

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: IMSC  
BRANCH: CHEMISTRY

SEMESTER : II  
SESSION : SP/2022

SUBJECT: CH108 ORGANIC CHEMISTRY-I

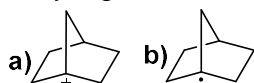
TIME: 3 Hours

FULL MARKS: 50

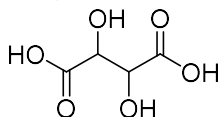
**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

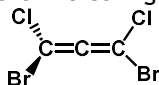
- Q.1(a) Explain why *p*-nitrophenol is a stronger acid than phenol? Draw the  $\pi$ -molecular orbitals energy diagram for 1,3-butadiene. [3+2]
- Q.1(b) Determine the double bond equivalence (DBE) and possible isomers of the molecular formula  $C_4H_7Cl$  and  $C_3H_6O$ . [5]
- Q.2(a) Differentiate between classical, and non-classical carbocation and give one example each. [2+2+1]  
Discuss the singlet and triplet carbene with structure. Which of them can be identified by ESR spectroscopy?
- Q.2(b) Discuss two methods for generating free radicals. What is the hybridization and structure of free radicals? [3+2]  
Can you generate the following reactive intermediate? Explain the reason.



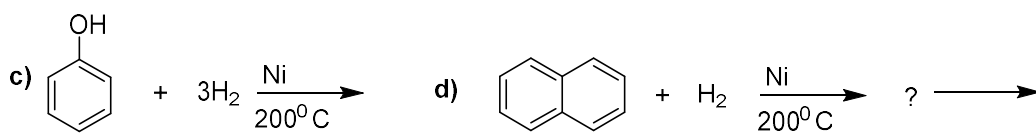
- Q.3(a) Draw the possible isomeric structures of tartaric acid in Fischer projection. Identify the isomeric pair in terms of enantiomer, diastereomer, and meso form. [2+3]



- Q.3(b) Determine the absolute configuration of the meso form of tartaric acid and comment on its optical activity. Convert the Fischer projection (meso-tartaric acid) to the Newman projection. [3+2]
- Q.4(a) Draw and explain the axially chiral molecule with an example of Spiranes. [5]
- Q.4(b) Determine the R/S configuration of the following molecule and draw its enantiomeric form. [5]



- Q.5(a) Write the products obtained from the following reactions. [5]



- Q.5(b) Draw the Chair, Boat and Twist boat forms of cyclohexane and discuss their relative stability. [5]

:20/07/2022: