



## SCIENCE CENTRE

**Location:** Maganjo, Opp. Pr Deo's church

**For;** Science lessons, text books, stationery etc..

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END OF JULY TEST EXAMS 2021

### S.5 CHEMISTRY

2 HOURS

**Topics: PERIODICITY, BONDING AND STRUCTURE, ALKENES, ALKYNES**

- 1 (a) Distinguish between ionization energy and electron affinity (1 mark)
- .....
- .....
- .....
- (b) Write equations to illustrate (1 mark@)
- i. 1<sup>st</sup> ionization energy of Al
- .....
- .....
- ii. 3<sup>rd</sup> ionization energy of Boron
- .....
- .....
- iii. 2<sup>nd</sup> electron affinity of Sulphur
- .....
- .....
- (c) Explain the following observations
- i. The value of ionization energy progressively increases as more electrons are removed from the atom (03 marks).
- .....
- .....
- .....
- ii. The 1<sup>st</sup> electron affinity of most elements is always higher than the second (02 marks)
- .....
- .....
- .....
- 2 (a) How does formation of a covalent bond differ from that of an ionic bond. (01 mks)
- .....
- .....
- .....

(b) Explain what is meant by the following terms;(01 mark@)

i. Polarization

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ii. Polarizability

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iii. Polarizing power

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iv. Charge density

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(c) Explain the following observations;

i. Aluminium chloride has a higher melting point than sodium chloride.

(03 marks)

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ii. Carbon dioxide exists as a gas at room temperature whereas silicon (iv) oxide exists as a solid.

(02 marks).

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iii. The boiling point of 4-nitrophenol is higher than that of 2-nitrophenol.

(02 mark)

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3 Draw and name the shapes of the following molecules. (12 marks)

MOLECULES / ION	SHAPE	NAME OF THE SHAPE
PH <sub>3</sub>		
CO <sub>3</sub> <sup>2-</sup>		

$\text{SO}_3^{2-}$		
$\text{H}_2\text{SO}_4$		
$\text{SnCl}_2$		
$\text{PBr}_5$		
$\text{SO}_2$		
$\text{H}_2\text{PO}_4^-$		
$\text{NO}_3^-$		
$\text{NO}_2^-$		

- 4 1.8g of a compound X contains carbon, hydrogen and nitrogen only. X on combustion liberated 5.2g of carbon dioxide gas and 224cm<sup>3</sup> of nitrogen at s.t.p.

a) Determine the empirical formula of X.

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b) When vaporized, 0.2g of X occupied 81cm<sup>3</sup> at 184.1°C and 101.325 KPa. Determine the molecular formula of X.

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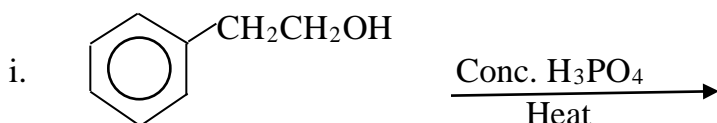
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c) Complete and write an acceptable mechanism for each of the following reactions.



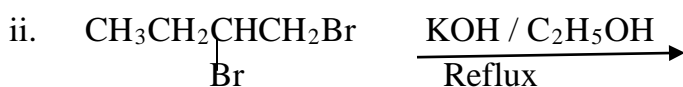
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5 Using equations, show how the following conversions can be effected. Show all the reagents and the required conditions.

a)  $\text{CH}_4$  from  $\text{CH}_3\text{CH}_2\text{OH}$

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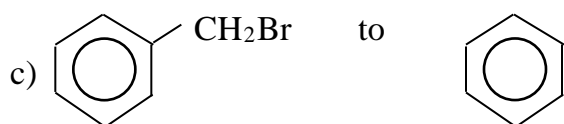
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b)  $\text{CH}_3\equiv\text{CH}$  from  $\text{CaC}_2$

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