Total Pages: 2

PG CBCS

M.SC. Semester-IV Examination, 2021

CHEMISTRY

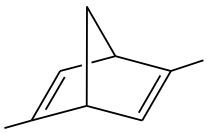
PAPER: CEM-401

(COMMON PAPER)

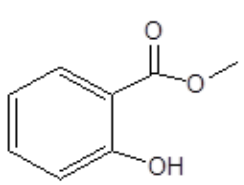
Full Marks: 40 **Time: 2 Hours**

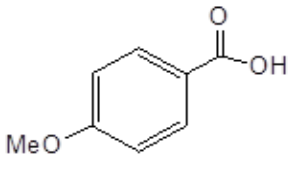
Answer any <u>FOUR</u> questions from the following: 10X4=40

1. (a) What is ORD in chemistry? 2
   (b) What is the principle of Massbauer spectroscopy? 2
   (c) Mention some importance characteristics of solvent used in NMR. 2
   (d) What is circular dichroism(CD)? 2
   (e) What is chemical shift in NMR spectroscopy? 2
2. (a) The MB-spectrum of $K_4[Fe(CN)_6]$ consist of one line, where as that of $K_3[Fe(CN)_6]$ consist of two line. Draw these spectra qualitatively and account for their appearance.
   (b) Compare MB-spectrum of $K_4[Fe(CN)_6]$ vs.$[Fe(CN)_5NH_3]^{3-}$ and explain it. 5+5
3. (a) $C_{\square}H_{\square}O_{\square}$. Find the structure of organic compound with the help of following data
   □ 128 d, □ 60 t, □ 132 t, □ 35 q, □ 170 s,
   (b) What is spin-spin splitting?
   (c)What is the principle of Massbauer spectroscopy? 4+3+3
4. (a) Identify the number of ^1H NMR peak observed in the following structure.



   (b)Which of the following compound will show a base peak at m/z 120 in its EI mass spectrum. 5+5





5. (a) The pmr spectrum of a mixture of methyl iodide and tert-butyl bromide shows two signals at 2.20δ and 1.8δ with relative integrals of 5:1. What is the mole percent of each compound in the mixture?
   (b) Why TMS is used as a reference standard in NMR spectroscopy?

(P.T.O.)

6. (a) Aromatic protons are more deshielded than ethylinic protons, although both the types of protons are attached to sp^2 hybridized carbon atom? 5+5

   (b) How will you distinguish cis- and trans-stilbene by means of NMR spectroscopy? 5+5

7. (a) What is nitrogen rule in the mass spectroscopy?

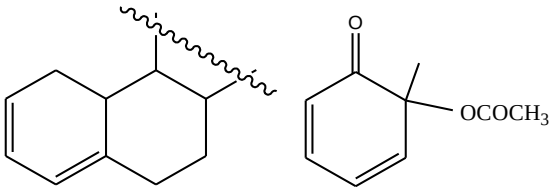
   (b)What is the basic principle of ORD in spectroscopy?

   (c) Write application of ORD and CD spectroscopy? 2+4+4

8. (a) Elucidate the structure of the compound having the following spectral data,

   1H NMR: δ 6.2 (br s, 1H), 5.5 (br s, 1H), 4.2 (q,2H), 2.0 (s,3H),1.1 (t,3H).

   (b) Calculate the λ_{max} valiue of the given compounds using woodward fieser rule. 5+5



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