JAT-003-2011004 Seat No. _____

B. Sc. (Sem. I) (CBCS) Examination

December – 2019

Chemistry : C-101

(New Course)

Faculty Code : 003

Subject Code : 2011004

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

Instructions :

(1) This question paper contains five questions and all are compulsory.

(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 : **4**

(1) Define : Allotropy.

(2) Define : Catenation.

(3) What is another name of chemical adsorption ?

(4) Define : electronegativity.

(b) Answer any one : **2**

(1) Give Fajan's first rule about polarizing power.

(2) Explain magnetic quantum number *m*.

(c) Answer any one : **3**

(1) Differentiate physisorption and chemisorption.

(2) Write a short note "Pauli's exclusion principle".

(d) Answer any one : **5**

(1) Discuss diagonal relationship between B and Si.

(2) Derive Langmuir adsorption isotherm equation.

2 (a) Answer the following questions : **4**

(1) What is sp^3-hybridization ?

(2) Give shape and hybridization of SF_6 molecule.

(3) Define Bond length.

(4) What is ABMO ?

(b) Answer any one : **2**

(1) Define sp hybridization and write one example of sp^3d^2 hybridization.

(2) Explain B.M.O.

(c) Answer any one : **3**

(1) Discuss the shape of sulphate (SO_4^{-2}) ion.

(2) Draw molecular orbital energy level diagram of F_2 molecule.

(d) Answer any one : **5**

(1) Discuss M.O. energy level diagram of O_2 molecule.

(2) What is Hybridization ? Discuss sp^3d hybridization with suitable example.

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

(1) Define carbene.

(2) Give the I.U.P.A.C. name of $CH_3 - CH = CH - CH_3$.

(3) Write the structural formula for 1, 3 butadiene.

(4) Define free radical.

(b) Answer any one : **2**

(1) Explain electrophilic reagent.

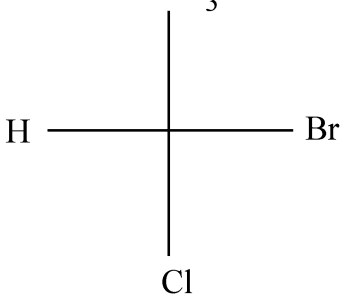
(2) Discuss heterolytic fission with example.

(c) Answer any one : **3**

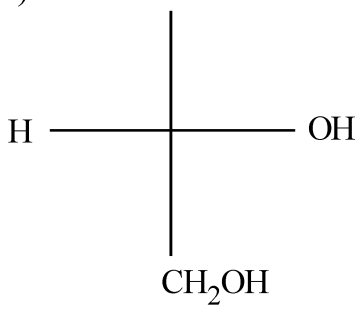
(1) Explain Inductive effect.

(2) Using the designation R/S, and specify the configuration.

(I)



(II)



(d) Answer any one : **5**

(1) What is nucleophilic substitution reaction ? Explain SN^2 reaction with mechanism.

(2) Describe carbocation, carbanion and Benzyne with example.

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

(1) Write Anti Markovnikov's rule.

(2) Define alkyne.

(3) Define vicinal dihalides.

(4) Define E^2 - reaction.

(b) Answer any one : **2**

(1) Explain Saytzeffs rule with example.

(2) Explain Dehalogenation of vicinal dihalides.

(c) Answer any one : **3**

(1) Explain Diels-Alder reaction.

(2) Explain Ozonolysis reaction of alkene.

(d) Answer any one : **5**

(1) Explain E^1 reaction with mechanism.

(2) Explain Markovnikov's and Hofmann rule with example.

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

(1) What is order of reaction ?

(2) Define first order reaction.

(3) What is negative catalyst ?

(4) Define Antiocatalyst.

(b) Answer any one : **2**

(1) Explain zero order reaction.

(2) Write note on Auto catalyst.

(c) Answer any one : **3**

(1) Calculate the activation energy of a reaction whose reaction at 27^oC gets doubled for 10^oC rise in temperature.

(2) Give differences between molecularity and order of reaction.

(d) Answer any one : **5**

(1) Derive equation of rate constant second order reaction and mention its characteristics (when $a = b$).

(2) Discuss intermediate compound formation theory and write uses of catalyst.