B. Pharm / Sem – I CBSGS KT / P.O.C

Date :– 29/3/16

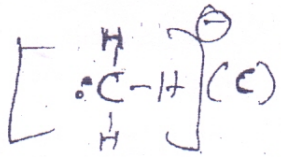
QP Code : **24917**

(3 Hours) [Total Marks : 70

N. B. : (1) **All** questions are **compulsory.**
(2) **Figures** to the **right** indicate **full** marks.

1. (a) Explain the following terms (any **five**) :– 5
   (i) Rate law
   (ii) Nodal plane
   (iii) Specific acid catalysis
   (iv) Heterogenous catalyst
   (v) Symmetry in MH_3 system
   (vi) Zero order Kinetics

(b) Fill in the blanks (any **five**) :– 5
   (i) Reaction rate in specific acid catalysis is directly proportional to _____.
   (ii) Formal charge for the atom specified in curved bracket is _____.



   (iii) Iodine-starch complex is an example of _____.
   (iv) Lewis structure for H_2CO_3 is _____.
   (v) Half life for first order reactionis 6 hr. The rate constant for reaction is _____.
   (vi) Ground state electronic configuration of Argon is _____.

(c) Match the following :– 5

Group 'A'	Group 'B'
(i) $d_{x^2-y^2}$	(a) Solvolysis
(ii) S_N1	(b) Electron deficient species
(iii) H_3O^+	(c) $3d^6\ 4s^2$
(iv) Acceptor	(d) General Acid
(v) Valence electrons of (Fe (At. No. 26)	(e) σ symmetry

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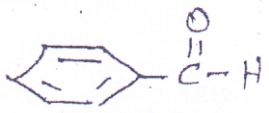
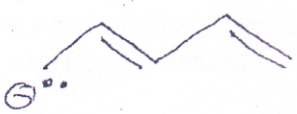
XZ-Con. 57-15.

2. (a) Draw resonating structure for the following :– 2

(i) 

(ii) 

(b) Draw the molecular orbitals of Ethene and Indicate HOMO and LUMO. 3

(c) Explain Primary Kinetic Isotope effect with a suitable example. 3

(d) Enlist various types of catalysis. Explain any one with suitable example. 3

3. (a) Mention the symmetry operations for BH_3. Enlist molecular orbitals of BH_3. 3

(b) Explain formation of H_2O on the basis of QMOT. Also justify why the two lone pairs of H_2O are not identical in vapar phase. 3

(c) State Eyring equation for transition state theory and clearly state each term in it stands for what. Also write same equation w.r.t. activation parameter. 3

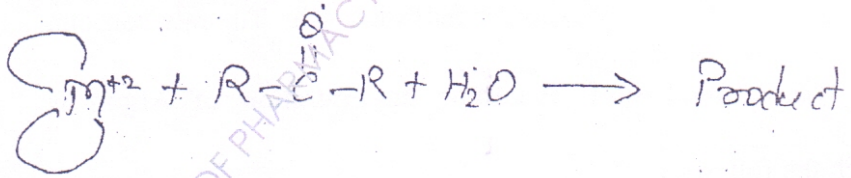
(d) In a first order reaction, 60% of the given compound decomposes in 45 mins. Determine the half life of the reaction. 2

4. (a) Compare and constrast between VBT and MOT. 3

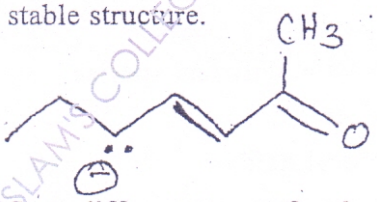
(b) Define group orbitals. Enlist any four rules of QMOT. 3

(c) How Kinetics of reaction is studies? State suitable example. 3

(d) Identify the type of catalysis for following reaction. Explain the identified catalysis in brief. 2



5. (a) Draw resonating structures for the given molecule. Indicate the most stable structure. 3



(b) State different types of carbene? Differentiate between them. 3

(c) Arhenius plot has a slope of -2.01×10^2. What will be the activation energy of the reaction? (R = 8.314 J/K mol) 2

(d) Explain in brief Charge Transfer Complex. 3

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6. (a) Complete the following table on the basis of hybridization concept. 3

Molecule	Hybridization state of underlined atom	Bond Angle
(i) $\underline{N}F_3$		
(ii) $H_2\underline{S}$		
(iii) $\underline{C}H_2 = CH_2$		

(b) Explain General Base Catalysis. Also discuss the Kinetic plots for General Base Catalysis. 4

(c) Write in short about Hammond's Postulate 2

(d) $A \xrightarrow[\text{temp}]{\text{lower}} \underset{\text{Major}}{B} + \underset{\text{Minor}}{C}$ 2

$A \xrightarrow[\text{temp}]{\text{higher}} \underset{\text{Minor}}{B} + \underset{\text{Major}}{C}$

Identify which is kinetically controlled and which is thermodynamically controlled product.
