EXAM DATE

Time : 1 Hr. - (($ ' 9 $ 1 & (' 7 (6 7 **19-07-20** (5 , **Marks : 80**

SECTION – I

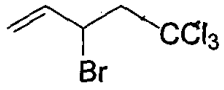
SINGLE CORRECT CHOICE TYPE

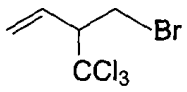
This section contains 4 multiple choice questions. Each question has 4 choices A, B, C and D for its answer, out of which **ONLY ONE** is correct. (+3, –1) 4 x 3 = 12M

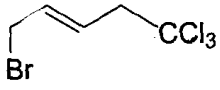
1. The increasing order of reactivity of the following compounds towards electrophilic aromatic substitution reaction is

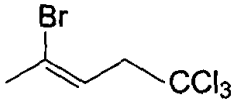
A. I < II < III < IV B. IV < III < II < I C. II < IV < I < III D. II < IV < III < I

2. What is the major product in the reaction below

A. 

B. 

C. 

D. 

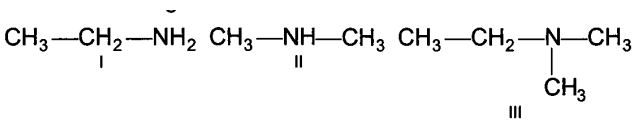
3. An organic compound contains C, H, N, S and Cl. For the deflection of chlorine the sodium extract of compound is first heated with few drops of fuming H_2SO_4 and then $AgNO_3$ is added to get a white precipitate of AgCl. The digestion with HNO_3 before addition of $AgNO_3$ is
   A. To prevent the formation of NO_2
   B. To create a common ion effect
   C. To convert CN^-, S^{2-} to volatile HCN, H_2S, else they will interfere with the test forming AgCN or Ag_2S
   D. To prevent the hydrolysis of NaCN and Na_2S
4. In the vinyl cation, the positively charged carbon is sp hybridized. Which statement about the hybridization type of the negatively charged carbon in the vinyl carbanion is correct?
   A. The carbon is sp hybridized to help to stabilize the orbital with the lone pair
   B. The carbon is sp hybridized to maximize s-character in the orbital with the lone pair
   C. The carbon is sp hybridized to minimize repulsion between the bonding and non-bonding electrons
   D. The carbon is sp^2 hybridised to minimize angle strain around pi-bond

SECTION – II

MULTIPLE CORRECT CHOICE TYPE

This section contains 5 multiple choice questions. Each question has 4 choices A, B, C and D for its answer, out of which **ONE OR MORE** is/are correct. (+4, –1) 5 x 4 = 20M

5. Consider the following amines



   Which of the following statements is/are correct regarding their basicity?
   A. In aqueous solution, the increasing basicity is I < II < III
   B. In gas phase, the basic strength follows the order I < II < III
   C. The pK_b values of these amines in gas phase is in the order III < II < I
   D. In a aqueous solution, II evolve maximum heat on the basis of per mol when neutralized by adding excess of HCl
6. Which of the following sets of reagent when applied sequentially, on 2-butyne will produce a meso

product?

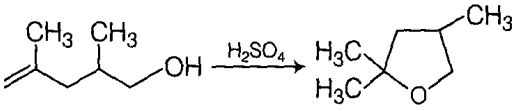
A. CCl_4/Cl_2 then Br_2/CCl_4

B. $Na/NH_3(l)$ then Br_2/CCl_4

C. $Pd/BaSO_4/H_2$ then Br_2-CCl_4

D. $Pd/BaSO_4/H_2$ then $OsO_4/NaHSO_3$

7. Consider the following reaction



Which of the following is/are true statement?

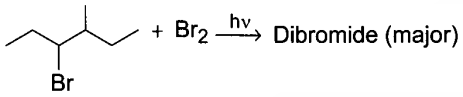
A. Reaction initiates by protonation of –OH followed by formation of carbocation

B. Reaction is initiated at C=C forming a tertiary carbocation

C. Here intramolecular reaction is favoured by entropy of reaction

D. The same reaction can also be accomplished using NaOH as catalyst

8. Consider the following bromination reaction



If a pure enantiomer of reactant is taken in the above reaction, the correct statement concerning product dibromide is/are

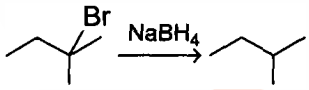
A. A racemic mixture is formed

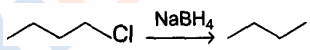
B. Two optically active isomers are formed

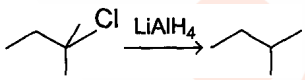
C. A pair of diastereomers in equal amount is formed

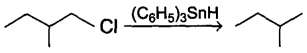
D. A pair of enantiomers but in unequal amounts is formed

9. Which of the following reduction reaction and their product is/are correctly matched?

A. 

B. 

C. 

D. 

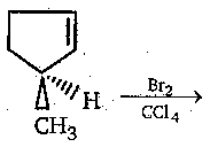
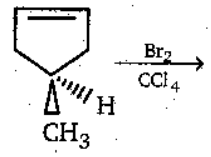
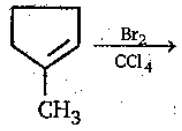
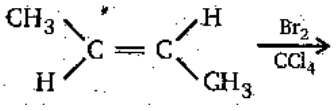
SECTION – III

Matrix Match type.

This section contains 2 questions. Each question contains statements given in two columns which have to be matched statements (A, B, C, D) in column I have to be matched with statements (P, Q, R, S) in column II.

(+8, 0) 2 x 8 = 16M

10.

Column – I	**Column – II**
A. 	P. Racemic mixture
B. 	Q. Meso
C. 	R. Diastereomer
D. 	S. Vicinal dihalide

11. Column – I has some alkynes and column – II has their corresponding reaction products. Match them appropriately.

Column – I	**Column – II**
A. 1-pentyne	P. Gives two carbonyls when treated with $H_2SO_4/HgSO_4$(major product)
B. 2-pentyne	Q. Gives a single carbonyls when treated with $H_2SO_4/HgSO_4$(major products)
C. 	R. Decolourises brown colour of Br_2–H_2O solution
D. $C_6H_5—C\equiv C—CH_3$	S. First on reaction with $Na/NH_3(l)$ then addition of Br_2 gives racemic dibromides

SECTION – IV
COMPREHENSION TYPE

This section contains 1 group of questions. Each group has 3 multiple choice questions based on a paragraph. Each question has 4 choices (1), (2), (3) and (4) for its answer, out of which **ONLY ONE OR MORE THAN ONE** is correct.

(+4, –1) 3 x 4 = 12M

Paragraph for Question No.s 12 to 14

A number of unsaturated hydrocarbons have the same molecular formula $C_{11}H_{22}$. All of these hydrocarbons on catalytic hydrogenation gives the same 3,4,6- trimethyloctane

12. How many structural isomers of the starting hydrocarbon, on catalytic hydrogenation can give the mentioned alkane?

1. 4 2. 6 3. 8 4. 10

13. How many of the above unsaturated hydrocarbons of exhibiting geometrical isomerism?

1. 3 2. 4 3. 5 4. 6

14. If the product alkane is 3,6-dimethyloctane, how many different isomers (structural plus geometrical only) of alkenes can give this product?

1. 6 2. 8 3. 9 4. 11

INTEGER ANSWER TYPE

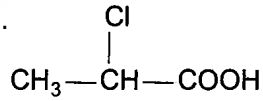
This section contains 5 questions. The answer to each of the questions is a single-digit integer, ranging from 0 to 9. The appropriate bubbles below the respective question numbers in the ORS have to be darkened.

(+4, –1) 5 x 4 = 20M

15. How many geometrical isomers exist in 1,2,4-trichlorocyclopentane?

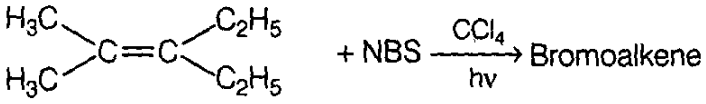
16. In the list below, how many of them is/are stronger acid than formic acid (HCOOH)?

I. CH_3COOH II. CF_2HCOOH III. C_6H_5COOH IV. $(COOH)_2$

V. Cl_3CCOOH VI. $(CH_3)_2CHOOH$ VII.  VIII. Br–COOH

IX. $HO–CH_2–COOH$ X. $CH_3–SO_3H$

17. Following is free radical allylic bromination reaction



NBS : N-bromosuccinimide

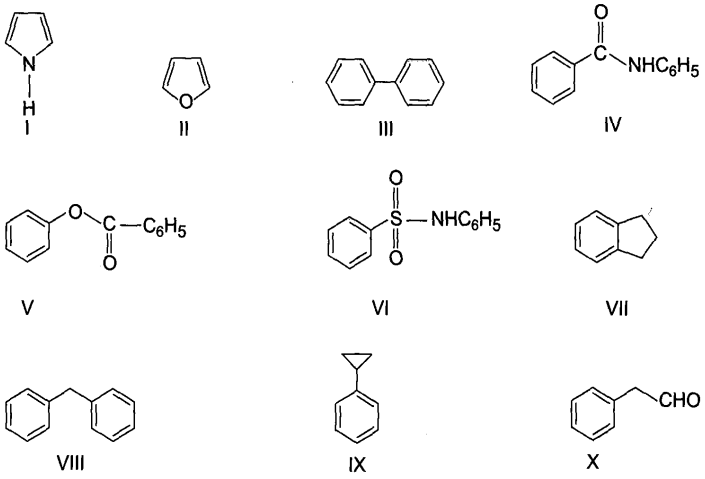
How many different monobromination product(s) are expected in the above reaction?

18. How many reagents from the list below would give effervescence when reacted with 1-pentyne?

I) NaOH II) CH_3CH_2ONa III) CH_3CH_2MgBr IV) NaH V) $NaNH_2$

VI) Na VII) $NaHCO_3$ VIII) $[(CH_3)_2CH]_2$ NLi IX) CH_3CH_2Li X) C_6H_5Li

19. How many of the following have an activated aromatic ring for electrophilic substitution reaction?



THE–END