DCY-003-0011003 Seat No. _____

B. Sc. (Sem. I) (CBCS) (W.E.F. 2016) Examination

August - 2022

Chemistry : C-101

Faculty Code : 003
Subject Code : 0011003

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) This question paper contains ten questions and attempt any five.
(2) All questions carry 14 marks each and figures to the right indicate full marks.
(3) Write sub questions (a), (b), (c) and (d) of particular question together.

1 (a) Answer the following questions in short : **4**
(1) What is h and ν in $E = h\nu$.
(2) Phosphorous is metal or non metal ?
(3) Define adsorption.
(4) What is Pauli's principle ?

(b) Write limitations of Freundlich adsorption isotherm. **2**

(c) Explain factors affecting the magnitude of electronegativity. **3**

(d) Explain quantum numbers in detail. **5**

2 (a) Answer the following questions in short : **4**
(1) What is the symbol of Principal quantum number ?
(2) Write name of any one crystalline allotrop of carbon.
(3) Define adsorbent.
(4) Define atomic radii.

(b) Name the factors affecting electron affinity. **2**

(c) Explain the structure of Graphite. **3**

(d) Discuss diagonal relationship between Li and Mg. **5**

3 (a) Answer the following questions in short : **4**

(1) What is the hybridization of SiH_4 ?

(2) What is the shape of PCl_5 molecule?

(3) Write the full form of VSEPR.

(4) What is bond order?

(b) Explain limitations of V. B. theory. **2**

(c) Discuss energy level diagram of N_2 molecule. **3**

(d) What is hybridization? Discuss Sp^3d^2 hybridization with suitable example in detail. **5**

4 (a) Answer the following questions in short : **4**

(1) What is the hybridization of BF_3 ?

(2) What is the shape of Sp^3d^2 hybrid molecule?

(3) Define Gerade, molecular orbitals.

(4) Write full form of LCAO.

(b) Write any four names of types of bonds. **2**

(c) Discuss the structure and shape of SO_4^{-2} ion. **3**

(d) Draw energy level diagram of O_2 and discuss bond order and stability of $O_2^{-2}, O_2^{-1}, O_2, O_2^{+1}, O_2^{+2}$. **5**

5 (a) Answer the following questions in short : **4**

(1) Define Carbanion.

(2) Write structural formula of Diethyl amine.

(3) Explain electrophilic reagent.

(4) Write the structure of tertiary butyl bromide.

(b) Explain homolytic fission. **2**

(c) Explain inductive effect. **3**

(d) Discuss Mesomeric effect (M) and Electromeric effect. **5**

6 (a) Answer the following questions in short : **4**

(1) Define Carbocation.

(2) Give structural formula of isopropyl group.

(3) Explain nucleophilic reagent.

(4) Write the structure of trans-2-butene.

(b) Explain Heterolytic fission. **2**

(c) What is Carbene ? Explain with suitable example. **3**

(d) Discuss SN^1 reaction with mechanism and draw energy diagram for it. **5**

7 (a) Answer the following questions in short : **4**

(1) Give one example of Geminal dihalide.

(2) Which compound is used to carryout anti Markovnikov's rule ?

(3) Define catalysis.

(4) Which negative catalyst is used in oxidation of chloroform ?

(b) Give one reaction for formation of Alkene. **2**

(c) Write short note on Heterogeneous catalysis. **3**

(d) Describe E^1 reaction with mechanism. **5**

8 (a) Answer the following questions in short : **4**

(1) Give one example of Vic. dihalide .

(2) Write the formula of diborane.

(3) Define promoters.

(4) Which anticatalyst is used in Haber's process of ammonia ?

(b) Explain positive catalyst with suitable example. **2**

(c) Write Saytzeff and Hoffimann elimination reaction with example. **3**

(d) Describe 1, 2 and 1, 4 addition reaction in conjugated dienes and explain Diel's - Alder reaction. **5**

9 (a) Answer the following questions in short : **4**

(1) Define rate of reaction.

(2) Name only one example of first order reaction.

(3) Explain Molecularity of a reaction.

(4) Write only the equation of Affhenius for the effect of temperature on rate of reaction.

(b) What is Pseudo reaction ? Give one example. **2**

(c) Explain Graphical method for determining the order of reaction. **3**

(d) Describe first order reaction and its characteristics. **5**

10 (a) Answer the following questions in short : **4**

(1) What is order of reaction ?

(2) Write unit of second order reaction.

(3) Name any two factors which affect the rate of reaction.

(4) What is half life period ?

(b) Explain energy of activation. **2**

(c) Explain Vant hoff's differential method for determining the order of reaction. **3**

(d) Describe second order reaction. **5**