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TCH-101

**B. Tech. (First Semester)
Mid Semester EXAMINATION, 2016
(All Branches)**

ENGINEERING CHEMISTRY

Time : Two Hours] [Maximum Marks : 60

Note : (i) This question paper contains *three* questions with alternative choice.

(ii) All questions are compulsory.

(iii) Each question carries four Parts (a), (b), (c) and (d). Attempt either Parts (a) and (b) or (c) and (d) of each question.

(iv) Each Part carries ten marks. Total marks assigned to each question are twenty.

1. (a) What is meant by bond order ? Calculate the bond order of He_2^+ , O_2^{2-} molecular ions.
- (b) Discuss the mechanism and stereochemical implication of nucleophilic substitution bimolecular reaction.

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Or

- (c) Give a brief account of 'VSEPR' theory.
- (d) Write short notes on the following :
- (i) Stability of Carbocations
 - (ii) Inductive effect
2. (a) Define Hydrogen Bond. Discuss its types.
- (b) Explain Metallic bonding on the basis of 'Electron sea model' and 'Band theory'.
- Or
- (c) Describe the following :
- (i) Mesomeric effect
 - (ii) Free radicals
- (d) Discuss the following :
- (i) SN^1 reactions
 - (ii) Carbanion
3. (a) Describe mechanism of halogenations and nitration in aromatic electrophilic substitution reactions.
- (b) Write short notes on the following :
- (i) Carbenes
 - (ii) Structure of SO_2 and XeF_4

[3]

Or

- (c) Draw molecular orbital diagram of a molecule having bond order 3.
- (d) Comment upon the following :
- (i) Bonding and antibonding molecular orbitals
 - (ii) Phenomenon of hyperconjugation

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