H Roll No. .....

TCH–201

B. TECH. (SECOND SEMESTER)
MID SEMESTER EXAMINATION, 2018

(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 CH_3 (methyl carboanion) is ..... .
   (b) The bond order of CN is ..... .
   (c) NO molecule is paramagnetic in nature while N_2 is diamagnetic. (True/False)
   (d) The shape of XeF_4 is square planar. (True/False)
   (e) BF_3 is nucleophiles. (True/False)
2. Attempt any *five* parts : (3×5=15 Marks)
   (a) Define Electromeric effect.

(b) What are the Nucleophiles ?

(c) Draw the shape of SF_4 molecule (on the basis of VSEPR theory).

(d) Write a short note on Hyperconjugation effect.

(e) Write a short note on free radicals.

(f) Explain, why chloroacetic acid is strong acid than acetic acid.

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) Draw the MOT diagram of HF molecule with its bond order and magnetic nature.

(b) Differentiate between bonding and antibonding molecular orbitals.

(c) Explain aromatic electrophilic substitution reaction with the mechanism of nitration.

4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) Describe the structures of CH_4 and NH_3 molecules in terms of VSEPR theory.

(b) Write a short note on H-Bonding with its classification and applications.

(c) Explain, why *p*-nitrophenol and *o*-nitrophenol can be able to separate through fractional distillation method.

5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) Describe the electron sea theory of metallic bond.

(b) Differentiate the mechanisms between S_{N^1} and S_{N^2} nucleophilic substitution reactions with stereochemistry.

(c) With reason arrange the following carbocations in increasing order of stability :

$$RCH_2^+, CH_3^+, R_3C^+, R_2CH^+$$