Reg.No : | | | | | | | | | | | |

D.K.M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1

SEMESTER EXAMINATIONS

NOVEMBER – 2016 15CPCH3A

SPECTROSCOPY

Time : 3 Hours **Max. Marks : 75**

SECTION – A (5 x 6 = 30)

Answer ALL the questions.

1. (a) Show that on the rigid rotor model, the energy difference between the adjacent lines in a rotation spectrum of a diatomic molecule is constant. Explain. (6)

(Or)

(b) i) State and explain Franck Condon principle. (3)

ii) Discuss about Woodward - Fieser rules for calculating in λ_{max} in conjugated dienes. (3)

2. (a) i) What are stokes and anti - stokes lines? (3)

ii) State and explain Mutual Exclusion principle. Mention its applications. (3)

(Or)

(b) What is mean by chemical shift? What are the factors that affecting chemical shift? (6)

3. (a) Briefly explain the principle and applications of NQR spectroscopy. (6)

(Or)

(b) i) What are NMR shift reagents? Give examples. (3)

ii) Give brief account on Off resonance decoupling in ^{13}C NMR. (3)

4. (a) i) Explain Koopman's theorem and XPS spectrum for Pd metal. (4)

ii) State Mc Connel's equation. (2)

(Or)

(b) Discuss in detail about Zero filed splitting and Kramers degeneracy. (6)

5. (a) Write the McLafferty rearrangement. Draw and explain the mass spectra of hydrocarbons, phenols and aldehydes. (6)

(Or)

(b) What is Mossbauer spectroscopy? Discuss some applications of Mossbauer spectroscopy. (6)

SECTION – B (3 x 15 = 45)

Answer any THREE of the following questions.

6. a) Write any four applications of i) IR Spectroscopy and ii) UV Spectroscopy. (6)

b) What is meant by finger print region? (2)

c) What are chromophores and auxochromes? Give suitable examples. (2)

d) Discuss in detail about the effect of solvent on the electronic transistions. (5)

7. a) What is meant by NOE? Explain in detail. (5)

   b) Describe the principle, instrumentation and applications of ^{1}H - NMR Spectroscopy. (6)

   c) Give a brief account on chemical exchange. (4)

8. Briefly explain the applications of

   i) ^{19}F NMR spectroscopy and (8)

   ii) ^{31}P NMR Spectroscopy by taking inorganic molecules. (7)

9. a) Explain the basic principle and instrumentation of ESR spectroscopy. (7)

   b) Explain the principles of PAS and Auger spectroscopy. (8)

10. a) Write the basic principle of Mass spectroscopy. (5)

    b) What is meant by molecular ion peak, base peak and isotopic peak? (6)

    c) Explain the mass spectra of alcohols and ketones. (4)

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