# COMBINED COMPETITIVE EXAMINATION (MAIN)

## CHEMISTRY

Paper—II

*Time* : 3 hours | *Full Marks* : 200

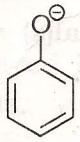
***Note*** : *(1) The figures in the right-hand margin indicate full marks for the questions.*

*(2) Attempt **five** questions in all.*

*(3) Question No. **1** is compulsory.*

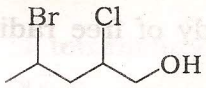
**1.** Answer any *ten* of the following : 4×10=40

*(a)* Draw the resonance structure of

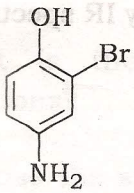


*(b)* Write the IUPAC name of the following compounds :

*(i)*




*(ii)*




*(c)* Which of the following atoms are NMR active?

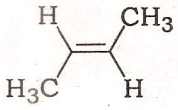
$^{1}H_{1}$, $^{12}C_{6}$, $^{13}C_{6}$, $^{14}N_{7}$, $^{16}O_{8}$

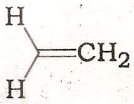
*(d)* Write the names of DNA bases.

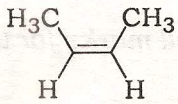
*(e)* What happens when two molecules of acetone are reacted in presence of base?

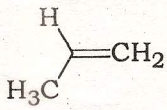
*(f)* Write the coupling constants of *ortho-*, *meta-* and *para-*hydrogens of benzene.

(g) Arrange the following molecules in order of increasing stability :

(i) 

(ii) 

(iii) 

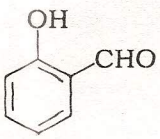
(iv) 

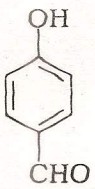
(h) How many $^1$H-NMR signal(s) would you expect in dimethyl ether ($CH_3—O—CH_3$)? Explain.

(i) What is Beer-Lambert law? Write the mathematical form of it.

(j) Describe the application of ESR on the study of free radicals.

(k) How will you distinguish the following molecules by IR spectroscopy?

(i) 

(ii) 

(l) Which of the following molecules has higher dipole moment?

(i) $CHCl_3$

(ii) $CCl_4$