

Section- ANote: Attempt all questions. $2 \times 3 = 6$ marks

1. Differentiate HCV and NCV.
2. With the help of reaction, explain how vulcanization of rubber is done? What are the advantages of vulcanized rubber over raw rubber?
3. Write the significance of the following in lubrication process:
 - i) Flash point and fire point
 - ii) Cloud point and pour point

Section- BNote: Attempt all questions $3 \times 3 = 9$ marks

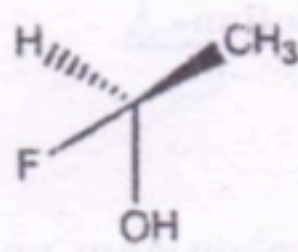
1. What do you understand by conformational isomers? Draw all possible conformers of n-butane. State which one is most stable and which one is least stable?
2. What are ceramics? How they can be classified?
3. Calculate the weight of air required for complete combustion of 1 m^3 of a gaseous fuel having following composition:
 $\text{CH}_4 = 45\%$, $\text{C}_2\text{H}_6 = 15\%$, $\text{CO} = 10\%$, $\text{N}_2 = 10\%$, $\text{H}_2 = 10\%$, $\text{O}_2 = 10\%$.

Section- CNote: Attempt any three questions $5 \times 3 = 15$ marks

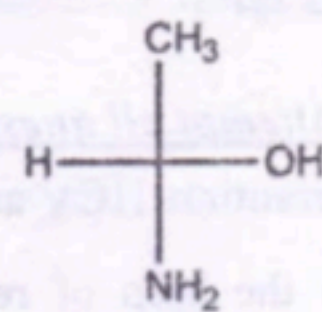
1. Using the concept of Molecular orbital theory, draw molecular orbital diagram of Oxygen molecule. Also, write its molecular orbital electronic configuration, bond order and magnetic character.

2. i) Explain with help of well labeled diagram, how petrol can be synthesized using "Fisher Tropsch Method". Also, write reactions involved in this method.

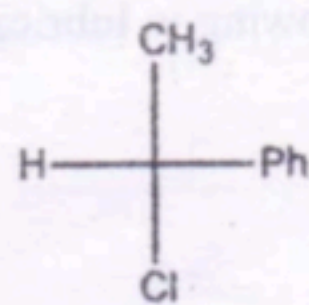
- ii) Assign R/S configuration in the following compounds:



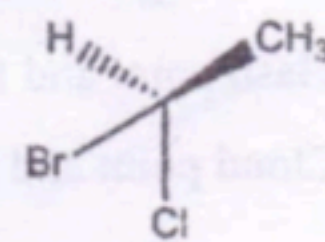
(a)



(b)



(c)



(d)

3. i) Differentiate Thermosetting and thermoplastic polymers. (2)
- ii) Design the method of synthesis and write the applications of following polymers (*any two*): (3)
 - a. Buna-S
 - b. Polystyrene
 - c. Polylactic acid
4. i) Write the composition and uses of *any two* type of glasses: (3)
 - a. Borosilicate glass
 - b. Lead glass
 - c. Soda glass
- ii) Draw a well labeled diagram of bomb calorimeter for determination of HCV. Also, write the formula involved in it. (2)