Y—19—2019

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) (Backlog) EXAMINATION

OCTOBER/NOVEMBER, 2019

(CGPA Pattern)

CHEMISTRY

Paper-XIV

(Organic and Inorganic Chemistry)

(Thursday, 14-11-2019)　　　　　　　　　　　**Time : 10.00 a.m. to 12.00 noon**

Time—2 Hours　　　　　　　　　　　　　　　　　　　*Maximum Marks—40*

N.B. :—　(i)　Attempt *all* questions.

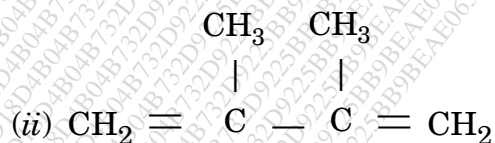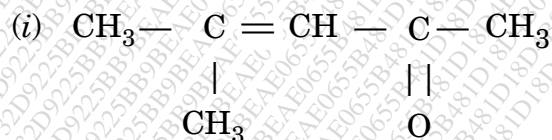　　　　　(ii)　Figures to the right indicate full marks.

Section A

(Organic Chemistry)

1.　Answer any *five* of the following :　　　　　　　　　　　　　　　　5×2=10

　　(a)　Explain $\Pi \to \Pi^*$ transitions.

　　(b)　Calculate the λ_{max} :

　　　　(i)　$CH_3 - \underset{\underset{CH_3}{|}}{C} = CH - \underset{\underset{O}{||}}{C} - CH_3$

　　　　(ii)　$CH_2 = \underset{\underset{CH_3}{|}}{C} - \underset{\underset{CH_3}{|}}{C} = CH_2$

　　(c)　Explain deshielding of a proton with an example.

　　(d)　Predict the number of PMR signals of :

　　　　(i)　Acetone

　　　　(ii)　Cyclobutane.

P.T.O.

(e) What is the action of formaldehyde and acetaldehyde on glycine.

(f) Give the following colour test of protein :

(i) Biuret test

(ii) Xanthoprotic test.

(g) What are peptides ? How are they classified ?

2. Answer any *two* of the following : 2×5=10

(a) How will you interpret IR spectra of the following compounds :

(i) Phenol

(ii) Acetone

(iii) Ethyne.

(b) Explain Fries rearrangement with mechanism.

(c) How will you synthesis α-amino acid by Gabriel's phthaliamide synthesis ? What is the action of nitrous acid on glycine ?

3. Answer any *one* of the following : 1×7=7

(a) Discuss the anionic addition polymerisation with mechanism. Give the synthesis and uses of :

(i) Bakelite

(ii) Polymethyl methacrylate.

(b) An organic compound with molecular formula C_3H_8O gave the following spectral data :

UV : Transparent above λ_{max} 210 nm

IR : 3400 (Broad), 2890, 1050 cm^{-1}

PMR (δ PPM) : δ 1.2 (t, J = 7.5 Hz, 3H)

δ 2.6 (Sextet, J = 7.5 Hz, 2H)

δ 3.5 (t, J = 7.5 Hz, 2H)

δ 4.5 (S, 1H, exchangeable with D_2O)

Deduce the structure of the compound.

Section B

(Inorganic Chemistry)

4. Solve any *three* of the following : 3×3=9

   (*a*) Explain outer orbital complex of coordination number six with example.

   (*b*) Give the postulates of crystal field theory.

   (*c*) Define CFSE ? Calculate CFSE of d^6 configuration in high spin octahedral complex.

   (*d*) What are selection rules for electronic spectra ?

   (*e*) Calculate the spectroscopic ground state term symbol of d^4 configuration.

5. Solve any *two* of the following : 2×2=4

   (*a*) Give the limitation of valence bond theory.

   (*b*) Explain the effect of oxidation state of metal ion on magnitude of crystal field splitting.

   (*c*) Calculate the number of unpaired electrons in octahedral complex of Co^{3+} and Fe^{3+}, in strong field ligand.

   (*d*) Draw Orgel diagram for d^1 and d^9 system.