

P. Pages : 2

Time : Two Hours

**AW - 3540**

Max. Marks : 40

- Notes :
1. Due credit will be given to neatness and adequate dimensions.
 2. Assume suitable data wherever necessary.
 3. Diagrams and chemical equations should be given wherever necessary.
 4. Illustrate your answer necessary with the help of neat sketches.
 5. Discuss the reaction, mechanism wherever necessary.
 6. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) How will you determine 'C' and 'H' in the coal sample during ultimate analysis. 3
b) What do you mean by Boundary film lubrication? Discuss its mechanism. 4
c) Distinguish between octane number and cetane number. 2
d) A fuel has the following percentage composition by volume: 5
 $H_2 = 35\%$, $CH_4 = 35\%$, $C_2H_6 = 20\%$,
 $CO = 6\%$, $O_2 = 4\%$, calculate
Minimum air required for complete combustion of fuel. Calculate % of dry products by volume.
(Air contains 20% O_2 and 80% N_2 by volume).

OR

2. a) Explain the properties and functions of the lubricant required for the internal combustion engines and gears. 3
b) Define gross calorific value and net calorific value. Give the relation between them. 4
c) Give any four characteristics of an Ideal fuel. 2
d) Explain the following: 5
i) Viscosity and viscosity index
ii) Flash and Fire Point
3. a) Explain cationic mechanism of chain polymerisation. 3
b) What is an elastomer? Discuss drawbacks of natural rubber. 3
c) Give the preparation, properties and uses of the following: 5
i) Polyvinyl chloride ii) Butyl rubber
d) What do you mean Resin and Plastic? Give industrial applications of Plastic. 2

OR

4. a) Explain the classification of polymers on the basis of their structure with examples. 3
- b) Differentiate between thermoplastic and thermosetting resins. 3
- c) Give the preparation, properties and uses of following polymers: 5
i) Teflon ii) Bakelite
- d) Write the role of following ingredients in compounding of rubber. 2
i) Vulcanizer ii) Accelerators
5. a) What do you mean by 'lapse rate' and 'temperature inversion'? Write the major minor and trace components of atmosphere. 4
- b) What are the effects of 'CFC' on environment? How O_2 is formed and depleted in nature? 3
- c) Give the causes and effect of following toxic metals: 2
i) As and ii) Cr
- d) Explain the working of: 4
i) Fabric filter ii) Electrostatic precipitator

OR

6. a) What do you mean by air pollution? Give classification of air pollutants with suitable examples. 3
- b) What is acid rain? Discuss its causes and consequences. 3
- c) Explain Green house effect. 3
- d) Give a detailed account of the various environmental segments. 4
