PAPER-1

SECTION- I
(ONE OR MORE THAN ONE)

Each question has **FOUR** options for correct answer(s). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct option(s).
For each question, choose the correct option(s) to answer the question.
Answer to each question will be evaluated according to the following marking scheme:

Full Marks :	+4 If only (all) the correct option(s) is (are) chosen.
Partial Marks:	+3 If all the four options are correct but **ONLY** three options are chosen.
Partial Marks:	+2 If three or more options are correct but **ONLY** two options are chosen, both of which are correct options.
Partial Marks :	+1 If two or more options are correct but **ONLY** one option is chosen and it is a correct option.
Zero Marks :	0 If none of the options is chosen (i.e. the question is unanswered).
Negative Marks:	-2 In all other cases.

1. The **IUPAC** name(s) of the following compound is (are):

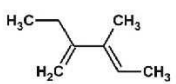
A) 1-chloro-2-bromocyclohexa-1,3-diene

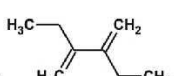
B) 1-bromo-2-chlorocyclohexa-1,3-diene

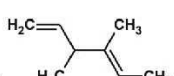
C) 2-bromo-3-chlorocyclohexa-1,3-diene

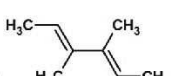
D) 2-chloro-1-bromocyclohexa-1,3-diene

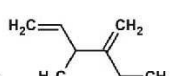
2. Which of the following is **NOT** the chain isomer of



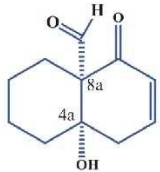
A)


B)


C)


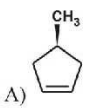
D)


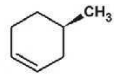
3. Absolute stereochemistry of the given compound is?

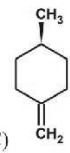


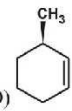
A) 4a*R*, 8a*S* B) 4a*R*, 8a*R* C) 4a*S*, 8a*S* D) 4a*S*, 8a*R*

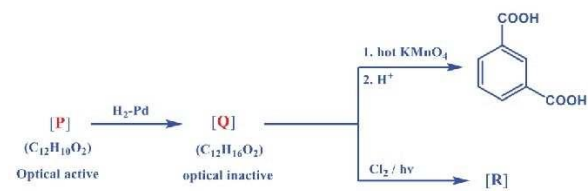
4. The reactant in which diastereomeric mixture is not obtained as a major product on reaction with Br_2 / CCl_4 is

A) 

B) 

C) 

D) 

5. 

P gives CO_2 gas with $NaHCO_3$.

Correct statement(s) is(are) for the above reactions:

A) Total monochloro products obtained by $Cl_2/h\upsilon$ of compound **(Q)** including stereoisomers are 7.

B) IUPAC name of **(P)** is 3-(1-Ethynylprop-2-enyl) benzene carboxylic acid.

C) Compound **(Q)** gives effervescence of CO_2 with sodium bicarbonate

D) One monochloro product of **Q** is achiral

6. The energy profile for the two possible mechanisms of the following reaction,

Are given below

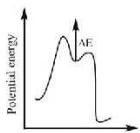


Figure-X

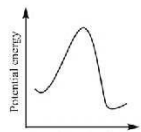


Figure-Y

Consider the following substrates (I to IV) for the above reaction

I. $R_1 = R_2 = R_3 = H$ II. $R_1 = C_2H_5; R_2 = R_3 = H$

III. $R_1 = C_2H_5; R_2 = CH_3; R_3 = H$ IV. $R_1 = C_2H_5; R_2 = R_3 = CH_3$

Choose the **CORRECT** statement(s).

A) The reaction mechanism changes from the one shown in figure **Y** to that in figure **X**, as one changes the substrate from I to IV.

B) Considering the mechanism corresponding to figure **X** for substrates I to IV, the correct order of ΔE is : $\Delta E_I > \Delta E_{II} > \Delta E_{III} \Delta E_{IV}$.

C) The reaction for substrate I follows 2nd order kinetics and that for IV follows 1st order kinetics.

D) If OH^- is taken in large excess, reaction may not follows mechanism corresponding to energy profile in figure **X**.

7. Arrange the following compounds in increasing order of C-OH bond length

Methanol, Phenol, p-methoxyphenol

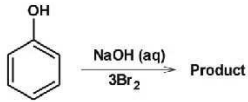
A) p-methoxyphenol< phenol < methanol

B) Phenol< p-methoxyphenol< methanol

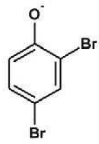
C) Methanol< p-methoxyphenol< phenol

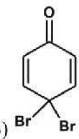
D) Methanol< phenol < p-methoxyphenol

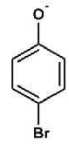
8.

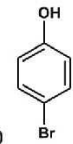


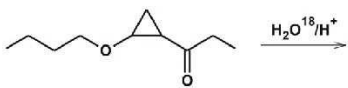
The intermediate(s) formed in the above reaction is/ are :

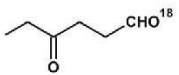
A) 

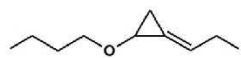
B) 

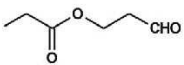
C) 

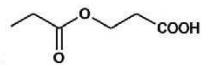
D) 

9. 

A) 

B) 

C) 

D) 

SECTION- II
(NUMERICAL VALUE)

The answer to each question is a **NUMERICAL VALUE**

For each question, enter the correct numerical value (in decimal notation, truncated/rounded off to the **second decimal place;** e.g. 6.25, 7.00, -0.33, -.30, 30.27, -127.30) designated to enter the answer.

Answer to each question will be evaluated according to the following marking scheme:

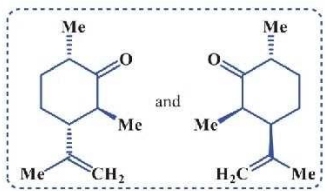
Full Marks: +3 If **ONLY** the correct numerical value is entered as answer.

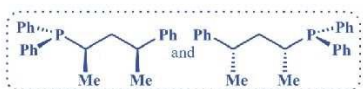
Zero Marks: 0 in all other cases.

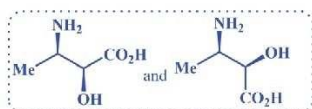
10. The degree of unsaturation (double bond equivalent) for a compound with molecular formula $C_{14}H_{12}O_2$ is

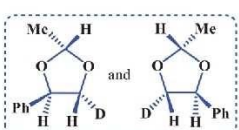
11. Total number of constitutional isomers (only position isomers) possible for trimethyl cyclohexane is

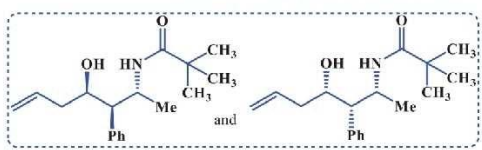
12. Among the following the total number of set(s) of diastereomeric pair(s) is?



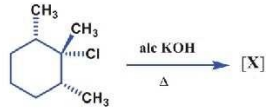






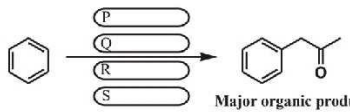


13. Find the number of unsaturated products formed in given reaction



14. Choose the appropriate reagent sequence from the given reagents pool to complete the synthetic conversation. Make sure to use strictly four reagents, not more not less. Note: you can simply mention the numerical values corresponding to the reagents in the boxes P, Q, R, S, respectively and also consider major organic product in each step.

What is the value of **[P + Q + R –S]**



Major organic product

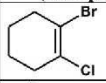
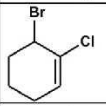
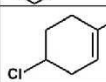
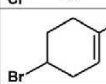
1. $CH_3CH_2CH_2Cl, AlCl_3$
2. NBS, ROOR, hv
3. BH_3·THF
4. $HC\equiv\bar{C}$
5. $CH_3Cl, AlCl_3$
6. H_2O_2, NaOH, H_2O
7. HBr
8. $H_2O, H_2SO_4, HgSO_4$
9. $CH_3CH_2Cl, AlCl_3$
10. PCC

15. If [X] is the number of different compounds produced on monochlorination of cis-1,2-dimethyl cyclopentane then find $\left[\frac{X}{2}\right]$? (Including stereoisomers).

SECTION- III
(MATRIX MATCH WITH NUMERICAL)

Each question has **TWO (02)** matching lists: **LIST-I** and **LIST-II**.
FOUR options are given representing matching of elements from **LIST-I** and **LIST-II**.
For each question, choose the option corresponding to the correct matching.
For each question, choose the option corresponding to the correct matching.
Full Marks : +3 If ONLY the option corresponding to the correct matching is chosen.
Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered).
Negative Marks : −1 in all other cases.

16. Match the column

	List-I **(Compound)**		List-II **(IUPAC names)**
P)		1)	1-Bromo-4-chloro cyclohexene
Q)		2)	4-Bromo-1-chloro cyclohexene
R)		3)	1-Bromo-2-chloro cyclohexene
S)		4)	6-Bromo-1-chloro cyclohexene

Note: Correctly match **P, Q, R, S** with 1, 2, 3 & 4 and give your answer in integer values

If

P	Q	R	S
4	1	2	3

Then your answer is [4123]

ANSWERS

1	2	3	4	5	6	7	8	9	10
C	**D**	**D**	**A**	**ABCD**	**ACD**	**B**	**AC**	**A**	**9**
11	12	13	14	15	16	17	18	19	20
6	**3**	**3**	**3**	**6**	**3412**				