Additional Problems For Self Practice (APSP)

PART - I : PRACTICE TEST PAPER

This Section is not meant for classroom discussion. It is being given to promote self-study and self testing amongst the Resonance students.

Max. Marks : 120 **Max. Time : 1 Hr.**

Important Instructions

1. The test is of **1 hour** duration.

2. The Test Booklet consists of **30** questions. The maximum marks are **120.**

3. Each question is allotted **4 (four)** marks for correct response.

4. Candidates will be awarded marks as stated above in Instructions No. 3 for correct response of each question.
¼ (one fourth) marks will be deducted for indicating incorrect response of each question. No deduction from the total score will be made if no response is indicated for an item in the answer sheet.

5. There is only one correct response for each question. Filling up more than one response in any question will be treated as wrong response and marks for wrong response will be deducted accordingly as per instructions 4 above.

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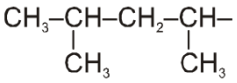
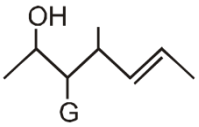
1.  Radical has IUPAC name-

(1) 4-Methyl pentyl (2) 1,3-Dimethyl butyl (3) 1,4-Dimethyl butyl (4) 3-methyl pentyl

2. In the given formula G (in place of H-atom) is an unknown group.



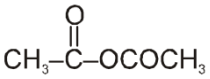
What will be the group G, which can change the word root (parent carbon chain length) of above structure?

(1) $-CH=CH_2$ (2) $-Cl$ (3) $-CH_2-CH_2-CH_3$ (4) $-COOH$

3. The group of heterocyclic compounds is :

(1) Phenol, Furan (2) Furan, Thiophene (3) Thiophene, Phenol (4) Furan, Aniline

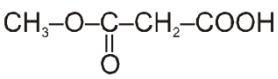
4. The correct IUPAC name of



(1) Methyl ethanoate (2) Aceto ethanoate (3) Ethanoic anhydride (4) Ethanoyl ethanoate

5. The IUPAC name of the hydrocarbon
$CH\equiv CCH=CH-CH=CH_2$ is

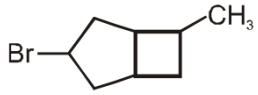
(1) Hexa-3, 5-dien-2-yne (2) Hexa-1, 2-dien-5-yne
(3) Hexa-1, 3-dien-5-yne (4) Hexa-3, 5-dien-1-yne

6. 

The IUPAC name of the above compound is :-

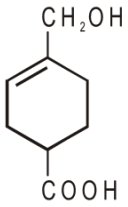
(1) 2-Acetoxy ethanoic acid (2) 2-Methoxycarbonyl ethanoic acid
(3) 3-Methoxyformyl ethanoic acid (4) 2-Methoxyformyl acetic acid

7. The correct IUPAC name of the following compound is :



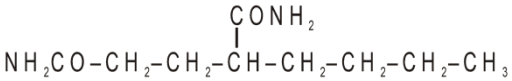
(1) 2-Bromo-5-methylbicyclo[5.4.0]heptane (2) 3-Bromo-7-methylbicyclo[3.2.0]heptane
(3) 3-Bromo-6-methylbicyclo[3.2.0]heptane (4) 2-Methyl-6-bromobicyclo[2.3.0]heptane

8. IUPAC name of the following molecule is :



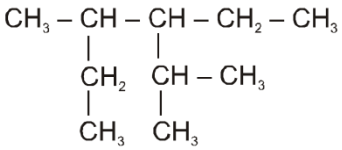
(1) 4-Hydroxy methyl-1-carboxy cyclohex-3-ene
(2) 4-Hydroxy methyl cyclohex-3-ene carboxylic acid
(3) 1-Hydroxy methyl cyclohexene-4-carboxylic acid
(4) 4-(Hydroxy methyl cyclohex-3-enyl) methanioic acid

9. The IUPAC name of compound



(1) 1, 3–Dicarbamoylheptane (2) 4-Carbamoyloctane
(3) 2-Butyl pentanediamide (4) 2-Butyl pentane diamino ketone

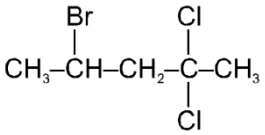
10. The correct IUPAC name of the following compound is



(1) 4–Ethyl–3,5–dimethylhexane (2) 2,4–Dimethyl–3–ethylhexane
(3) 3–Isopropyl–4–methylhexane (4) 3–Ethyl–2,4–dimethylhexane

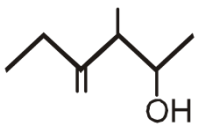
11. Which IUPAC name is incorrect for the following compounds ?

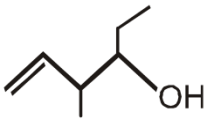
(1) $CH_3–CH=CH–CH_2–Cl$ 1-Chlorobut-2-ene
(2) $CH\equiv C–CH_2–CH_2–Br$ 1-Bromobut-3-yne
(3) $CH_3–CH=CH–CH=CH_2$ Penta-1,3-diene

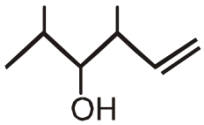


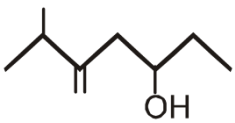
(4) 4-Bromo-2,2-dichloropentane

12. What is the structure of 4-Methylhex-5-en-3-ol.

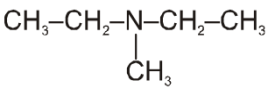
(1) 

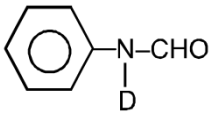
(2) 

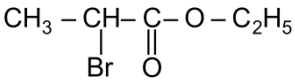
(3) 

(4) 

13. A compound having straight chain of five carbon atoms, It has one ketone group and two methyl groups on different-different carbon atoms. The IUPAC name of the compound is :
(1) 2,4-Dimethyl-3-oxopentane (2) 2,4-Dimethylpentan-3-one
(3) 3,4-Dimethyl-2-oxopentane (4) 3,3-Dimethylpentan-2-one

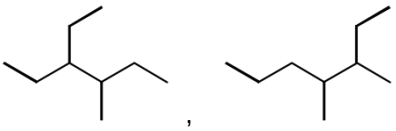
14. The IUPAC name of  is :
(1) N-Methyl-N-ethylethanamine (2) Diethyl methanamine
(3) N-Ethyl-N-methylethanamine (4) Methyl diethylethanamine

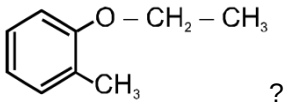
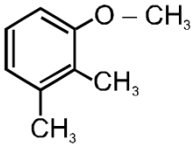
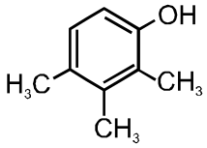
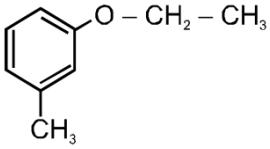
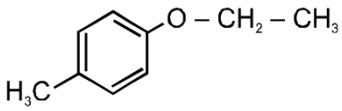
15. IUPAC name of  is :
(1) N-Deutero-N-formylbenzenamine (2) N-Phenylamino-N-deuteromethanal
(3) N-Deutero-N-phenylmethanamide (4) N-Deuterobenzene carboxamide

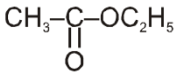
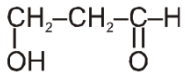
16. Correct IUPAC name of given ester is :

(1) Ethyl 2–bromopropanoate (2) 2–Bromoethylpropanoate
(3) Ethyl 1–bromoethanoate (4) 2–Bromo ethoxyethanecarboxylate

17. Which name of the $CH_3–C\equiv N$ is incorrect :
(1) methyl cyanide (2) methyl carbylamine (3) ethanenitrile (4) acetonitrile

18. Total number of position isomers of trimethyl cyclohexane are :
(1) 5 (2) 6 (3) 7 (4) 8

19. 
Relation between the above compounds :
(1) Position isomers (2) Chain isomers (3) Homologs (4) No relation

20. Which one is not metamer of  ?
(1) 
(2) 
(3) 
(4) 

21. Which of the following compound is isomeric with propanoic acid :-
(1)  (2)  (3) $CH_6–CH(OH)–CH_3$ (4) $CH_3O–CH_2–CH_2OH$

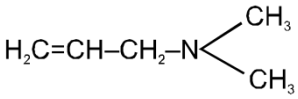
22. Molecular formula $C_4H_8O_2$ represents -
(1) Acid only (2) Ester only (3) Alcohol only (4) Acid and ester both

23. Total number of structurally isomeric ethers with molecular formula $C_5H_{12}O$.
(1) 4 (2) 5 (3) 6 (4) 7

24. How many number of all aldehydes (structurally isomeric) with molecular formula $C_5H_{10}O$ are possible?
(1) 4 (2) 5 (3) 6 (4) 3

25. What is the number of all (structurally isomeric) alkynes with molecular formula C_6H_{10}.
(1) 5 (2) 6 (3) 7 (4) 8

26. How many aromatic benzenoid structural isomers are possible for C_7H_8O ?
(1) 4 (2) 5 (3) 6 (4) 3

27. The compound  is an :
(1) alkyne, 3º amine (2) alkene, 2º amine (3) alkene, 3º amine (4) alkyne, 2º amine

28. How many structures of $C_3H_6Cl_2$ are possible ?
(1) 3 (2) 4 (3) 5 (4) 6

29. How many structures are possible containing aromatic ring, having molecular formula C_8H_{10} ?
(1) 2 (2) 3 (3) 4 (4) 5

30. How many structures are possible containing aromatic ring, having molecular formula C_7H_5OCl?
(1) 3 (2) 4 (3) 5 (4) 6

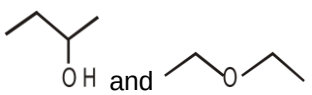
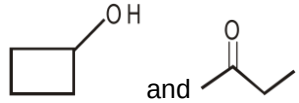
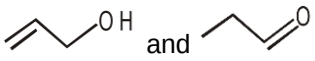
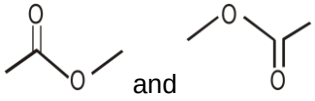
Practice Test (JEE-Main Pattern)

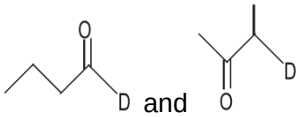
OBJECTIVE RESPONSE SHEET (ORS)

Que.	1	2	3	4	5	6	7	8	9	10
Ans.										
Que.	11	12	13	14	15	16	17	18	19	20
Ans.										
Que.	21	22	23	24	25	26	27	28	29	30
Ans.										

PART - II : PRACTICE QUESTIONS

1. The number of isomers of dibromobiphenyl (Biphenyl:$C_6H_5–C_6H_5$) is
(1) 8 (2) 10 (3) 12 (4) 4

2. Which of the following pair of compounds is not functional isomers ?
(1) 
(2) 
(3) 
(4) 

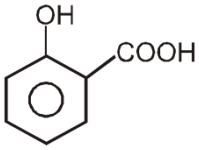
3. Find the relation between  and

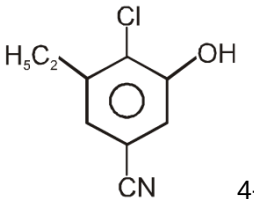
(1) Chain Isomers (2) Position Isomers (3) Functional Isomers (4) Metamers

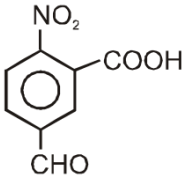
4. Total number of structural isomers with molecular formula C_8H_{18} that contain 7 carbon atoms in the parent chain are :

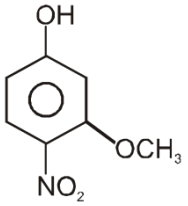
(1) 3 (2) 4 (3) 5 (4) 6

5. The compound with correct IUPAC name is -

(1)  2-Carboxyphenol

(2)  4-chloro-3-Ethyl-5-hydroxybenzenecarbonitrile

(3)  3-Formyl-5-nitrobenzenecarboxylic acid

(4)  1-Hydroxy-3-methoxy-4-nitrobenzene

6. The number of isomers of C_6H_{14} is :

(1) 6 (2) 5 (3) 4 (4) 7

7. The compound which represents an unsaturated hydrocarbon is :

(1) $CH_3 - C \equiv N$ (2) $CH_3 - CH = CH_2$ (3) $CH_3 - CH = O$ (4) all of these

8. The number of possible primary alcohols with the molecular formula $C_4H_{10}O$ is :

(1) 1 (2) 2 (3) 3 (4) 4

9. The IUPAC name of $HOCH_2CH = C(CH_3)_2$

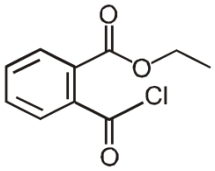
(1) 2-Methyl-2-buten-4-ol (2) 3-Methyl-2-buten-1-ol

(3) 2-Methyl-2-butenol (4) 3-Methyl-2-butenol.

10. The compound 2-Chloro-3-methyl-1-butanol has the following formula

(1) $CH_3CH(CH_3)CHClCH_2OH$ (2) $CH_3CHOHCH(CH_3)CH_2Cl$

(3) $CH_2ClC(CH_3)_2CH_2OH$ (4) $CH_3CHClCH(CH_3)CH_2OH$.

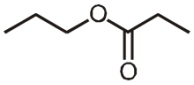
11. The IUPAC name of  is :

(1) 2–Chlorocarbonylethylbenzoate (2) 2–Carboxyethylbenzoyl chloride

(3) Ethyl 2–(chlorocarbonyl)benzoate (4) Ethyl 1–(chlorocarbonyl)benzoate

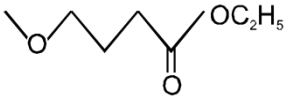
12. How many sigma bonds and pi bonds are present in $CH_2=C=CH_2$?
(1) 6 sigma and 1pi (2) 8 sigma and 0 pi (3) 4 sigma and 4 pi (4) 6 sigma and 2 pi

13. The IUPAC name of the following compound is :



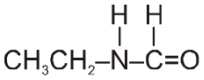
(1) n-Propyl ethanoate (2) Ethyl propanoate
(3) Pentanoic anhydride (4) n-Propyl propanoate

14. The IUPAC name of the following compound is :



(1) 3-Methoxyethylpropanoate (2) Ethyl 4-methoxybutanoate
(3) 1,4-Diethoxybutane (4) Ethoxy-3-methoxybutyrate

15. One among the following is the correct IUPAC name for the compound



(1) N-Formylaminoethane (2) N-Ethylformylamine
(3) N-Ethylmethanamide (4) Ethylaminomethanal

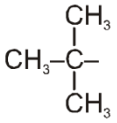
16. The third member of the homologous series of aliphatic aldehydes has the structure :-
(1) CH_3CH_2CHO (2) $CH_3(CH_2)_2CHO$ (3) $CH_3COCH_2CH_3$ (4) CH_3COCH_3

17. Total number of structurally isomeric ethers with molecular formula $C_5H_{12}O$.
(1) 4 (2) 5 (3) 6 (4) 7

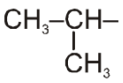
18. How many dichloropentane isomers are vicinal dichloride ?
(1) 1 (2) 2 (3) 3 (4) 4

19. How many structurally isomeric acyclic esters with molecular formula $C_5H_{10}O_2$ is :
(1) 6 (2) 7 (3) 8 (4) 9

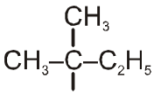
20. Which of the following are tetiary radicals :-



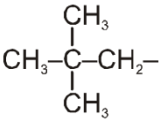
(1)



(2)

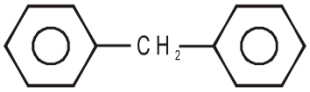


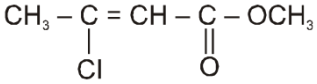
(3)



(4)

(1) a and b (2) b and c (3) a and c (4) b and c

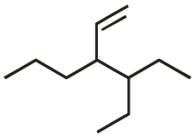
21. The molecular formula of diphenyl methane,  , is $C_{13}H_{12}$.
How many structural isomers are possible when one of the hydrogen is replaced by chlorine atom
(1) 4 (2) 8 (3) 7 (4) 6

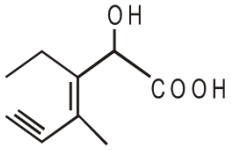
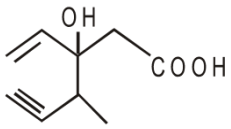
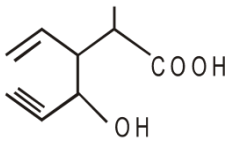
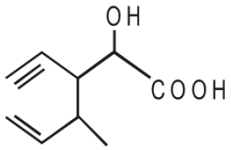
22.  is named in IUPAC as :
(1) Methyl 3–chloro–2–butenoate (2) Methyl 4–chloro–2–pentanoate
(3) Methoxy 3–chloro butanol (4) Methoxy 2–chloro butenone

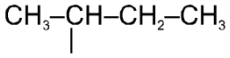
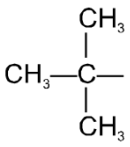
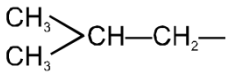
23. The general molecular formula, which represents the homologous series of alkanol is
(1) $C_nH_{2n}O_2$ (2) $C_nH_{2n}O$ (3) $C_nH_{2n+1}O$ (4) $C_nH_{2n+2}O$

24. In the hydrocarbon $\overset{6}{CH_3} - \overset{5}{CH} = \overset{4}{CH} - \overset{3}{CH_2} - \overset{2}{C} \equiv \overset{1}{CH}$
The state of hybridization of carbons 1, 3 and 5 are in the following sequence :
(1) sp, sp^2, sp^3 (2) sp^3, sp^2, sp (3) sp^2, sp, sp^3 (4) sp, sp^3, sp^2

25. The homologue of ethyne is :
(1) C_2H_2 (2) C_2H_6 (3) C_3H_8 (4) C_3H_4

26. The correct IUPAC name of the compound  is :
(1) 4-Ethyl-3-propylhex-1-ene (2) 3-Ethyl-4-ethenylheptane
(3) 3-Ethyl-4-propylhex-1-ene (4) 3-(1-ethylpropyl)hex-1-ene

27. Structure of the compound whose IUPAC name is 3-Ethyl-2-hydroxy-4-methylhex-3-en-5-ynoic acid is :
(1) 
(2) 
(3) 
(4) 

28. The structure of isobutyl group in an organic compound is :
(1) 
(2) $CH_3–CH_2–CH_2–CH_2–$
(3) 
(4) 

29. The isomer of ethyl alcohol is :
(1) diethyl ether (2) dimethyl ether (3) acetaldehyde (4) acetone

30. The number of metamers of the compound with molecular formula $C_4H_{10}O$ is :
(1) 1 (2) 3 (3) 8 (4) 6

Additional Theory

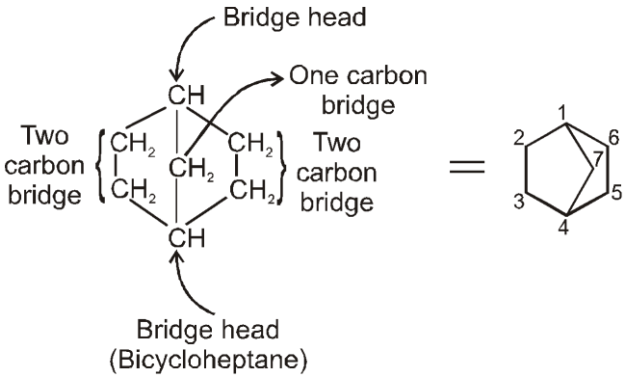
Nomenclature of Bicyclo and spiro compounds :

Bicyclo compounds :

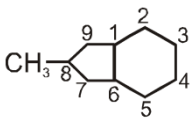
(i) Bicyclo compounds contain two fused rings with the help of a bridge. We use the name of the alkane corresponding to the total number of carbon atoms as the base name. The carbon atoms common to both the rings are called bridge heads, and each bond or chain of atoms connecting the bridgehead atoms, is called a bridge.

(ii) While naming the bicycloalkane we write an expression between the word bicyclo and alkane (in square bracket), that denotes the number of carbon atoms in each bridge. The numerals are written in descending order and the numbers are separated by a point.

(iii) If substituents are present, we number the bridged ring system beginning at one bridge head, proceeding first along the longest bridge to the other bridge head, then along the second next longest bridge back to the first bridge head. The shortest bridge is numbered in the last.

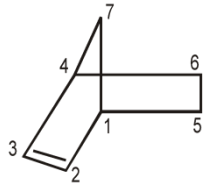


Ex. (1) Bicyclo [2.2.1] heptane
It's common name is norborane

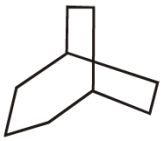


(2) 8-Methyl bicyclo [4.3.0] nonane

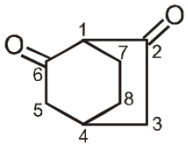
(3) Bicyclo [4.1.0] heptane



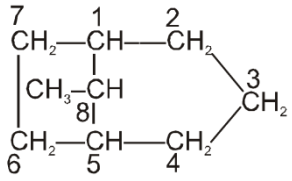
(4) Bicyclo [2.2.1] hept-2-ene



(5) Bicyclo [3.2.2] nonane



(6) Bicyclo [2.2.2] octa-2,6-dione

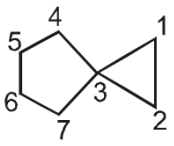


(7) 8-Methyl bicyclo [3.2.1]octane

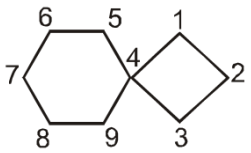
Spiro compounds :

If two rings are joined by quaternary carbon at the apex, then they are prefixed by the word **spiro** followed by brackets containing the number of carbon atoms in each ring in ascending order and then by the name of parent hydrocarbon containing total number of carbon atoms in the two rings. The numbering starts from the atom next to the spiro atom and proceeds through the smaller ring first.

Ex. (1)

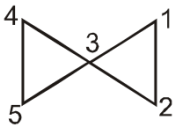


spiro [2.4] heptane (2)

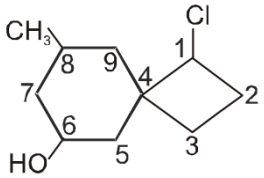


Spiro [3.5] nonane

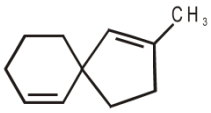
(3)



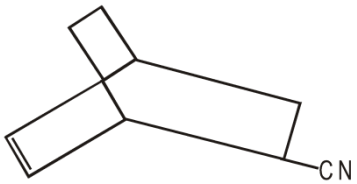
Spiro [2.2] pentane (4)



1-Chloro-8-methyl spiro [3.5] nonan-6-ol.

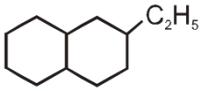
1. Correct IUPAC name of  is :

(1) 2-Methyl-spiro [4.5] deca-1,6 diene.
(2) 4-Methyl-spiro [4.5] deca-1,6 diene.
(3) 4-Methyl-spiro [4.5] deca-4,7 diene.
(4) 8-Methyl-spiro [4.5] deca-2,8 diene.

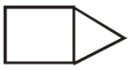
2. Correct IUPAC name of  is :

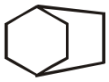
(1) Bicyclo [2.2.2] oct-5-ene-2- carbonitrile.
(2) Bicyclo [2.2.2] oct-2-ene-6-carbonitrile
(3) Bicyclo [2.2.2] oct-2-ene-4-carbonitrile
(4) Bicyclo [2.2.2] oct-4-ene-6-carbonitrile

3. Which name is **incorrect** matched for the respective structures :

(1)  3–Ethyl bicyclo [4.4.0] decane

(2)  Bicyclo [3.3.1] nonane

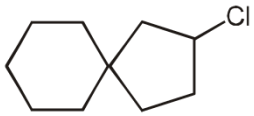
(3)  Bicyclo [2.1.0] pentane

(4)  Bicyclo [4.2.2] octane

4. Which name is **incorrect** for the respective structures :

(1)  Bicyclo [1.1.1] pentane

(2)  Spiro [4.3] nonane

(3)  2-Chlorospiro [4.5] decane

(4)  Bicyclo [3.2.1] octane

APSP Answers

PART - I

1.	(2)	**2.**	(4)	**3.**	(2)	**4.**	(3)	**5.**	(3)
6.	(2)	**7.**	(3)	**8.**	(2)	**9.**	(3)	**10.**	(4)
11.	(2)	**12.**	(2)	**13.**	(2)	**14.**	(3)	**15.**	(3)
16.	(1)	**17.**	(2)	**18.**	(2)	**19.**	(2)	**20.**	(2)
21.	(2)	**22.**	(4)	**23.**	(3)	**24.**	(1)	**25.**	(3)
26.	(2)	**27.**	(3)	**28.**	(2)	**29.**	3)	**30.**	(2)

PART - II

1.	(3)	**2.**	(4)	**3.**	(3)	**4.**	(1)	**5.**	(2)
6.	(2)	**7.**	(2)	**8.**	(2)	**9.**	(2)	**10.**	(1)
11.	(3)	**12.**	(4)	**13.**	(4)	**14.**	(2)	**15.**	(3)
16.	(1)	**17.**	(3)	**18.**	(2)	**19.**	(4)	**20.**	(3)
21.	(1)	**22.**	(1)	**23.**	(4)	**24.**	(4)	**25.**	(4)
26.	(1)	**27.**	(1)	**28.**	(4)	**29.**	(2)	**30.**	(2)

ADDITIONAL PROBLEMS

1.	(1)	**2.**	(1)	**3.**	(4)	**4.**	(2)

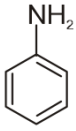
APSP Solutions

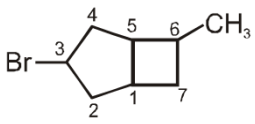
PART - I

3. (i) Phenol  - homocyclic, aromatic

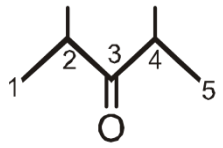
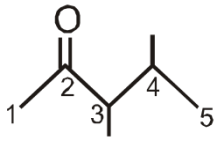
(ii) Furan  - heterocyclic, aromatic

(iii) Thiophene  - heterocyclic, aromatic

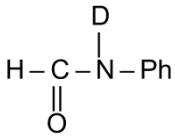
(iv) Aniline  - homocyclic, aromatic

7. 

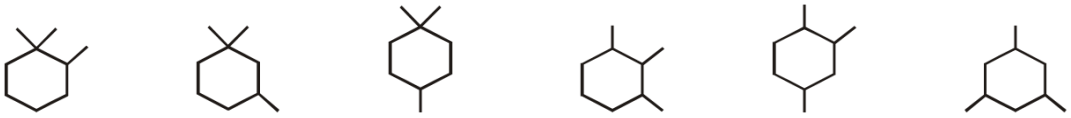
IUPAC name : 3-Bromo-6-methylbicyclo[3.2.0]heptane.

13.  or 

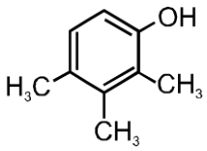
2,4-Dimethylpentan-3-one 3,4-Dimethylpentan-2-one

15. 

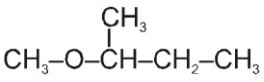
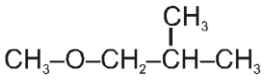
N-Deutero-N-phenylmethanamide.

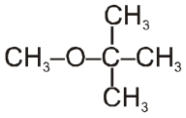
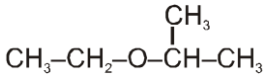
18. 

19. Carbon skelton is different in both compounds.

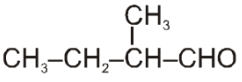
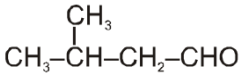
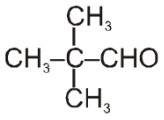
20. 

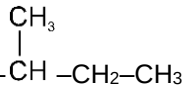
This compound is functional isomer of the given compound.

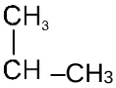
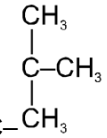
23. (i) $CH_3–O–CH_2–CH_2–CH_2–CH_3$ (ii)  (iii) 

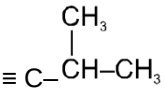
(iv)  (v) $CH_3–CH_2–O–CH_2–CH_2–CH_3$ (vi) 

24. (i) $CH_3–CH_2–CH_2–CH_2–CHO$

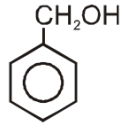
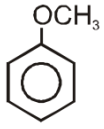
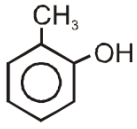
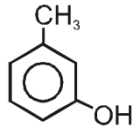
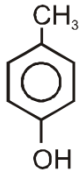
(ii)  (iii)  (iv) 

25. (i) $H–C \equiv C–CH_2–CH_2–CH_2–CH_3$ (ii) 

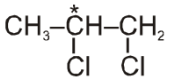
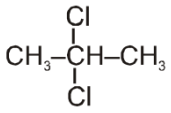
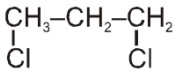
(iii)  (iv) 

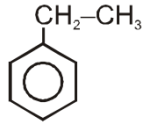
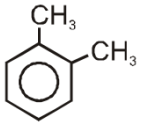
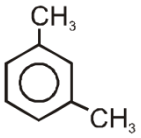
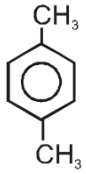
(v) $CH_3–C\equiv C–CH_2–CH_2–CH_3$ (vi) 

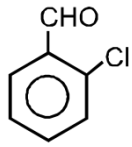
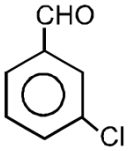
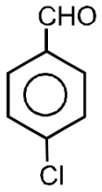
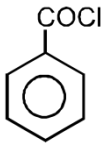
(vii) $CH_3–CH_2–C \equiv C–CH_2–CH_3$

26. (i)  (ii)  (iii)  (iv)  (v) 

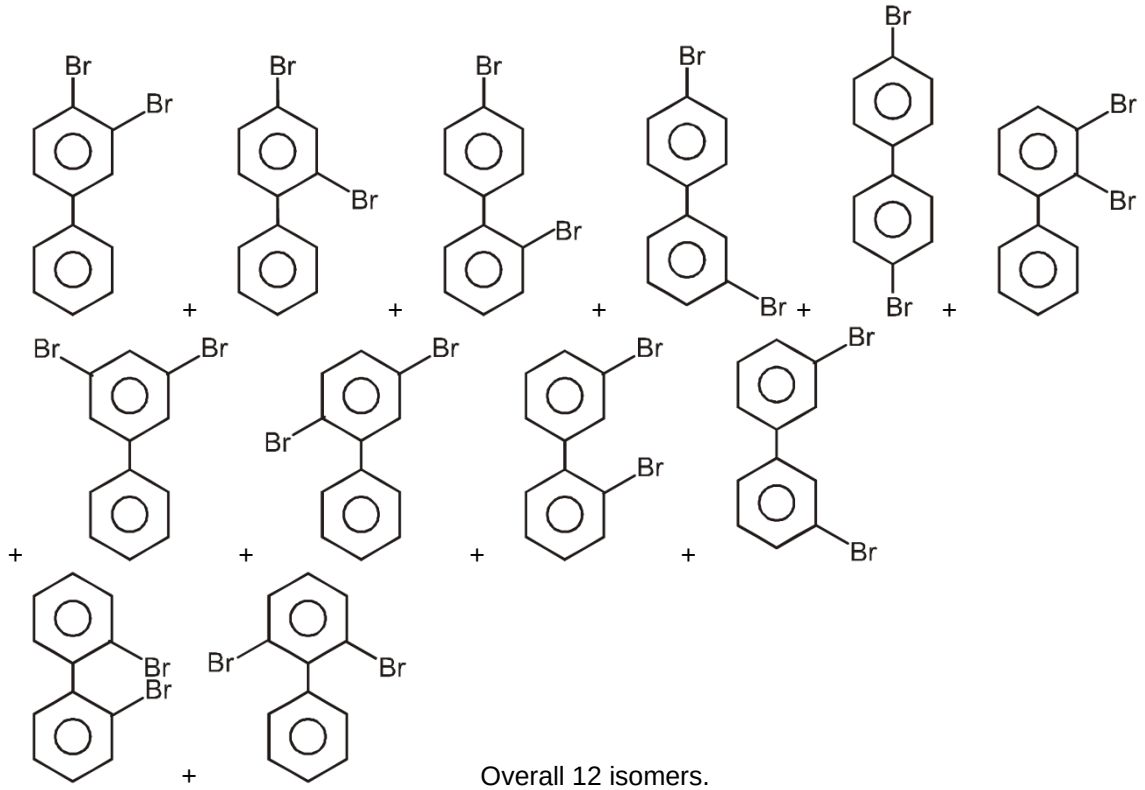
27. N atom is attached with 3 carbon atoms so it is 3° amine.

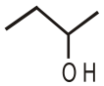
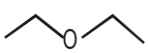
28. (i) $CH_3–CH_2–CHCl_2$ (ii)  (iii)  (iv) 

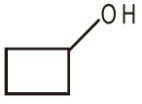
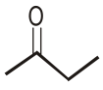
29. (i)  (ii)  (iii)  (iv) 

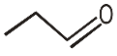
30. (i)  (ii)  (iii)  (iv) 

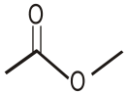
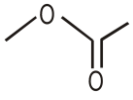
PART - II

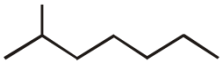
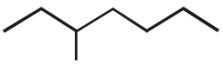
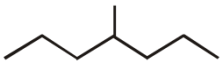
1. 
Overall 12 isomers.

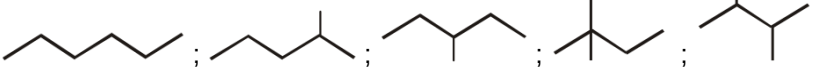
2. (1)  and  are functional isomer.

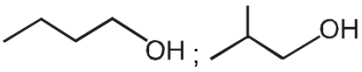
(2)  and  are functional isomers.

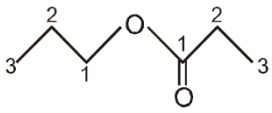
(3)  and  are functional isomers.

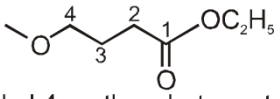
(4)  and  are identical.

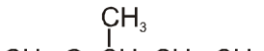
4. (1)  (2)  (3) 

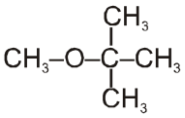
6. 

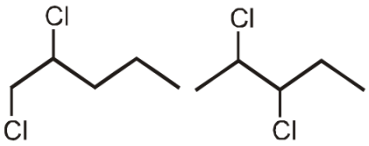
8. 

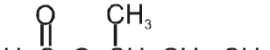
13.  It is n-propyl propanoate.

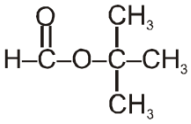
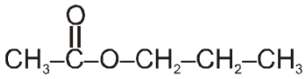
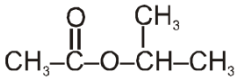
14. 
Ethyl 4-methoxybutanoate

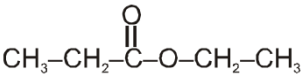
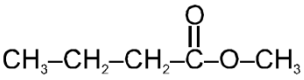
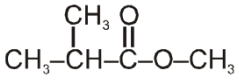
17. (i) $CH_3–O–CH_2–CH_2–CH_2–CH_3$ (ii)  (iii) 

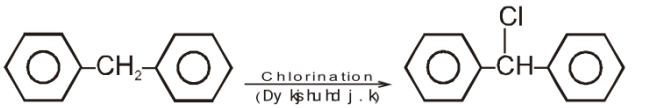
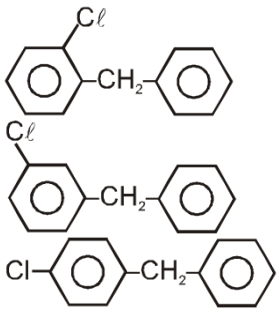
(iv)  (v) $CH_3–CH_2–O–CH_2–CH_2–CH_3$ (vi) 

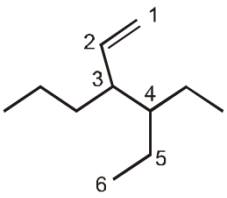
18. 

19. (i)  (ii)  (iii) 

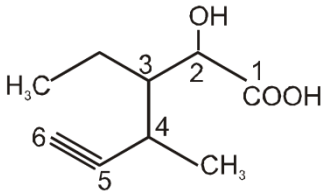
(iv)  (v)  (vi) 

(vii)  (viii)  (ix) 

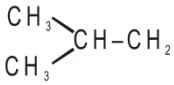
21. 

Total 4-isomers

26. 

4-Ethyl-3-propylhex-1-ene.

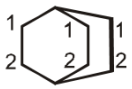
27. 

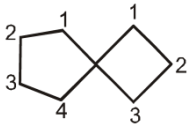
IUPAC name of the structure is 3-Ethyl-2-hydroxy-4-methylhex-3-en-5– ynoic acid

28.  — (iso-butyl group)

29. CH_3CH_2OH and $CH_3–O–CH_3$ are functional isomer becuase mol formula is same for both compound and f.g. are different.

ADDITIONAL PROBLEMS

3.  Bicyclo [2.2.2] octane

4.  Spiro [3.4] nonane