Roll No. .....

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) O_2 molecules is paramagnetic while N_2 is diamagnetic.
   (d) Ethanol is ..... viscous than glycerol.
   (e) Polystyrene is prepared from styrene in the presence of ..... .

261

2. Attempt any *five* parts : (3×5=15 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 CH_4, NH_3 and H_2O and explain why their shapes are different.
   (e) Why are metals good conductors of heat and electricity ?
   (f) Explain the limitations of VSPER theory.

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 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 NH_4^+ and H_3O^+ 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) and (c). (5×2=10 Marks)
   (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

F. No. : b-39