (7 marks)



