H Roll No. .....

TCH–201

B. TECH. (SECOND SEMESTER)
MID SEMESTER EXAMINATION, 2019

(All Branches)

ENGINEERING CHEMISTRY

Time : 1:30 Hours

Maximum Marks : 50

Note : (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)

(a) The shape of SF_4 molecule is ..... .

(b) Bond order of O_2^{--} is ..... .

(c) VSEPR theory was proposed by ..... .

(d) Hybridization of carboanion ion is sp^3. (True/False)

(e) Free radicals are formed by homolytic bond fission. (True/False)

2. Attempt any *five* parts : (3×5=15 Marks)
   (a) Write the main postulates of VSEPR theory.
   (b) Write a short note on carbonium ion and their stability.
   (c) Explain metallic bond on the basis of electron sea theory.
   (d) Explain hyperconjugation with suitable example.
   (e) Define electrophiles with examples.
   (f) Write a short note on Carbenes.

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
   (a) Write the differences between bonding and anti-bonding molecular orbitals.
   (b) Discuss hydrogen bonding and its applications.
   (c) Explain Inductive effect in detail. What are the applications of Inductive effect ?

4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
   (a) Write the mechanisms of S_N^1 and S_N^2 nucleophilic substitution reactions.

   (b) Explain Aromatic electrophilic substitution reaction with the mechanism of halogenation of benzene.
   (c) Discuss the shapes of CH_4, NH_3 and H_2O molecules.

5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
   (a) Draw the molecular orbital diagram of HF molecule and also comment on the magnetic behaviour of the molecule.
   (b) Explain why *p*-nitrophenol and *o*-nitrophenol has different solubility in water.
   (c) Write the differences between electromeric and mesomeric effect with suitable examples.