Roll	No.		101	

TCH-101

B. TECH. (FIRST 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) Ignition temperature of a solid fuel is high.
 - (b) The degree of polymerization represents the number of monomer units in a polymer.
 - (c) O₂ molecules is paramagnetic while N₂ is diamagnetic.
 - (d) Ethanol is viscous than glycerol.
 - (e) Polystyrene is prepared from styrene in the presence of

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- 2. Attempt any five parts: $(3\times5=15 \text{ Marks})$
 - (a) Although chlorine has the same electronegativity as nitrogen, it does not form effective hydrogen bond.
 - (b) Why low density and high density polyethylene differ in density?
 - (c) Explain why the order of viscosity is glycerol > water > methanol > dimethyl ether.
 - (d) Comment on the shape of CH₄, NH₃ and H₂O and explain why their shapes are different
 - (e) Why are metals good conductors of heat and electricity?
 - (f) Explain the limitations of VSPER theory.

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- 3. Attempt any two parts of choice from (a), (b) and (c). The monomial of the model ($5 \times 2 = 10 \text{ Marks}$)
- (a) Differentiate between addition and condensation polymerization with suitable examples.
 - (b) Enumerate the difference between thermoplastics and thermosetting resins with suitable examples.
 - (c) Write a brief note on biodegradable polymers.

- 4. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
 - (a) Explain the shape of NH₄ and H₃O⁺ in the light of the VSPER theory.
 - (b) Explain on the basis of MO theory as to why:
 - (i) The bond order of O_2^- is less than in O_2 which is turn, is less that in O_2^+ .
 - (ii) Hydrogen forms diatomic molecule while helium is monoatomic.
 - (c) Draw the MO diagram of NO. Calculate its bond order.
- 5. Attempt any two parts of choice from (a), (b) $(5\times2=10 \text{ Marks})$ and (c).
 - (a) Write a note on biomass and biogas as a source of energy. Give the composition of biogas.
 - (b) On burning 0.83 g of a solid fuel in a bomb calorimeter. the temperature of 3500 g of water increased from 25.5°C to 29.2°C. Water equivalent of calorimeter and latent heat of steam are 385 g and 587 cal/g respectively. If the fuel contains 0.7% hydrogen, calculate its gross and net calorific values.

- (c) Write short notes on any two of the following:
 - (i) Characteristics of a good fuel
 - (ii) Relative merits of solid, liquid and gaseous fuel
 - (iii) Non-conventional energy sources

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(c) Draw the MO diagram of NO. Calculate merselling its bond orders.

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