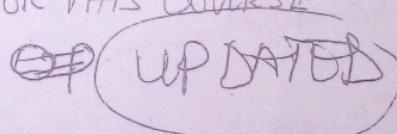


# **CHS 102**

# **ORGANIC CHEMISTRY**

**FSB SERIES 09069482566**

GET A COMPLETE NOTE FOR THIS COURSE  
FROM ME (MR FSB)       **UPDATED**

OPTION D

## CHS 102- ORGANIC CHEMISTRY

NAME (Surname first):.....

MATRIC NO:..... DEPT:.....

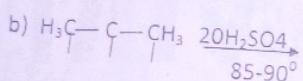
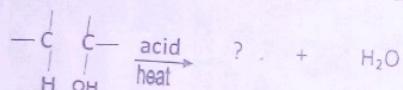
Signature..... Time: 1 hour

ATTEMPT ALL QUESTIONS

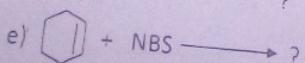
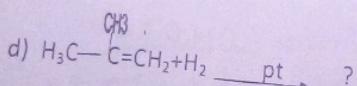
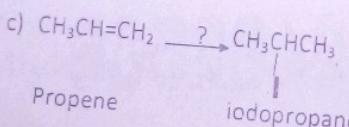
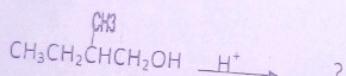
### SECTION A

1. Fill in the missing (?) structures, reagent/catalyst, mechanism, or indicate where there is no reaction in the following equation.

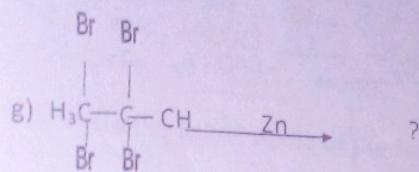
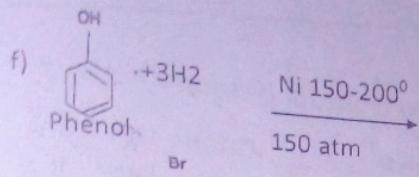
a)



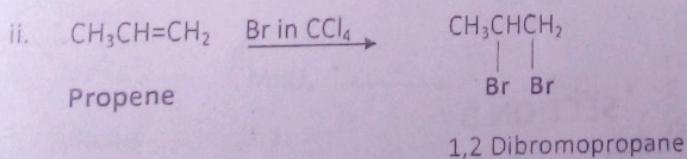
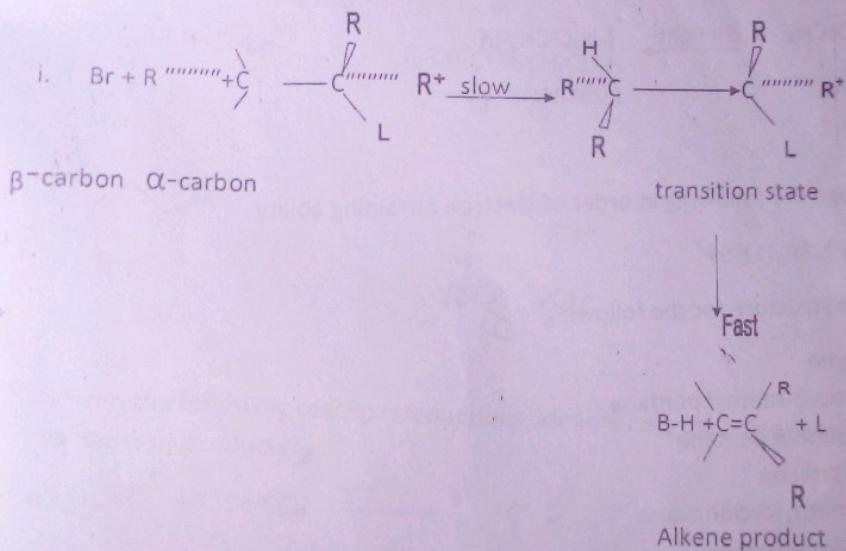
Tert-butyl alcohol

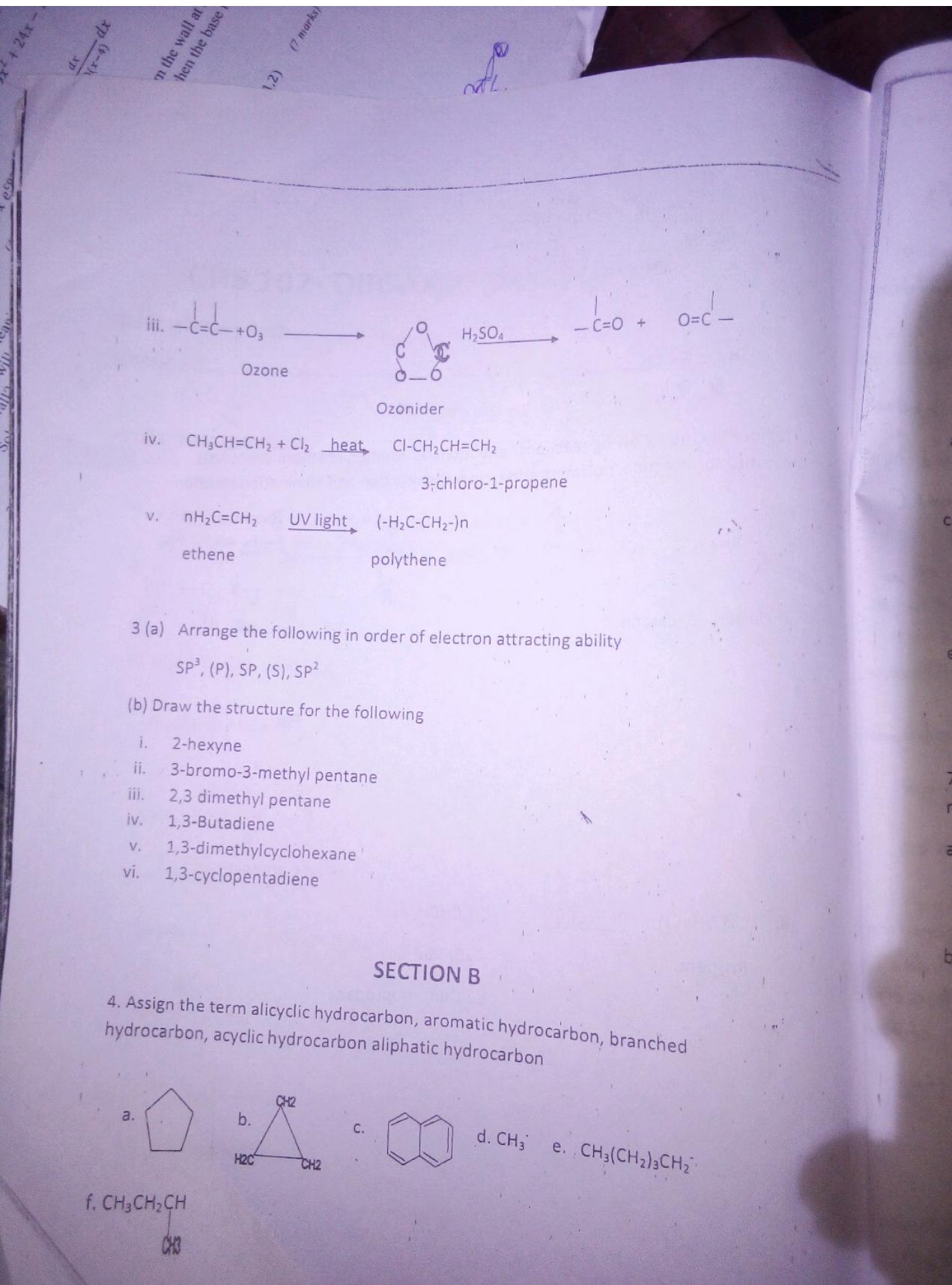


Cyclohexene N-Bromosuccinimide

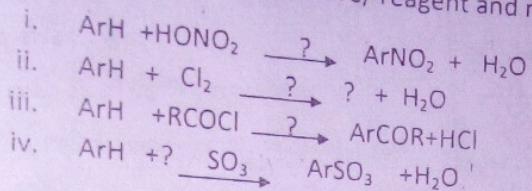


(2) Identify the following reactions/ equations as addition reaction, ozonolysis, substitution reaction, polymerization, cleavage reaction and elimination reaction

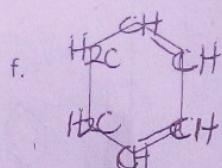
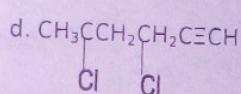
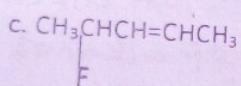
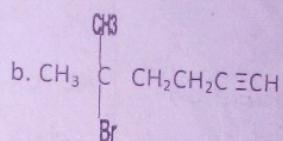
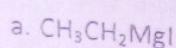




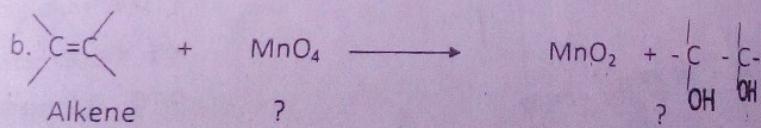
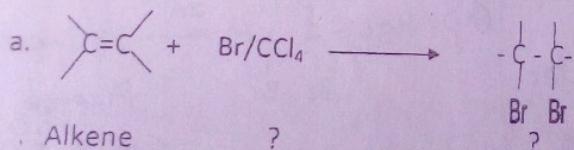
5. Fill the missing (?) structure/reagent and name the type of the reaction involved



6. Write the IUPAC name of the following structures/formulas

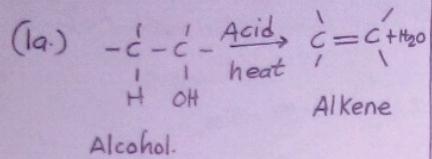


7. From the following reactions/equations, identify only the colour of the reactants or products.



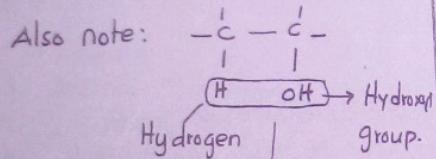
## SOLUTION TO CHS 102

### SECTION A OPTION D

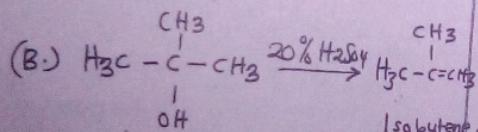


Note: The above equation represents dehydration of Alcohols (i.e. elimination of Water molecule  $\rightarrow \text{HOH}$  or  $\text{H}_2\text{O}$  to be left, as  $\text{C} = \text{C}'$ )

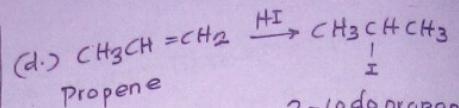
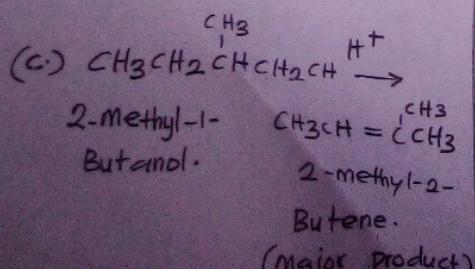
Alkene.



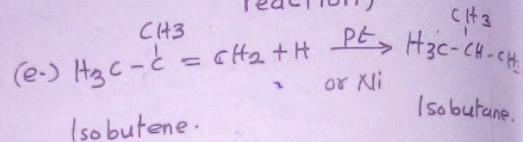
This is eliminated as Water molecule  $\text{HOH}$  or  $\text{H}_2\text{O}$



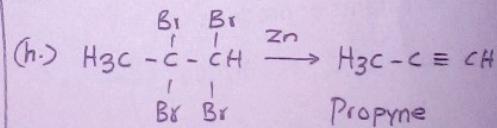
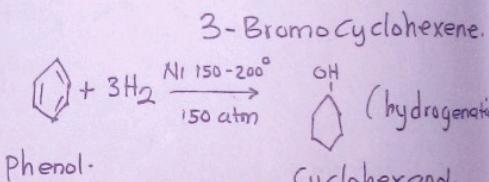
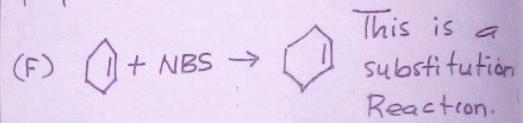
Ter-Butyl alcohol.



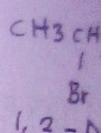
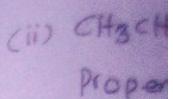
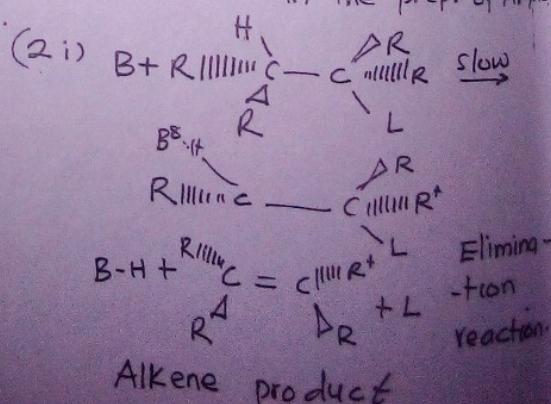
(This is an addition reaction)



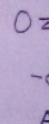
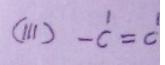
NOTE: The above is called hydrogenation of alkenes (preparation of alkane)



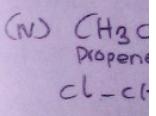
(Dehalogenation of tetrahalides one of the methods in the prep. of Alkyne.



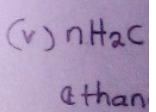
(This is i.e addition)



The above  
-lysis - c

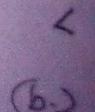


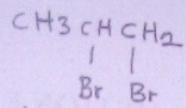
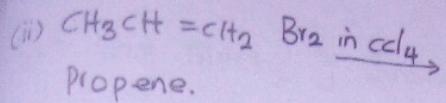
The abo  
reaction



(Polymer  
Reac

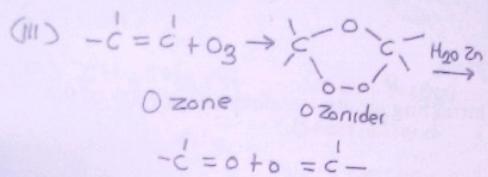
(3) a.)





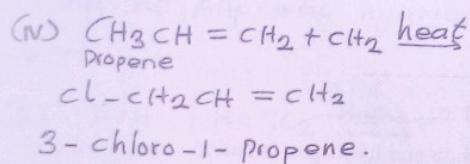
1, 2 - Dibromo propane.

(This is addition Reaction  
i.e addition of Halogens)

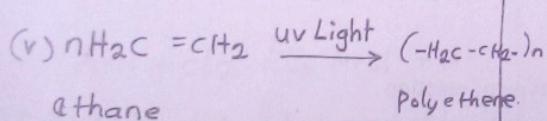


Aldehydes and ketones.

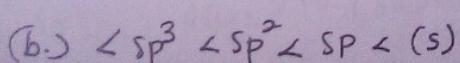
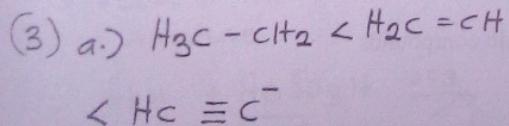
The above reaction is ozonolysis - cleavage Rxn



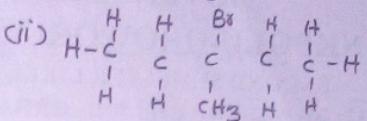
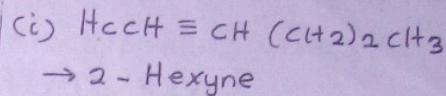
The above is substitution reaction (Halogenation).



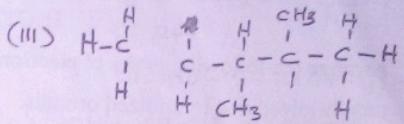
(Polymerization i.e Addition Reaction.)



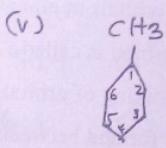
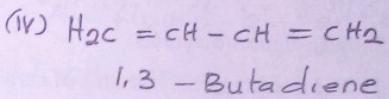
(c) Draw structures for the following. <sup>2</sup>



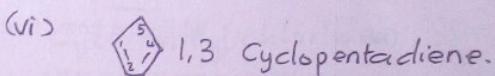
3-bromo-3-methyl pentane.



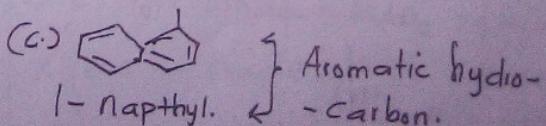
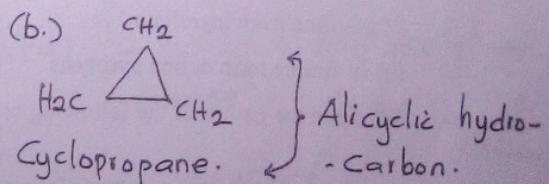
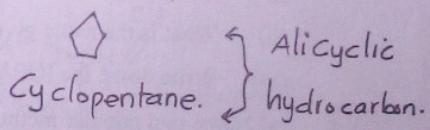
2, 3-dimethyl pentane.



1, 3 Dimethyl Cyclohexane.



### SECTION B

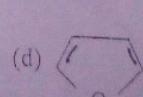
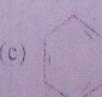
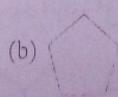
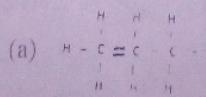


RIVERS STATE UNIVERSITY      OPTION E  
NKPOLU-OROWORUKWO, PORT HARCOURT  
SECOND SEMESTER LIKELY EXAMINATION QUESTIONS  
CHS 102 – ORGANIC CHEMISTRY  
TIME: 1 HOUR

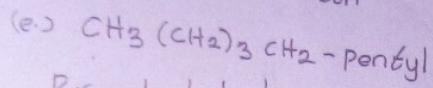
Instruction: Attempt all questions

SECTION A

1. Arrange the following <sup>in</sup> order of electrons attracting ability i.e. electronegativity of the unhybridized and hybridized orbitals.
  - (a)  $Sp$ ,  $SP^2$ ,  $SP^3$
  - (b)  $HC \equiv C^-$ ,  $H_3C - CH_2$ ,  $H_2C = CH^-$
2. Show in figures/diagrams
  - (i) The overlap of  $SP^3$  orbitals of carbon with S orbitals of hydrogen in  $CH_4$
  - (ii) The overlap of  $SP^3$  orbitals in ethane  $H_3C - CH_3$
3. (a) The mixing of atomic orbital is called-----
  - (i) The mixing of orbital lead to-----
  - (ii) The bond that is formed between carbon and hydrogen is called-----
  - (iii) while the bond formed between carbon to carbon compound is called-----
4.  $CH_4 + Cl_2 \xrightarrow[\text{or light}]{\text{heat}} ?$ 
  - (i) Complete the above reaction
  - (ii) What is the name given to this type of reaction
  - (iii) Write down the IUPAC name of the product formed
5. (a) Name two popular method used in the production of excellent antiknock qualities of gasoline from petroleum.  
(b) In simple term define pyrolysis
6. What are the names of the following organic compounds

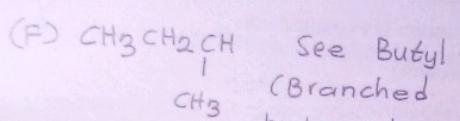


(d)  $\text{CH}_3$  Methyl group Branch  
hydrocarbon or Acyclic hydrocarbon



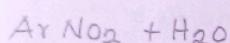
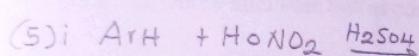
Branched hydrocarbon.

A Cyclic or Aliphatic hydrocarbon.



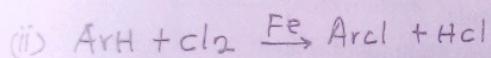
Aliphatic (A cyclic hydrocarbon).

Note: Acyclic is the same thing as Aliphatic hydrocarbon.

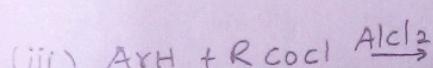


Anitro compound.

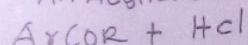
(Type of reaction; Nitration)



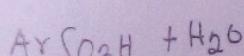
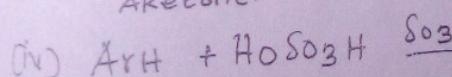
(chlorination An acylchloride)



An ACylhalide

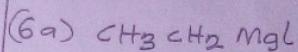


Aketone.

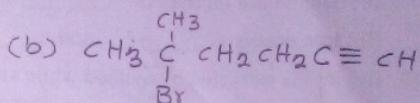


An aryl sulphonic Acid.

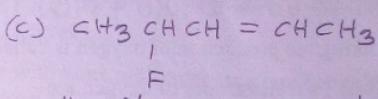
Note that all the reaction 3. from i-iv are all called Electrophilic Aromatic substitution.



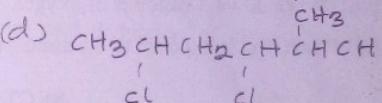
ethyl Magnesium iodide



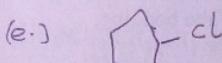
5-bromo - 5- methyl - 1-hexyne.



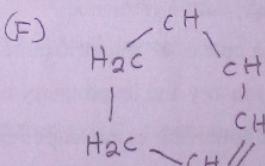
4-fluoro - 2-pentene



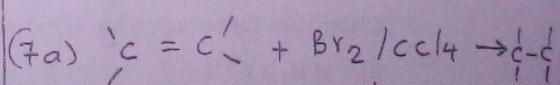
2,4-dichloro - 5-methylhexane.



Cyclopentyl chloride.



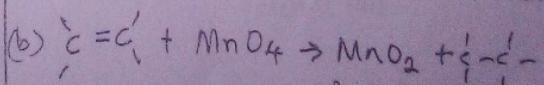
1,3-Cyclohexadiene



Alkene Red

Br B

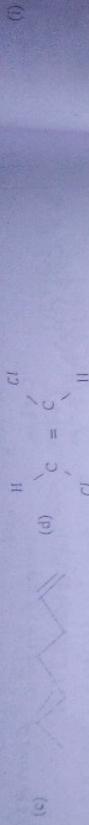
(Colourless)



Alkene Purple Brown

(ppt) Colourless

7. Give



10. (i) The electronic structure of aluminium is

(ii) Beaufort is a mixture of \_\_\_\_\_ and \_\_\_\_\_

(iii) Iron occurs as \_\_\_\_\_ and \_\_\_\_\_ etc.

(iv) Iron is extracted by \_\_\_\_\_ method while aluminium is extracted via \_\_\_\_\_

(v) Steel  $\rightarrow A + B$  (what does A & B represent)

(vi)  $2H_2O_2 \rightarrow 2H_2O(l) + O_2(g)$ . The reagent/catalyst used in the above equation during the production of oxygen is called \_\_\_\_\_

(vii) Two allotropes of oxygen are \_\_\_\_\_ and \_\_\_\_\_

(viii) Write down 3 isotopes of oxygen

(ix) When iron is exposed to the atmospheric rust is formed. Write down the equation.

#### SECTION B

1. Indicate the type of hybrid orbitals used by carbon in the molecule below and state the geometry of the bonding.

(a)  $O = C = O$  (b)  $H_3Ccl$  (c)  $H_2C = O$  (d)  $Hc \equiv N$

2. The order of arrangement of the reactivity of alkane, alkene and alkyne is.

3. In an optically active substance

(a) Give example of asymmetric molecule and non-asymmetric molecule

(b) Dextro-rotatory and levorotatory molecule

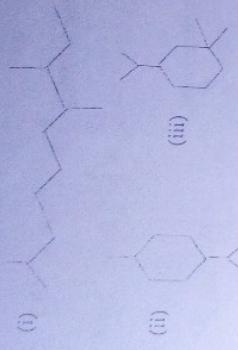
4. Classify the following as nucleophiles or electrophiles

(a)  $OH^-$  (b)  $(CH_3)_2SnI$  (c)  $H_2O$  (d)  $CH_3^+$  (e)  $H_3C^+$   
(f)  $CN^-$  (g)  $RN_2^+$  (h)  $NH_3$  (i)  $NH_3$

5. Classify the following carbon as tertiary, secondary and primary

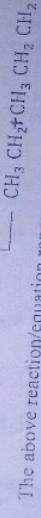
(i)  $(CH_3)_2C^+H$   
(ii)  $C^+H_3CH_2$   
(iii)  $(CH_3)_3C^+$

7. Give the IUPAC names of the following



8. State true or false in the following statements.

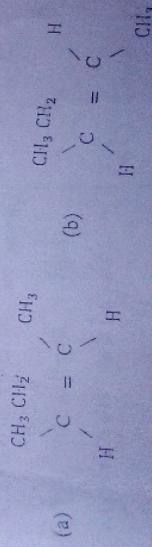
- (i) The knocking resistance of gasoline is the quality of an octane number.
- (ii) 1 barrel of crude = 42 gallons = 159 litres.
- (iii) Isomerism are organic compounds with same molecular structure but different molecular formula.
- (iv) Catalytic hydrogenation of alkanes and deduction of alkyl - halides are methods of preparing alkanes
- (v) During the addition of halogens to alkane (halogenation) radicals has to be generated first before a reaction



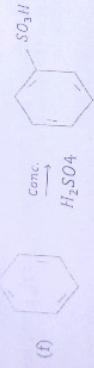
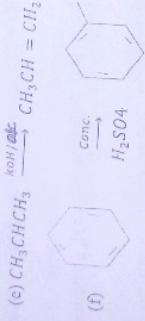
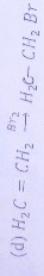
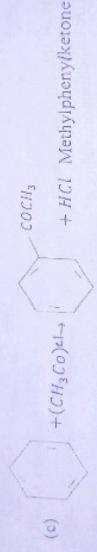
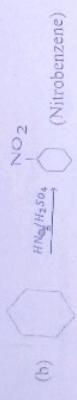
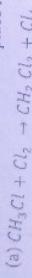
The above reaction/equation represents pyrolysis or cracking  
(vii) The geometric structure of alkane is well known from spectroscopic and diffraction experiments.

(viii)  $C=C$  bond is much more reactive than  $C-C$  single bond

9. Write the names of the following structures



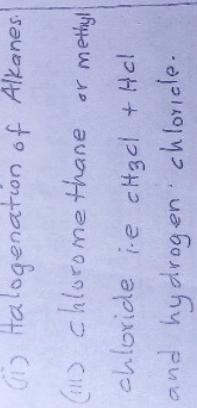
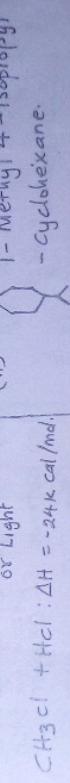
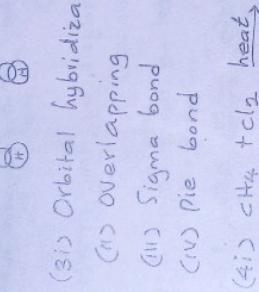
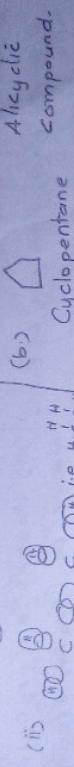
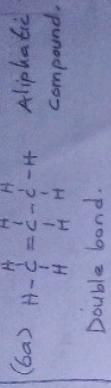
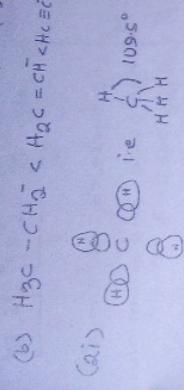
6. Name the reaction that takes place in the following



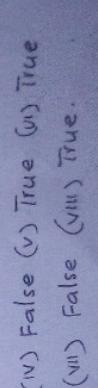
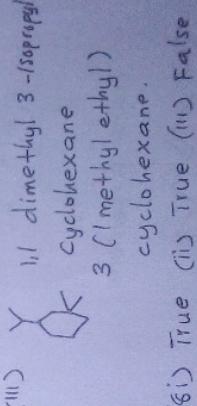
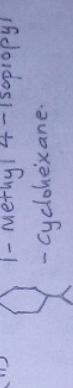
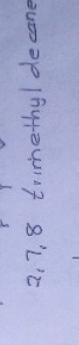
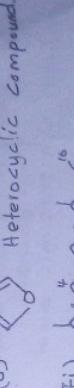
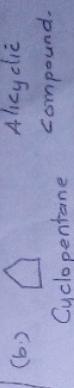
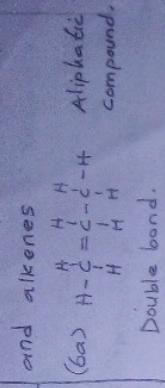
## SOLUTION TO CHS 102

### OPTION E

- (1a)  $sp^3 < sp^2 < sp < s$
- (b)  $H_3C - CH_2^- < H_2C = CH^- < H_3C \equiv C^-$



- (1a) Conversion of a compound by the action of heat alone or the conversion of large alkanes mixture of smaller alkanes and alkenes

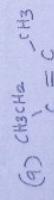


Note: (iii) Isomerism are organic compounds with the same molecular formula but different molecular structure.

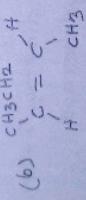
(iv) Catalytic hydrogenation of alkanes and reduction of alkyl-halides are methods of preparing alkane

(v) The geometric structure

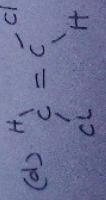
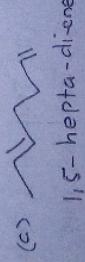
of alkene is well known from Spectroscopic and diffraction experiments.



Cis - 2 - Pentene

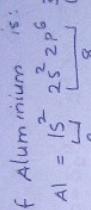


Trans - 2 - Pentene



Trans - 1,2 - dichloroethene:

(vi) Electronic structure



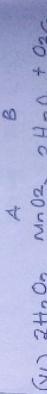
(ii) hydrated aluminium hydroxide and aluminium oxide

(iii) Haematite ( $\text{Fe}_2\text{O}_3$ ) and Magnetite ( $\text{Fe}_3\text{O}_4$ ) etc.

(iv) The blast / furnace method (iron)

(v) Electrolysis by Hall-Herwald (aluminium)

(vi) Steel  $\rightarrow$  iron + small % of C



(viii) Allotropes of Oxygen :  $\text{O}_2$  and  $\text{O}_3$

(ix) Isotopes of Oxygen  
 $^{16}\text{O}$ ,  $^{17}\text{O}$  and  $^{18}\text{O}$

(x)  $4\text{Fe}(s) + 3\text{O}_2(g) \rightarrow 2\text{Fe}_2\text{O}_3(s)$  (Rust)

SECTION B

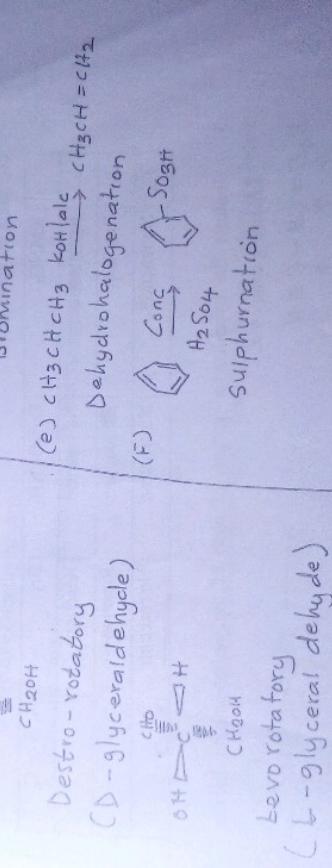
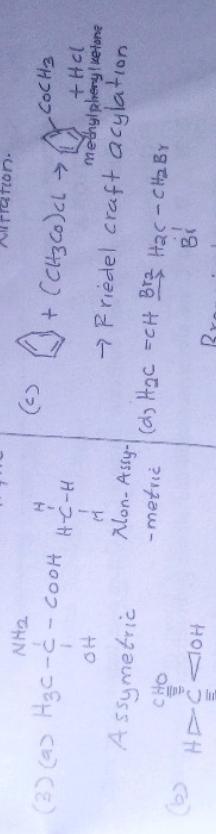
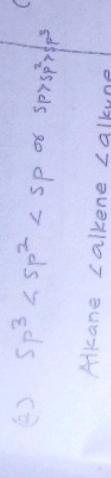
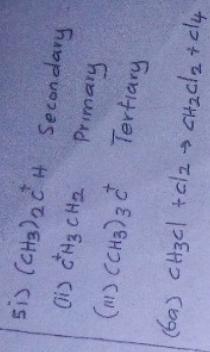
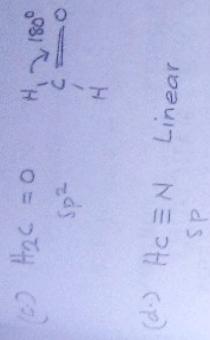
(1a)  $\text{O}=\text{C}=\text{O}$

$\text{SP}^2$

Angle =  $180^\circ$  Linear

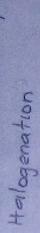
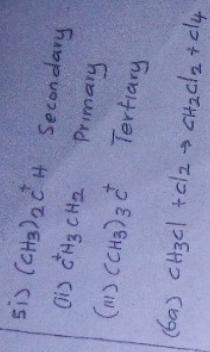
(b)  $\begin{array}{c} \text{H}_3\text{C} \\ | \\ \text{C} \\ | \\ \text{SP}^3 \\ \text{Cl} \end{array}$

$\text{H}-\begin{array}{c} \text{C} \\ | \\ \text{Cl} \\ | \\ \text{H} \end{array}-\text{Cl}$   
Tetrahedral.

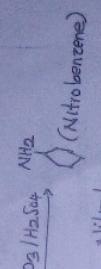


Levorotatory  
(L-glyceraldehyde)

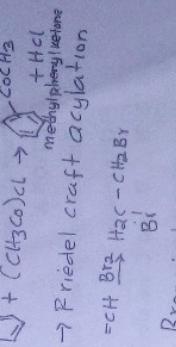
Nucleophile	Electrophile
$OH^-$	$H_2O$
$(CH_3)_2NH$	$CH_3^+$
$H_2O$	$H_3C^+$
$CN^-$	$O_2N^+$
$NH_3$	$R_3N^+$



Halogenation



Nitration.

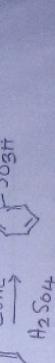


(d)  $H_2C = C = Br_2$

$Hac - CH_2Br$

$Br$

Bromination



$C_2H_5CH_2$

Dehydrohalogenation



Sulphurization

**RIVERS STATE UNIVERSITY**  
**OPTION F**  
**NKPOLU-OROWORUKWO, PORT HARCOURT**  
**CHS 102: ORGANIC CHEMISTRY, SECOND SEMESTER EXAMINATION**  
**2017 SESSION LIKELY EXAMINATION QUESTIONS**

Name/Matric No. \_\_\_\_\_

Department: \_\_\_\_\_

Signature: \_\_\_\_\_

Attempt all questions

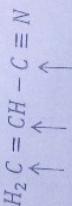
**SECTION A**

- Can a compound with molecular formula  $C_4H_6O$  turn blue litmus paper red?  
Give reason.

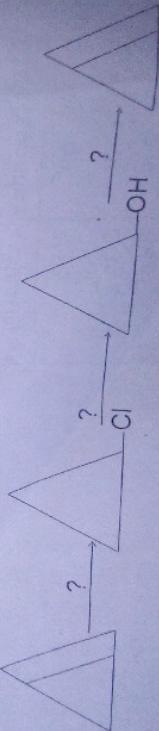
- If A, B and C are alkyne, aromatic and alkene hydrocarbons respectively, complete the table below

	KMnO <sub>4</sub>	Cu(NO <sub>3</sub> ) <sub>2</sub> /NH <sub>3</sub>	Br <sub>2</sub>	A, B or C
1.	Reaction	No reaction	Reaction	
2.	Reaction	reaction	Reaction	
3.	No reaction	No reaction	No reaction	

- Indicate the hybridization pattern of each of the carbon atoms in the following compound



- Identify each of the following steps as an elimination, addition or substitution reaction.



5. Draw and name 2 different compounds with formula  $C_2H_6O$
6. Draw and give IUPAC named for 2 hydrocarbons with formula  $C_3H_4$ .

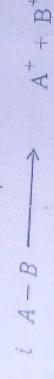
7. In the equation/reaction below, fill in the missing structures/reagents and write the names of the products.



8. Draw structures for the following

- a. 5-Amino-3-Chloro-2-Hexanol
- b. 3-ethyl-2-methylhexanoic acid
- c. 4-methyl-1,2-dipropyl cyclohexane
- d. 3-ethyl-2-methylhexane

9. State the type of process that takes place in the reactions below



10. Complete the reaction showing the bleaching action of chlorine below



11. The three basic structures of solid are

i \_\_\_\_\_ ii \_\_\_\_\_ iii \_\_\_\_\_

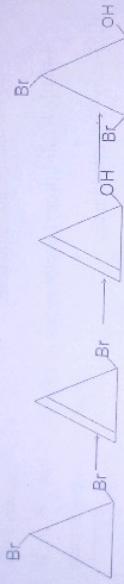
12. The reaction of alcohol and carboxylic acid gives/yields \_\_\_\_\_

4. Fill in

Ketone
Ether
Hydroxy
Carboxy
Amine
Nitro

### SECTION B

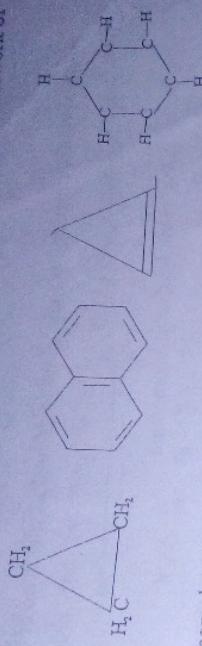
1. Identify each of the following steps (?) as a substitution, addition or elimination reaction.



2. Identify the class of each hydrocarbons (HC) A;B,C and D if their reactions are as indicated in the table below.

Sample	Br <sub>2</sub>	AlCl <sub>3</sub> /CHCl <sub>3</sub>	H <sub>3</sub> N/AgNO <sub>3</sub>	Class of HC
A	-ve	+ve	-ve	?
B	+ve	-ve	+ve	?
C	-ve	-ve	-ve	?
D	+ve	-ve	-ve	?

3. Assign the term aromatic, anti-aromatic, alkane and bond framework of benzene.



4. Fill/complete the table below

Class	Functional group
Ketone	-
Ether	-
Hydroxyl/Alcohol	-
Carboxylic acid	-
Amine	-
Nitro	-

5. Write down the condensed structure of the following

i. n-butane (C<sub>4</sub>H<sub>10</sub>)

ii. Octane (C<sub>8</sub>H<sub>18</sub>)

iii. n-pentane (C<sub>5</sub>H<sub>12</sub>)

iv. Decane C<sub>10</sub>H<sub>22</sub>)

v. Heptane (C<sub>7</sub>H<sub>16</sub>)

6. Organic chemistry exclude some compound mention two of them

7. i) Alkane is also known as \_\_\_\_\_

ii) Give example of an iso compound

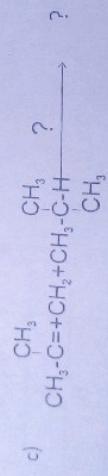
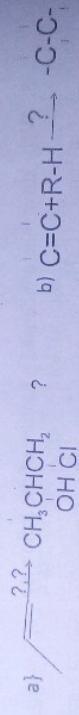
iii)  $\text{RCOO}^- + \text{R} \xrightarrow{\quad} \text{RH} + \text{CO}_3^{2-}$  This equation represents

iv. The heating of a substance in the absence of oxygen during cracking is called \_\_\_\_\_

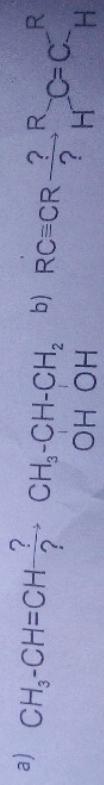


8. Name the different fractions obtained from different columns during petroleum/crude oil refining

9. Fill in the missing (?) structures/reactants/mechanism of reaction in the following equations.

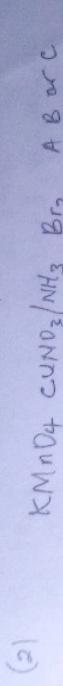


10. What are the reagents used in this equation and the name of the products formed



SOLUTIONS TO CHE 102  
2017 SESSION

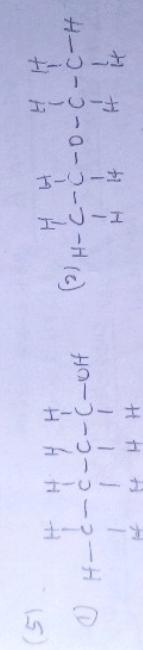
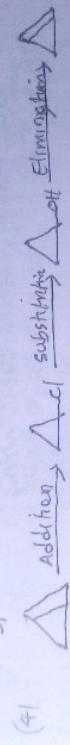
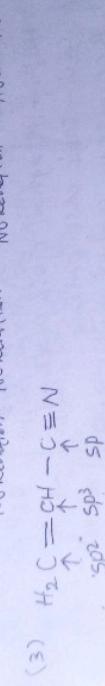
- (1) NO. This is because the functional group of an acid (which has the capacity to turn blue litmus paper red) is COOH and not CHO i.e.  $C_2H_6O$



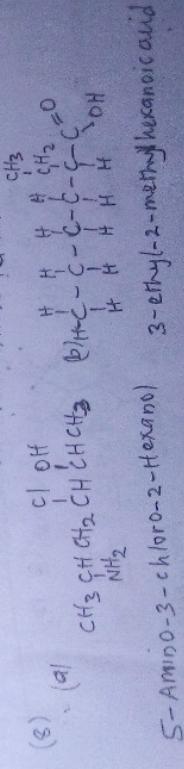
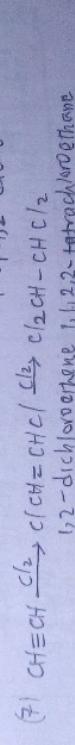
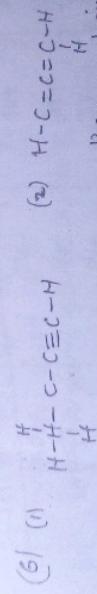
i Reaction No reaction Reaction Alkene

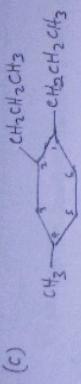
ii Reaction Reaction Reaction Alkyne

iii No Reaction No Reaction No Reaction Aromatic

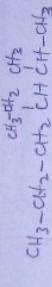


Methanized methane  
butanol





4-methyl-1,2-dimethylcyclohexene



1,2-dimethylcyclohexane

(9) (i)  $A - B \rightarrow A^+ + B^-$  homolysis  
 (ii)  $C - D \rightarrow C^+ + D^-$  heterolysis

(10)  $C_2(s) + H_2O(l) \rightarrow HOCl(aq) + HCl(aq)$

(i) Three basic structures of solid rare

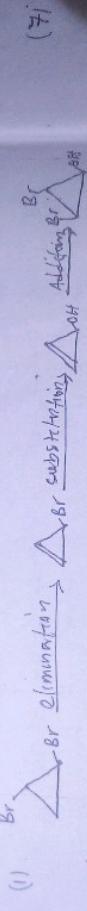
(ii) HCP - Hexagonal close packing

(iii) CCP - cubic close packing

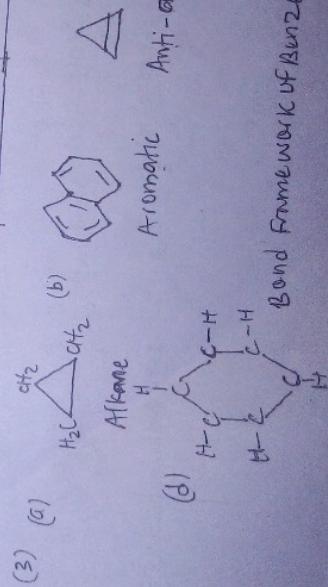
(iv) BCC - Body centred cubic array

(12) Ester

SECTION B



Sample	Bra	$AlCl_3/HCl(l)$	$H_3N/AgNO_3$	Class of HC
A	-ve	+ve	-ve	Aromatic
B	+ve	-ve	+ve	Alkyne
C	-ve	-ve	-ve	Alkane
D	+ve	-ve	-ve	Alkene



(4)

(5)

(6)

(7)

(8)

(9)

(10)

(11)

(12)

(13)

(14)

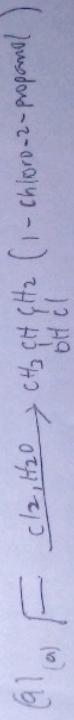
(15)

(16)

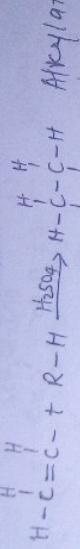
(17)

(4)	Class	Functional Group
(i)	Ketones	$C=O$ or $\text{C}\equiv O$
(ii)	Ether	$-O-$
(iii)	Hydroxyl/Alcohol	$-OH$
(iv)	Carboxylic acid	$-COOH$ or $\text{C}\overset{\text{O}}{=}\text{O}H$
(v)	Amine	$-NH_2$
(vi)	Nitro	$-NO_2$

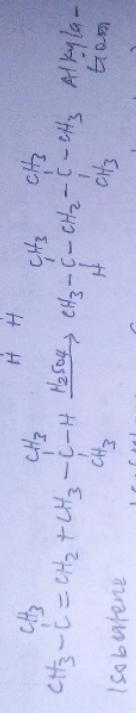
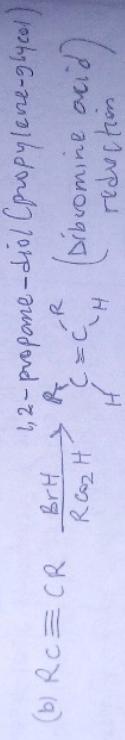
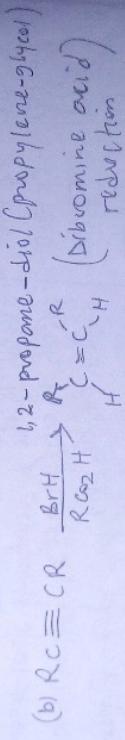
(5)	Formulae	Condensed Structure	Name
(i)	$C_4H_{10}$	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$	n-butane
(ii)	$C_8H_{18}$	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2(\text{CH}_2)_3\text{CH}_3$	Octane
(iii)	$C_5H_{12}$	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$	n-pentane
(iv)	$C_{10}H_{22}$	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2(\text{CH}_2)_5\text{CH}_3$	Decane
(v)	$C_7H_{16}$	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$	Heptane
(6)	$CO$	Carbon monoxide	
	$CO_2$	Carbon dioxide	
(7)	(i) Paraffin (ii) Isobutane (iii) Propene (iv) Propanoate (v) Isopropanoate		(i) Reduction of ketones (ii) Polymerisation (iii) Polypropylene (iv) Hydrogenation
(8)	(1) Natural gas (in petroleum ether (light petroleum)) (2) Lignum / Lignin (4) straight chain gasoline (5) Kerosene (6) Gas oils / diesel fuel / heating fuel / oil (7) Lubricating oils, grease, paint thinners (8) Bitumen / asphalt		



(b)



(c)

(10) (a)  $CH_3CH = CH_2 \xrightarrow[H_2O, OH]{KMnO_4} CH_3 - CH(OH) - CH_2$ 

**CHS**  
**108**

RIVERS STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT OF CHEMISTRY, FACULTY OF SCIENCE  
SECOND SEMESTER 2016/2017 SESSION, LIKELY EXAMINATION  
COURSE/TITLE/ CODE: CHS 108 (PRACTICAL CHEMISTRY II) - TIME 1.15MINS

1. If sample A is placed in a test tube and bromine solution drop with shaking, if there is no reaction sample A is likely to be ..... **Alkene** .....
  2. When sample B was added to Bromine in a test tube, No reaction took place, but sweet gasoline-like was observed. Which class of hydrocarbon does B belongs to ..... **Aromatic** .....
  3. Name two tissues of hydrocarbon that can react with bromine solution  
 (i) ..... **Alkane** ..... (ii) ..... **Alkyne** ..... (iii) ..... **Aromatic** .....
  4. Write an equation for the reaction of potassium permanganate with ethane  
 $\text{H}_3\text{C} \longrightarrow \text{CH}_3 \xrightarrow{\text{KMnO}_4 \text{ to Reaction}} \text{NO}_2$  .....  
 Which classes of hydrocarbon gives a precipitate with cuprous chloride. **Alkenes** .....
  5. Write down an equation for the reaction of phenylethyne with bromine. Turn to the next page
  6. Name two solutions that alkene can react with (i)  $\text{Br}_2$  (bromine solution) .....
  7. (ii)  $\text{KNaO}_4$  (potassium picromanganate)
  8. Drop sample C into a test tube that contains 1ml of ammonical cuprous chloride solution until reaction occurs. Sample C is likely to be  
 (i) ..... **Alkene** ..... (ii) ..... **Alkane** ..... (iii) ..... **Alkyne** ..... (iv) ..... **Aromatic** .....
  9. If a few drops of potassium permanganate solution is added sample A in a test tube until an initial colour change is observed. Add as much of the permanganate solution again. If reaction did not take place sample A is likely to be ..... **Alkene** .....
  10. Write an equation for the reaction of permanganate with cyclopentene. Name the product  
 $\Delta + \text{KMnO}_4 \xrightarrow{\text{H}_2\text{O}}$  ..... **It is called cyclopentone** .....  
 Is 1,2-cyclopentadiol
  11. Mention two roles of ammonia in the reaction below
- $$\text{C}_6\text{H}_5\text{CH}_2\text{AgNO}_3 \xrightarrow{\text{C}_6\text{H}_5\text{CO}_2^-} \text{C}_6\text{H}_5\text{CH}_2\text{CO}_2\text{Ag}^+ + \text{HNO}_3 + 2\text{NH}_3$$
- (i) The ammonia acts as a catalyst  
 (ii) It provides a base that abstracts acidic hydrogen of the Alkene
12. Name one organic compound that can be responsible in the smell of aromatic hydrocarbon **Phenyl ethanone (ester)**
  13. Which of the following solution can decolorise potassium permanganate and also indicate which of them is a ketone or an aldehyde (a) ethanol (b) propanone  
 \* Ethanal is an aldehyde, it decolorises potassium permanganate  
 \* Propanone is a ketone

time. How  
injection.  
um and minimum  
(4 marks). (6 marks)

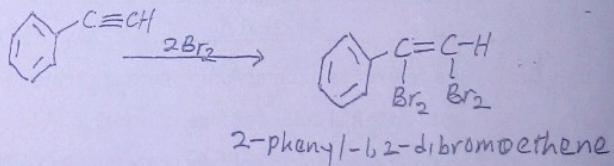
at a rate of  
is 4 m

Use the information below to answer question 14-18

Place 5 drops <sup>of</sup> A in a test tube, add 10 drops of dil.  $H_2SO_4$  and 1 drop of potassium permanganate solution. mix well and warm the mixture gently. observing any reaction. Allow to cool repeat with samples B and C.

14. If sample B formed a brownish ppt, after warming the odour was alcohol-like hence sample B is..... Ethanal (aldehyde)
15. The colour changed in sample C from purple to light brown with brownish ppt hence sample C is ..... propanone (ketone)
16. Which of the sample did not react..... sample A  $CH_3 - C - CH_3 \xrightarrow[OH^-]{KMnO_4} \text{No reaction}$
17. Which sample decolourises  $KMnO_4$ . sample B (Ethanal)
18. Give reason why sample A did not react.....
19. Mention two things you will observed if an aromatic compound you add bromine solution drop wise with shaking.....
20. Write down an equation for the reaction of cyclohexene with bromine. Name the product .....

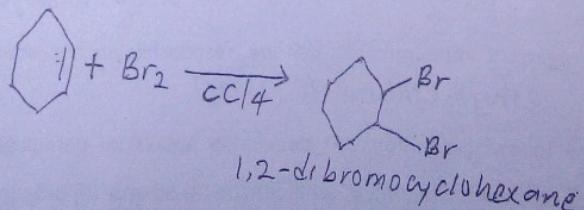
No 6 solution



(18) Because of the increase in the aryl group in the carbon bearing the OH group

(19) (i) No reaction takes place  
(ii) Sweet smell is observed

(20)



RIVERS STATE UNIVERSITY  
 NKPOLU-OROWORUKWO PORT HARCOURT  
 DEPARTMENT OF CHEMISTRY, FACULTY OF SCIENCE  
 SECOND SEMESTER 2016/2017 SESSION LIKELY COMPILED  
 COURSE TITLE/ CODE: PHY 104/GENERAL LABORATORY II

PHY  
 104

TIME:.....

INSTRUCTION: Answer all questions

1. Four methods of measuring resistance include (i) Voltmeter-ammeter  
 (iii) Wheatstone bridge method  
 (iii) Substitution method (iv) Meter-bridge method
2. Meter bridge is based on the principle of Wheatstone bridge and it is used to find the resistance of an unknown conductor or to compare two unknown resistances.
3. State Snell's law.
4. Mention two more accurate methods of measuring resistance (i) Wheatstone bridge method (ii) The meter-bridge method
5. List any 8 apparatus used in electricity experiment you carried out (i) Ammeter (ii) Voltmeter  
 (ii) Key (iii) Cell (iv) Galvanometer (v) Resistor  
 (vi) Rheostat (vii) V. O. M. (viii) Wire
6. Which is the best method to determine voltage in the circuit and why? Potentiometer method  
or Sliding wire - it does not draw current from the component (battery)
7. Differentiate between Image and shadow.
8. What is the usefulness of connecting identical cells in parallel? To provide twice the current
9. Write down the formula used in calculating the refractive index of the glass prism material.  $n = \sin(\theta_D / \theta_i) / \sin(\theta_D / 2)$
10. One precaution for measurement of internal resistance of cell is The accumulator C must be fully charged
- \* 11. Define EMF.
12. To determine the focal length of a mirror, mention 4 apparatus that can be used  
 (i) Concave mirror (ii) Two retort stands with clamps  
 (iii) Mirror & stand (iv) Meter rule
- \* 13. Define angle of incidence. The angle between the direction of the refracted ray and the direction of incident ray when a ray of light passes from one medium to another
- \* 14. Use symbols to differentiate between (i) cell & battery (ii) resistance box and rheostat/variable resistor (i) cell (ii) battery (iii) resistor box (iv) rheostat (variable)
15. What is Internal resistance of a cell. Resistance offered by the cell
16. Mention five apparatus that can be used to verify Snell's law using a parallel shaded glass block (Refraction at plane surface) (i) Ruler (ii) Rectangular glass block  
 (iii) Plain sheet (iv) Optical pins (v) drawing board
17. Electric current I is defined as  $I = \frac{Q}{t}$  while Resistance R is defined as  $R = \frac{V}{I}$   
Opposite
- \* 18. Differentiate between open circuit and close circuit.
19. Define potentiometer. It is an instrument for measuring an E.M.F by balancing it against the pd produced by passing a known current through a known variable
20. The following readings were obtained in an experiment

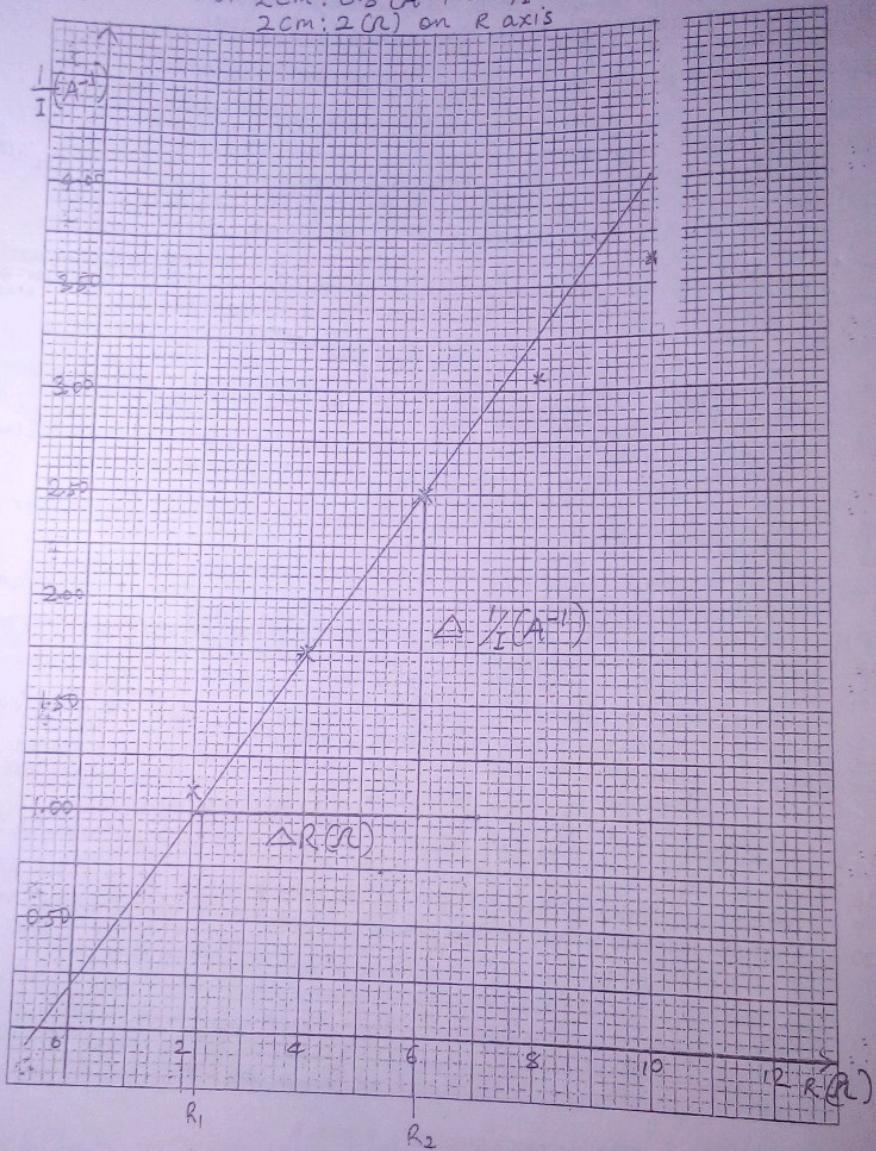
R (m)	2	4	6	8	10
I (A)	0.90	0.60	0.40	0.30	0.28
$I/I(A^{-1})$	1.11	1.67	2.50	3.33	3.57

- (a) Using a suitable scale, plot a graph of  $I/I(A^{-1})$  against R
- (b) Determine the intercept on the  $I/I(A^{-1})$  axis
- (c) Estimate the slope of the graph
- (d) From the scope of the graph determine the e.m.f, E of the cell

- (3) Snell's Law states that the ratio of sine of angle of incidence to the sine of angle of refraction is constant for a given medium i.e.  $\frac{\sin i}{\sin r} = n$
- (ii) EMF means Electromotive Force, it the P.D between the terminals of a cell when it is not delivering current to the external circuit
- (is) An open circuit is one where the connection has been broken by an interruption in the path for electrons to flow while a close circuit is one that is complete with good continuity throughout

TITLE: A GRAPH OF  $\frac{1}{I}$  AGAINST K  
SCALE: 2cm: 0.5  $(A^{-1})$  on  $\frac{1}{I}$  axis  
2cm: 2 (R) on R axis

20/6/2014




  
 Department of Mathematics,  
 Rivers State University, Nkpolu-Oruworukwo, Port Harcourt.  
 Second Semester Examinations 2021/2022 session

**MTH 116 Calculus**

Instruction: Answer **FIVE** questions.

$$\frac{3x^2+1}{2+1} \quad \cancel{\frac{3x^3}{x}} \quad \frac{x^{1+1}}{2^2}$$

Time: 3 Hours

- 1a Evaluate (i)  $\lim_{x \rightarrow 1} x^4 - x^2 + x - 2$  (ii)  $\lim_{x \rightarrow 0} \frac{\cos x \tan x}{x}$  (iii)  $\lim_{x \rightarrow 3} \frac{x^2 - 2x - 3}{x - 3}$  (3 marks each)
- 1b Find  $\frac{dy}{dx}$  from first principle given that  $y = x^2 + x$  (5 marks)
- 2 Find  $\frac{dy}{dx}$  if (i)  $y = x^3 - 5x + \sin x$  (ii)  $y = \frac{3x^2 + 2x}{1+x}$  (iii)  $y = xe^{2x}$   
 (iv)  $y = \sqrt{x^4 - 7x - 1}$  ( $3\frac{1}{2}$  marks each)
- 3a If  $x^3y - x^2 + 4y^2 = 7$  defines an implicit function, find  $\frac{dy}{dx}$ . (7 marks)
- 3b Find the area bounded by the curve  $y = 2x^3 + x^2 - x$  and the ordinates  $x = 1$  and  $x = 2$  (7 marks)
- 4a The concentration of a certain drug in a patients bloodstream  $t$  hours after injection is given by  $y = \frac{3t}{t+1}$ , find the rate at which the concentration is changing with time. How fast is the concentration changing (i) 1 hour after injection (ii) 2 hour after injection. (6 marks)
- 4b Investigate the stationary points of  $y(x) = x^3 - 9x^2 + 24x - 1$  for maximum and minimum (8 marks)
- 5 Evaluate the following (i)  $\int \sin x e^{\cos x+3} dx$  (ii)  $\int \frac{dx}{(x+4)(x-4)}$  [(4 marks), (6 marks)]  
 (iii)  $\int_0^3 (3x^2 + x - 1) dx$  (4 marks)
- 6a A 5m ladder, leaning against a wall slips so that it moves from the wall at a rate of 2m/s. How fast will the top of the ladder be moving down the wall when the base is 4m from the wall? (7 marks)
- 6b Solve the equation  $\frac{dy}{dx} = \frac{y+1}{x}$  (7 marks)
- 7a Find the gradient of the tangent to the curve  $2xy + x^2 + y^2 = 3$  at (1,2) (7 marks)
- 7b Evaluate  $\int \cos 12x \sin 9x dx$ .

$\int \sin 6x^2 - \cos 9x$

RIVERS STATE UNIVERSITY  
NKPOLU-OROWORUKWO  
PORT HARCOURT  
FACULTY OF SCIENCE  
**SECOND SEMESTER EXAMINATION FOR 2021/2022 ACADEMIC SESSION**  
**COURSE: USE OF ENGLISH II /GST 142**      **TIME ALLOWED: 90 MINS.**  
**INSTRUCTION: ANSWER ALL QUESTIONS**      **GROUP: A**

#### SECTION A

**Instruction:** Punctuate the text below. Capitalize where necessary.

the idea of a society represents different things to different people hence we hear of such phrases as western society information society and knowledge society others also view society based on social grouping demarcated by their subsistence strategies in that sense we have preindustrial industrial and preindustrial society is dominated by information service and technology of which service areas include government research education health sales law bank insurance etc

#### SECTION B

**Instruction:** write on one of the following.

1. A Faculty Board meeting has been scheduled as follows; 17/11/2022, 10am, Faculty Board room. As the secretary of the Faculty Board write an internal memorandum.
2. You have been invited as the guest speaker by your institution on the occasion of the inauguration of the newly elected SUG executives. Write your speech.
3. Write a good will letter to a friend who has just been elected the SUG president of your institution.
4. Write a report to be submitted to the vice-chancellor on the recent ASUU crisis.

#### SECTION C

**Instruction:** Name the figure of speech in each of the following.

1. Confusion heard his voice.
2. Her cheeks appears as the dawn of the day.
3. I live on the bible.
4. He is such a good keeper that he conceded ten goals in the first half of the match.
5. Success rendered Paul poorer.
6. Truth, justice and peace descend on us at this hour.
7. He is suffering from a terminal illness.
8. Fortunately, Honor's rose above the tumult.
9. He was raised from the bar to the bench.
10. I have not seen you for ages.

62P57c

## LABORATORY EXPERIMENTS IN MAGNETISM

20(b) Intercept on the  $\frac{1}{I}$  axis is

$$\text{Intercept on } I^{-1} = 0.1 \text{ A}^{-1}$$

$$(c) \text{ Slope} = \frac{\Delta I^{-1}}{\Delta R} = \frac{2.50 - 1.00}{6 - 2.2} = \frac{1.50}{3.8} = 0.40 \text{ V}^{-1}$$

(d) From  $y = mx + c$

$$\text{Slope } m = \frac{1}{E}$$

$$E = \frac{1}{0.40} = \underline{\underline{2.5 \text{ V}}}$$

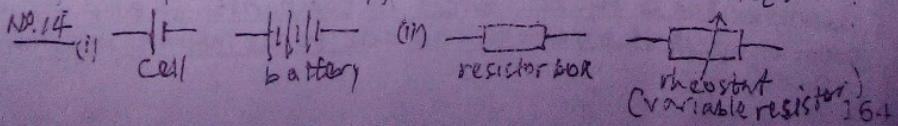
Approximately the Electromotive Force  
of the cell is 3 volts

Q7: Diff. btw image & shadow: image is produced when there is <sup>an</sup> actual intersection of rays while shadow occur when an opaque object absorb light energy to produce dark background.

Q13: Angle of incidence is the angle between the direction of the refracted ray and the direction of the incident ray when a ray of light passes from one medium to another.

Q15: Internal resistance of a cell is the resistance offered by the cell.

Q6: potentiometer method or sliding wire, it is a special feature in that it does not draw current from the component (battery) across where it is connected.



## RIVERS STATE UNIVERSITY

NKPOLU-OROWORUKWO PORT HARCOURT

DEPARTMENT OF PHYSICS, FACULTY OF SCIENCE

SECOND SEMESTER 2017/2018 SESSION EXAMINATION COMPILED

COURSE TITLE/ CODE: PHYSICS/GENERAL LABORATORY II TIME 1HR PHY 104

1. State three uses of meter bridge (i) To determine an unknown resistance  
(ii). To compare two resistance  
(iii). To determine the specific resistance of the material of a wire.
2. The equation for combining resistors in parallel is  $R_{eq} = \frac{1}{\left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_n}\right)}$
3. In an experiment to determine the internal resistance of a cell, mention two general precautions during the experiment (i). ensured zero error state of the apparatus  
before use (ii). made sure all connections were light and rightly positioned to avoid current fluctuations
4. Why is the use of voltmeter and ammeter a less accurate method of measuring resistance? It is because voltmeter and ammeter do not have zero resistance, they are of high resistance which must be overcome by measuring resistance.
5. How is voltmeter and ammeter connected in a circuit and why?  
Ammeter (series - becos of low resistance); voltmeter (parallel - high resistance).
6. Mention 5 electrical element in an electricity circuit and their function & symbol  
(i) Galvanometer: used in measuring small current  
(ii) Voltmeter: measuring voltage or P.d in the circuit  
(iii) Key: to make and break a circuit  
(iv) Rheostat: used to vary the current quota.  
(v) Resistor: use to control the amount of current in the circuit.
7. Define resistance and list out factors that determine the resistivity of material  
Resistance is opposition to the flow of current offered by a conductor.  
The Factors are (i) Length,  $R \propto L$  (ii) Area,  $R \propto \frac{1}{A}$  (iii) Temperature  $R_f = R_0(1 + \alpha t)$
8. Mention two types of reflection (i) Regular reflection  
(ii) Diffuse reflection
9. During electrical experiment an ammeter must be connected in Series with a component to measure the current through that component wave voltmeter must connect in Parallel
10. What is the use of the resistance box? A means of introducing different value of resistance with ease instead of disconnecting one and replacing it with another
11. In refraction the light wave is ... absorbed  
while in reflection light wave ... Transmitted, bounces back to the same medium
12. The most convenient and accurate way of measuring resistance over a range of widely different values is by means of ... Wheatstone bridge
13. What happen to current and voltages in series and parallel connection. In series: the same current flows throughout all the element with different voltage drop while for parallel connection the same voltage drop but different current
14. Two notable experiments that can be done with the aid of potentiometer  
(i) Comparison of two resistance (ii) Comparison of E.M.F of two cells
15. Define lost volt. i.e. the voltage drop due to the internal resistance in a cell