Total No. of Questions—**8**] [Total No. of Printed Pages—**4**

Seat No.	

[5668]-171

S.E. (Chemical Engg.) (I Sem.) EXAMINATION, 2019

CHEMISTRY—I

(2015 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Neat diagrams must be drawn wherever necessary.

(*ii*) Figures to the right indicate full marks.

(*iii*) Assume suitable data, if necessary.

1. (*a*) Explain bond order in carbon monoxide using molecular orbital theory. [4]

(*b*) Explain structure and stability of carbocation. [4]

(*c*) What is rate of reaction ? Give factors affecting rate of reaction. [4]

Or

2. (*a*) Draw resonance structure for Phenol and Benzaldehyde. [4]

(*b*) What is energy of activation ? Derive Arrhenius equation. [4]

(*c*) A certain first order reaction is 45% complete in 65 seconds. Determine rate constant and half life time. [4]

P.T.O.

3. (*a*) Explain technique and applications of column chromatography. [5]

(*b*) Give the instrumentation in single beam UV-visible spectrophotometer. [4]

(*c*) Define vapour pressure of liquid and explain the factors affecting vapour pressure of liquid. [4]

Or

4. (*a*) Give principle and instrumentation of flame photometry. [5]

(*b*) Derive the equation showing the relation between molecular mass of non-volatile solute and depression in freezing point. [4]

(*c*) Arginine vasopressin is a pituitary hormone. It helps to regulate the amount of water in the body by reducing flow of urine from kidneys. An aqueous solution containing 21.6 mg of vasopressin in 100 ml of solution had an osmotic pressure of 3.70 mmHg at 25°C. What is molecular weight of hormone ? [4]

5. (*a*) Explain the factors affecting rate of S_N1 and S_N2 reaction. [4]

(*b*) Give the mechanism involve in Friedal-Craft alkylation. [4]

(*c*) Write short note on Claisen rearrangement. [4]

Or

6. (*a*) Nitrobenzene undergoes electrophilic substitution at meta only while amino benzene at ortho and para explain. [4]

(*b*) Identify the compounds A & B in the following reactions : [4]

$$CH_3—CH_2—CH_2—I + KOH \xrightarrow{\text{alcoholic}} A \xrightarrow{HBr} B$$

$$CH_3—\underset{\displaystyle I}{\underset{|}{CH}}—CH_3 + KOH \xrightarrow{\text{alcoholic}} A \xrightarrow{HBr/H_2O_2} B$$

(*c*) Write a note on Beckman's rearrangement. [4]

7. (*a*) Give *two* methods each for the synthesis of pyrrole and pyridine. [5]

(*b*) Explain with the help of equation what happens when : [4]

(*i*) Furan when treated with benzene diazonium salt

(*ii*) 1, 4 diketone is heated with P_2O_5.

(*c*) Give the steps involved in the preparation of methyl orange. [4]

Or

8. (*a*) Describe the classification of dyes on the basis of chemical structure. [5]

(*b*) Complete the following reactions and predict product : [4]

(*i*)  $\xrightarrow[100°C]{SO_3/\text{Pyridine}}$

(*ii*)  $\xrightarrow{CHCl_3/KOH}$

(*iii*)  $\xrightarrow{Sn/HCl}$

(*iv*)  $\xrightarrow[10°C]{HNO_3/(CH_3CO)_2O}$

(*c*) Explain the following : [4]

(*i*) Pyridine is more basic than pyrrole

(*ii*) Phenolphthalein shows pink colour in basic medium.