



Chlorination?

**PART C**

*Answer all questions, each carries 10 marks.*

- 17 a) Discuss the factors affecting chemical shift. (5)  
b) Draw the instrumentation of UV-visible spectrometer, explain the various parts. (5)

**OR**

- 18 a) How will you distinguish the isomers of  $C_4H_{10}$  using NMR spectroscopy? (5)  
b) Calculate the force constant of HF molecule, if it shows IR absorption at  $4138\text{ cm}^{-1}$ . Given that atomic masses of hydrogen and fluorine are 1u and 19u respectively. What would be the wavenumber if hydrogen atoms are replaced by deuterium atoms? (5)
- 19 a) What are the various types of electrodes? (5)  
b) Calculate the single electrode potentials of  $H_2$  electrode at  $25\text{ }^\circ\text{C}$  and 1 atm pressure when the solution has  $\text{pH}=0$  and  $\text{pH}=14$ . Based on this which metal (Al or Fe) can liberate  $H_2$  only from acids? Which metal can liberate  $H_2$  from both acid and alkali? Given that  $E^0\text{ Fe}^{2+}/\text{Fe} = -0.44\text{ V}$  and  $E^0\text{ Al}^{3+}/\text{Al} = -1.66\text{ V}$ . (5)

**OR**

- 20 a) Discuss the variation in emf of a Daniel cell with respect to temperature at different concentration ratios of  $Zn^{2+}$  and  $Cu^{2+}$  (5)  
b) A cell reaction is given by  $A + B^{n+} \rightarrow A^{n+} + B$  Calculate the  $E^0_{\text{cell}}$  and number of electrons  $n$  involved in cell reaction. Given that concentration ratio of  $A^{n+}$  to  $B^{n+}$  is 0.1 and the cell shows an emf of 1.13006 V at  $30\text{ }^\circ\text{C}$  and 1.13105 V at  $40\text{ }^\circ\text{C}$ . (5)
- 21 a) Make a comparison between GSC and GLC. (5)  
b) Discuss the terms i) Carrier gas ii) columns iii) stationary phase iv) detectors (5)

**OR**

- 22 a) Write down the experimental procedures for the measurement of conductivity. (4)  
b) Describe the terms i) cell constant ii) specific conductance iii) conductivity cell (6)
- 23 a) What is poly pyrrole? How will you synthesise it? (6)  
b) Which kind of doping is possible (p or n) in poly pyrrole why? Give two properties and applications. (4)

**OR**

- 24 a) What is ABS? What are its important properties and applications? (6)

- b) What is Buna-S.? Mention the Historical importance? (4)
- 25 a) A sample of coal contains 60% C, 33% O, 6% H, 0.5% S, 0.2% N, and 0.3% Ash. Calculate the GCV and NCV of coal. (4)

- b) What are greases? Under what conditions they are preferred over a liquid lubricant. (6)

**OR**

- 26 a) What is Natural gas? Distinguish between LNG and CNG. What is the technical difficulty to use LNG fuel in a car? (5)

- b) Calculate the HCV and LCV of ethanol using Dulong's formula. (5)

- 27 a) 100 mL sewage water is diluted to 1000 mL with dilution water; the initial dissolved oxygen was 7.6 ppm, dissolved oxygen level after five days of incubation was 3.2 ppm. Find the BOD of the sewage water. (5)

- b) Compare aerobic and anaerobic oxidation of sewage water. (5)

**OR**

- 28 a) Discuss the steps involved in sewage water treatment. (5)

- b) Explain the working of trickling filter process with a neat labelled sketch. (5)

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