

**B.A. / B.Sc. PART II EXAMINATION, 2020**  
**FAKIR CHAND COLLEGE CENTRE (551)**

**INSTRUCTIONS FOR CANDIDATES**

**READ ALL THE INSTRUCTIONS CAREFULLY BEFORE WRITING ANSWERS**

1. Total **TIME OF EXAMINATION: 2 HOURS**
2. **Question Paper Comprises Of Two Separate Questions – Paper IIIA & IIIB. Candidates Must Have To Answer IIIA and IIIB Separately And Have To Prepare Two Separate pdf Files By Scanning All The Papers Clearly And Serially (According To Page Numbers). The Two pdf files Have To Upload Separately In The ‘ADD FILE’ Menu Of the Google Form For Submission.**
3. **ATTACH THE UNIVERSITY REGISTRATION CERTIFICATE** As The Last Page Of The pdf File
4. Use Only **WHITE PLAIN A4 PAPERS** For Writing Answers
5. Use **ONLY BLACK INK** For Writing Your Answers
6. Give **A TOP PAGE** With Clear Mention Of University **REGISTRATION NO.**
7. **GIVE PAGE NO.** At The Top Right/Middle Of Each Page
8. Give **AT LEAST 1CM MARGINS** In All The Four Sides Of Each Page

**2020**  
**B.A. /B.Sc. Part II Examination**  
**University of Calcutta**  
**CHEMISTRY – HONOURS**  
**Paper : IIIA**  
**F.M. 25**

**FAKIR CHAND COLLEGE CENTRE (551)**

**Answer ANY TWO from Question Nos. 1 to 4. Brief and to the point answer is desirable.**

1. Carry out the conversion

a) Benzaldehyde to  $\text{PhC}\equiv\text{CPh}$

7<sup>1</sup>/<sub>2</sub>

b) phenol from cumene

5

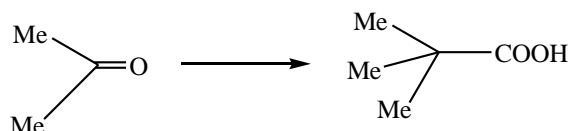
2.a) Give the products of Reimer-Tieman reaction on *p*-cresol. Explain the reaction with mechanism. 7<sup>1</sup>/<sub>2</sub>

b) What is directed aldol condensation? Give suitable example.

5

3.a) Carry out following transformation.

7<sup>1</sup>/<sub>2</sub>



b) Distinguish chemically (any one)

5

i)  $\text{CH}_3\text{CN}$  and  $\text{CH}_3\text{NC}$

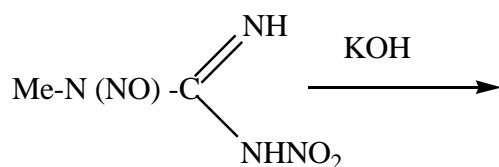
ii) aniline and N, N-Dimethyl aniline

4.a) Suggest the mechanism for the following transformations



7<sup>1</sup>/<sub>2</sub>

b)



5

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**F.M. 25**

**FAKIR CHAND COLLEGE CENTRE (551)**

Answer briefly **any two** questions from the following question no. 1 – 4 :

1. a) What is “activity and activity co-efficient” of electrolyte in solution? Define Buffer capacity. 5  
b) Prove that for a component in a mixture,  $\bar{v}_i = \left( \frac{\partial \mu_i}{\partial P} \right)_{T,N}$  where, terms have their usual significance. 7½
2. a) What do you mean by surface tension of a liquid? What is its S.I. unit? 5  
b) Drive the relation between the co-efficient of viscosity and the mean free-path of an ideal gas. 7½
3. a) The wave function of a particle in a one-dimensional box of length  $L$  is  $\psi_m(x) = B \sin \frac{m\pi x}{L}$  ( $m = 1, 2, 3, \dots$ ), where  $x$  is defined within  $0 \leq x \leq L$ . Find the value of  $B$ . 5  
b) Find the quantum number associated with the energy level  $\frac{14h^2}{8ma^2}$  of a particle in a cubical box of length ‘a’ and hence indicate the degree of degeneracy. 7½
4. a) Write a short note on “Liquid junction potential”. How it can be removed? 5  
b) Graphically explain how does the equivalent conductance of a strong and a weak electrolyte vary with dilution. 7½