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TCH-101

B. Tech. (First Semester)
Mid Semester EXAMINATION, 2017
(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 hybridization in CH_3 (methyl carbanion) is
 - (b) The bond order of HF is
 - (c) O_2 molecule is diamagnetic in nature while N_2 is paramagnetic. (True/False)
 - (d) The shape of SF_4 is square planar. (True/False)
 - (e) AlCl_3 is nucleophile. (True/False)
2. Attempt any five parts : (3×5=15 Marks)
 - (a) Define Inductive Effect.

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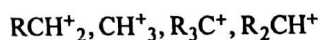
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- (b) What are Electrophiles ?
- (c) Write a short note on free radicals.
- (d) Write a short note on mesomeric effect.
- (e) Methylamine is a stronger base than ammonia. Explain, why.
- (f) Explain why, *p*-nitrophenol and *o*-nitrophenol can be able to separate through fractional distillation method.

Section—B

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

- (a) Describe the band theory of metallic bond.
- (b) Write the mechanisms of nucleophilic substitution (S_N^1 and S_N^2) reactions with stereochemistry.
- (c) With reason arrange the following carbocations in increasing order of stability :



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) On the basis of MOT, explain why hydrogen forms diatomic molecule while helium remains monoatomic.
- (c) Write a short note on H-Bonding with its classification and applications.

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[3]

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

- (a) Draw the MOT diagram of O_2 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 chlorination.

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