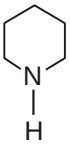
SOLUTIONS OF IUPAC NOMENCLATURE AND STRUCTURAL ISOMERISM

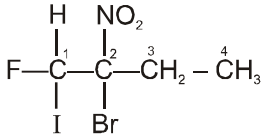
EXERCISE # 1

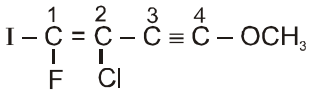
PART - II

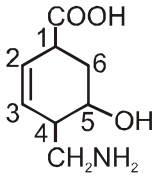
A-3.  This is aromatic compound.

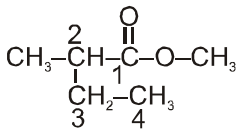
A-4.  saturated heterocyclic compound.

A-5. According to IUPAC only alkene and alkyne are unsaturated hydrocarbon.

B-3. 
(2-Bromo-1-fluoro-1-iodo-2-nitrobutane)

D-4. 

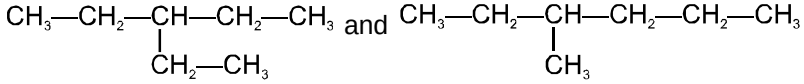
E-4. 
4-Aminomethyl-5-hydroxycyclohex-2-ene-1-carboxylic acid

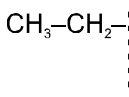
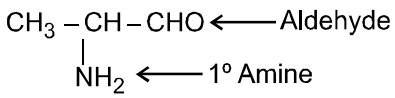
E-8.  Methyl 2-methylbutanoate

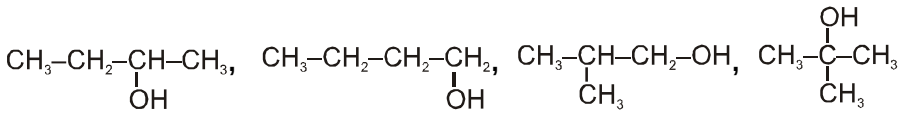
G-1. Self explanatory.

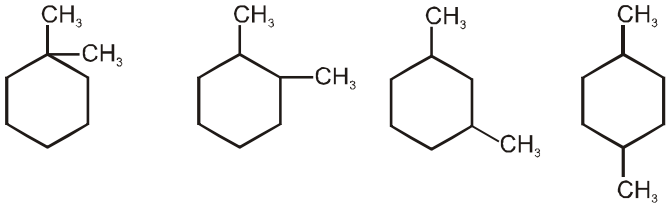
G-2. Self explanatory.

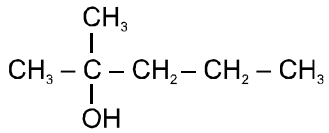
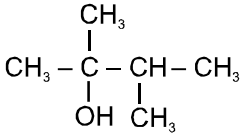
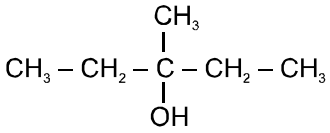
G-3. Carbon skeleton is different in both compounds.

G-4. 
Carbon skeleton is different in both compounds.

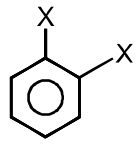
G-5.  ;

Amide functional group Aldehyde and 1º amine

G-6. 

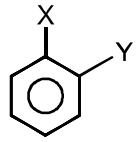
H-1. 

H-5. (i)  (ii)  (iii) 

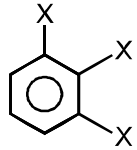
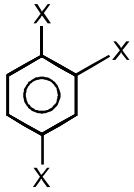
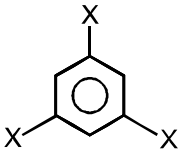
PART - III

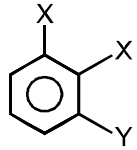
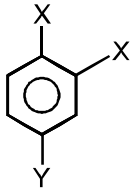
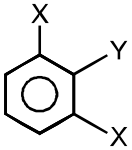
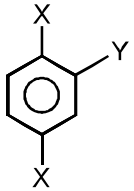
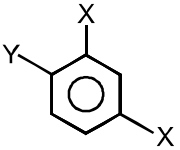
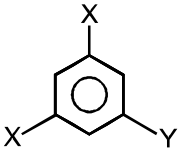
2. (A) 

o/m/p-isomers

(B) 

o/m/p-isomers

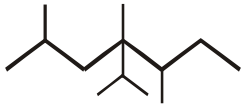
(C) (i)  (ii)  (iii) 

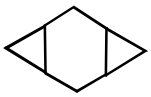
(D) (i)  (ii)  (iii)  (iv)  (v)  (vi) 

EXERCISE # 2

PART - I

2. 1º, 2º & 3º H's are that which is attach at 1º, 2º & 3º carbon respectively.



11. 

It has different molecular formula and different DU.

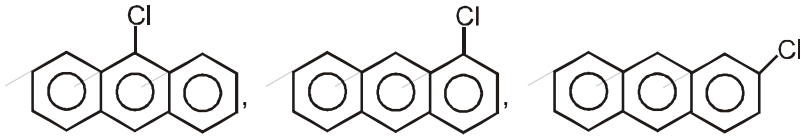
12. (i) $H–C \equiv C–CH_2–CH_2–CH_2–CH_3$ (ii) $H–C \equiv C–CH(CH_3)–CH_2–CH_3$ (iii) $H–C \equiv C–CH_2–CH(CH_3)–CH_3$

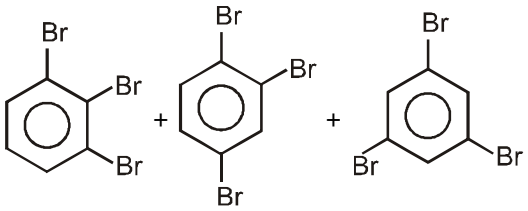
(iv) $H–C \equiv C–C(CH_3)_2–CH_3$ (v) $CH_3–C \equiv C–CH_2–CH_2–CH_3$ (vi) $CH_3–C \equiv C–CH(CH_3)–CH_3$

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

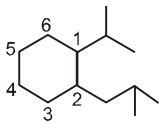
13. (i) $CH_3–O–CH_2–CH_2–CH_2–CH_3$ (ii) $CH_3–O–CH(CH_3)–CH_2–CH_3$ (iii) $CH_3–O–CH_2–CH(CH_3)–CH_3$

(iv) $CH_3–O–C(CH_3)_2–CH_3$ (v) $CH_3–CH_2–O–CH_2–CH_2–CH_3$ (vi) $CH_3–CH_2–O–CH(CH_3)–CH_3$

14. 

15. 

PART - II

1. 

1-(1-Methylethyl)-2-(2-methylpropyl)cyclohexane

2. a, c, f & i are incorrect

3. Only in (f).

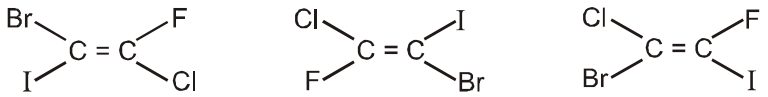
5. a, b, c & g are correct

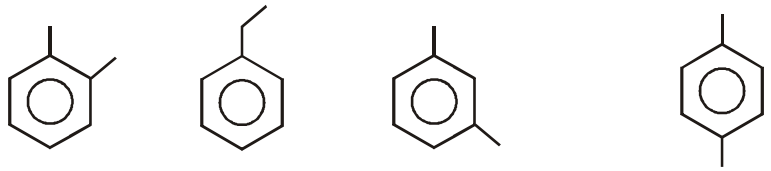
6. (a) $C–C(Br)–C(Br)–C$ (b) $Br–C(Br)–C–C–C$ (c) $C–C(Br)–C–C(Br)$ (d) $C–C(Br)–C–C(Br)$

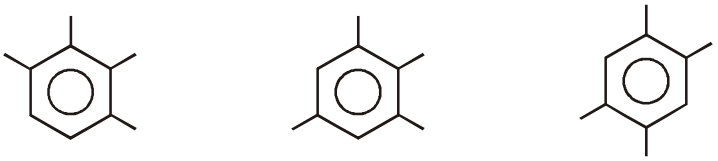
(e) $Br–C(Br)–C–C–C$ (f) $C–C(Br)–C(Br)–C$

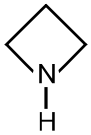
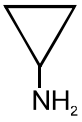
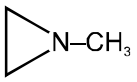
7. (a) $CH_2=C=CH–CH_2–CH_3$ (b) $CH_2=C=C(CH_3)–CH_3$ (c) $CH_2=CH–CH=CH–CH_3$

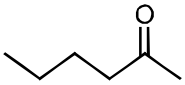
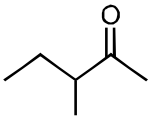
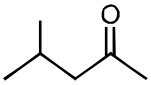
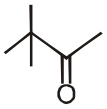
(d) $CH_2=CH–CH–CH=CH_3$ (e) $CH_2=C(CH_3)–CH=CH_2$ (f) $CH_3–CH=C=CH–CH_3$

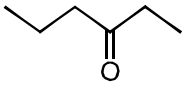
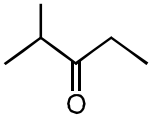
8. 

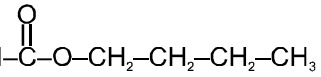
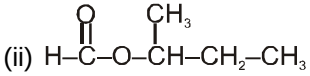
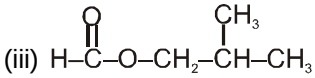
9. 

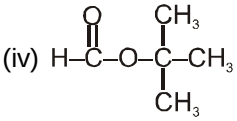
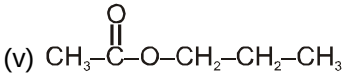
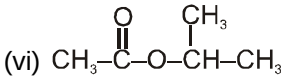
10. 

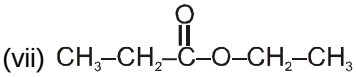
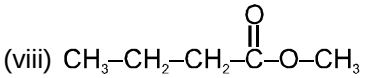
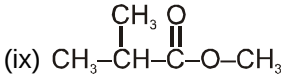
11. (a)  (b)  (c)  (d) 

12. (i)  (ii)  (iii)  (iv) 

(v)  (vi) 

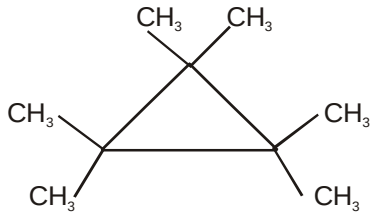
13. (i)  (ii)  (iii) 

(iv)  (v)  (vi) 

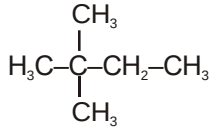
(vii)  (viii)  (ix) 

PART - III

3. (A) 3-Ethyl-1,1-dimethylcyclohexane (B) 1-Ethyl-3-methyl-5-propylcyclohexane
(C) 2-Bromo-1-chloro-4-fluorocyclohexane (D) 4-Bromo-1-chloro-2-fluorocyclohexane

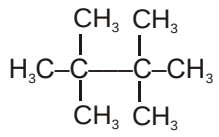
4. (A) 

1º Hydrogen = 18

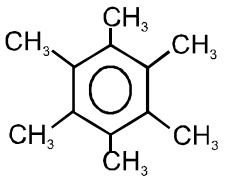
(B) 

1º Hydrogen = 12

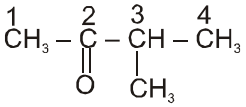
2º Hydrogen = 2

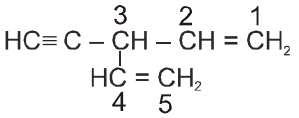
(C) 

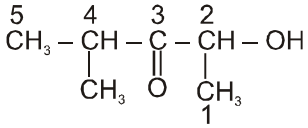
1º Hydrogen = 18

(D)  1º Hydrogen = 18

5. The correct IUPAC name is :

(A)  3-Methylbutan -2-one

(B)  3-Ethynylpenta-1,4-diene

(D)  2-Hydroxy-4-methylpent-3-one

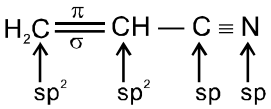
7. (A) Methyl-3-nitrobenzenecarboxylate
(B) Ethyl-3-phenylbenzene-1-carboxylate
(C) Ethyl-2-methyl-2-(3-nitrophenyl)propanoate
(D) 1,1,1-Trichloro-2, 2-bis(4-chlorophenyl) ethane

8. I & IV have different functional group. i.e. 1º & 2º amine therefore these are functional isomers.

9. All have different functional groups than ester.

EXERCISE # 3

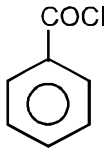
PART - I

1. From left to right 

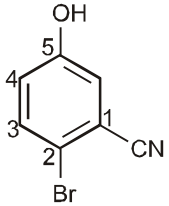
(Note : Hybrid orbitals always form σ-bonds due to overlapping on their axis).

2. 3-Aminobenzoic acid

3. 4-Methylbenzenesulphonic acid

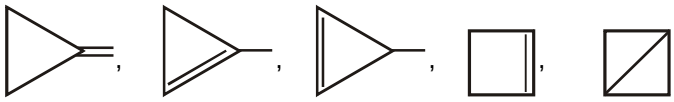
4. IUPAC name of  is benzene carbonyl chloride.

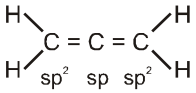
5. Molecular formula C_6H_{14}

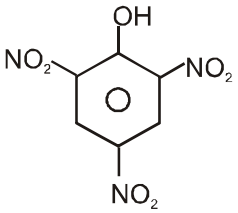
6. 

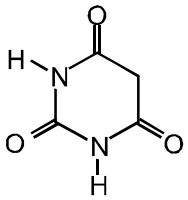
2-Bromo-5-hydroxybenzonitrile (–CN group gets higher priority over –OH and –Br)

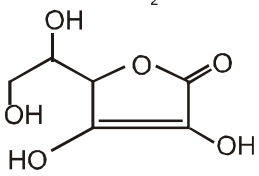
7. The DU of C_4H_6 = 2.
It can have (a) two rings (b) one double bond and one ring.

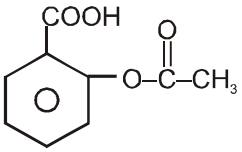


8. C_3H_4 

9.  picric acid ;

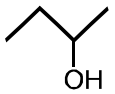
 barbituric acid

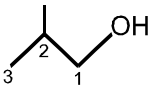
 ascorbic acid ;

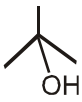
 aspirin

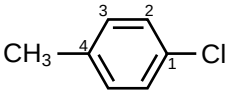
10. Alcohols with formula $C_4H_{10}O$ are -


1-Butanol


2-Butanol


Isobutyl alcohol
or 2-Methylpropan-1-ol

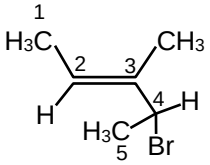

t-Butyl alcohol
or 2-Methylbutan-2-ol
(Not 1,1-Dimethylethan-1-ol)

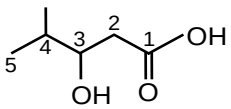
11. 
(C) 1-Chloro-4-methyl Benzene.
(B) 4-Chlorotoluene

PART - II

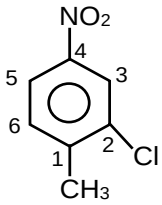
1. Lowest locant rule.

3. Refer IUPAC rules

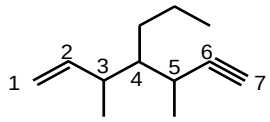
 (4-Bromo-3-methyl pent-2-ene)

4. 

3-Hydroxy-4-methylpentanoic acid.

5. 

2–chloro–1–methyl–4–nitrobenzene

6. 

3,5-Dimethyl-4-propylhept-1-en-6-yne