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R—16—2017
FACULTY OF SCIENCE
B.Sc. (Third Year) (Sixth Semester) EXAMINATION
MARCH/APRIL, 2017
CHEMISTRY
Paper XIV (CH-303)
(Organic and Inorganic Chemistry)

(Wednesday, 22-3-2017)   **Time : 10.00 a.m. to 12.00 noon**

Time—Two 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*)   What are amino acids ? How are they chemically classified ? Give its examples.

   (*b*)   How will you synthesize dipeptide by C-protecting group agent using benzyl alcohol ?

   (*c*)   Give the following colour test of proteins :

       (*i*)   Ninhydrin test

       (*ii*)   Biuret test.

   (*d*)   Explain the terms :

       (*i*)   Chemical shift and how is it calculated ?

       (*ii*)   'J' and spin-spin coupling.

   (*e*)   Predict the number of 'PMR' signals of :

       (*i*)   Ethylbenzene

       (*ii*)   Cyclobutane.

   (*f*)   Define the terms :

       (*i*)   Bathochromic shift and hyperchromic effect.

       (*ii*)   Frequency and EMR.

                                 P.T.O.

(g) Calcualte the λ_{max} :

    (i)   3, 4-dimethyl cyclohex-2-enone

    (ii)   2, 5-dimethyl-2, 4, 6-octatriene.

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

(a) What is aninotropic rearrangement ? Explain Wolf rearrangement with mechanism.

(b) Give the synthesis of glycine from phthalamide and what happens when :

    (i)   Action of lithium aluminum hydride on glycine

    (ii)   Reaction with NaOH on glycine.

(c) What is vibration in a molecule ? Explain in detail types of molecular vibrations.

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

(a) An organic compound with molecular formula '$C_2H_4O_2$' gave the following spectral data :

U : V   :   Transparent λ_{max} 210 nm (E_{max} 50)

IR   :   3100-2975 cm^{-1} (Broad), 1715-1720 cm^{-1}.

PMR (δ_{ppm}) : $\delta_{2.1}$ (S, 3H)

            : $\delta_{11.7}$ (S, 1H) exchangeable with D_2O.

Deduce the structure and name of organic compound.

(b) What are condensation polymerization ? Give *two* examples. Explain in detail free radical polymerization reaction with mechanism. Give synthesis and importance of :

    (i)   Nylon 6, 10

    (ii)   Thikol.

Section B

(Inorganic Chemistry)

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

(a) What are the postulates of valence bond theory of coordination compounds ?

(b) Explain the splitting of *d*-orbitals in octahedral complexes.

    (*c*)   What are limitations of crystal field theory ?

    (*d*)   What is hole formulation ? Explain it with suitable example.

    (*e*)   Write note on selection rule for electronic spectra.

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

    (*a*)   Give an account of spectrochemical series.

    (*b*)   Calculate CFSE in tetrahedral complexes having d^1 and d^9 configuration.

    (*c*)   Draw and explain the shape of *d*-orbitals.

    (*d*)   Explain $KMnO_4$ show dark purple colour.