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| JLR – 10/10 |
| CHEMISTRY |

Time : 3 hours

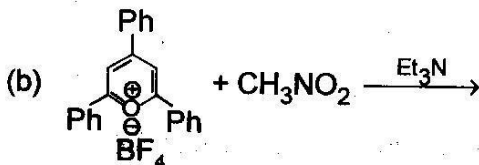
Full Marks : 100

The figures in the right-hand margin indicate marks.

*Answer any **five** questions.*

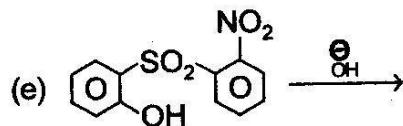
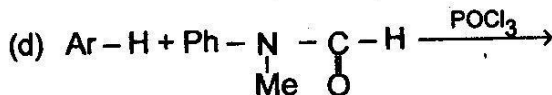
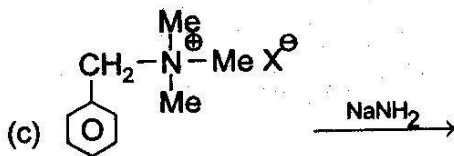
1. Write notes on the following : 5×4 = 20
 - (a) Importance of DCC in synthesis
 - (b) Mechanism of Osazone formation
 - (c) DL and Cahn-Ingold-Prelog System in the Stereochemistry
 - (d) Biochemical aspects of Zinc complexes

2. Predict the product(s) of the following. Give the mechanisms involved : 4×5 = 20



QS – 2/5

(Turn over)

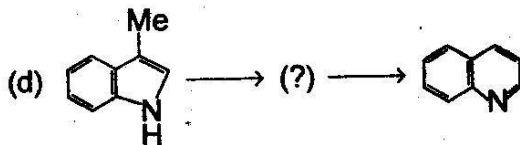
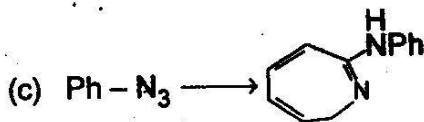


3. How can the following synthesis achieved ?

5x4 = 20

(a) Anthranilic acid \longrightarrow Saccharin

(b) α -Naphthol \longrightarrow α -Alkylated amino naphthalene



4. (a) Discuss the theory of Emulsification. 10

QS - 2/5

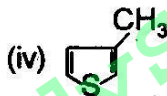
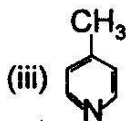
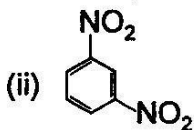
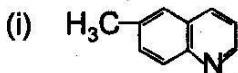
(2)

Contd.

- (b) How do you determine the "Entropy" by Statistical method ? 10
5. (a) Discuss the theory behind radioactive disintegration. 10
- (b) What is Chemisorption ? 5
- (c) By applying Clapeyron-Clausius Equation, calculate the latent heat of vapourisation of water at 100° C. 5
[Sp. volume of water vapour = 1674 cc and liquid water = 1 cc].
6. (a) Explain the "Crystal Field Theory" of coordination compounds. 10
- (b) Give the principle, working and applications of AAS. 10
7. (a) Comment on the structures of the following Werner's Complexes : 10
- (i) $\text{Os}_3(\text{CO})_{12}$
- (ii) $\text{Rh}(\text{CO})_{16}$

- (iii) $(B_4H_8) Fe(CO)_3$
- (iv) $Fe_3(CO)_{12}$
- (b) What are "Cage compounds" or "Clathrate compounds"? Why they are so important? Can you separate Potassium and Nickel from a solution using the above compounds? 10
8. (a) Explain the different types of Symmetry operations? What is the significance in Chemistry? 10
- (b) What do you mean by "Transport Number"? How do you determine it? 5
- (c) Explain, in brief, TG analysis. 5
9. (a) Explain "Magnetic Circular Dichroism". 5
- (b) Write a note on "Heavy Metals". 7
- (c) Explain the structures of the following : 8
- (i) $Co_3(CO)_9 CH_3$
- (ii) $Co_4(CO)_{12}$

10. (a) Predict the splitting pattern of NMR (Proton) signals for the following compounds. Give the approximate 'δ' values also : 10



- (b) Explain the terms Spin Decoupling and Anisotropic Effects. 5+5 = 10

