



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
**UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY,**  
**JABI - ABUJA.**  
**FACULTY OF SCIENCES**  
**DEPARTMENT OF PURE AND APPLIED SCIENCE**  
**SECOND SEMESTER EXAMINATION...**

**COURSE CODE:** CHM 415  
**COURSE TITLE:** INDUSTRIAL CHEMICAL TECHNOLOGY II  
**CREDIT UNIT:** 2  
**TIME:** 2 HOURS  
**INSTRUCTION:** Answer question one and any other three questions.

**QUESTION ONE**

- 1ai. Define auto-thermal reforming 2 mks
- 1aii. State the three processes by which syngas is produced in gas industry. 3 mks
- 1bi What is the term “Partial oxidation” in gas industry? 2 mks
- 1bii Explain “full boiled process” of manufacturing soap 8 mks
- 1c List five steps needed for the manufacture of glass 5 mks
- 1d. Enumerate five important characteristics of any glass 5 mks

**QUESTION TWO**

- 2a. Explain how oil can be extracted with volatile solvent method and Cold fat extraction method. 8 mks
- 2b. Differentiate between hard and soft soap. 4 mks
- 2c. What causes rancidity in soap making? 3 mks

**QUESTION THREE**

- 3a. Write short notes on these raw materials used in the manufacture of vanishes
- i. Driers ii. Plasticizers iii. Solvents and thinner 8 mks

3b. Mention three major and minor ingredients respectively for making glass. 7 mks

#### QUESTION FOUR

4. Explain the followings:

- |      |                                      |       |
|------|--------------------------------------|-------|
| i.   | The wet process of cement production | 3 mks |
| ii.  | The dry process of cement production | 3 mks |
| iii. | Quick setting Portland cement        | 3 mks |
| iv.  | Super-sulphate cement                | 3 mks |
| v.   | Sulphate resisting Portland cement   | 3 mks |

#### QUESTION FIVE

5a. At what stage of ceramic manufacture does “Dehydroxylation occur? With the aid of chemical equation explain dehydroxylation. 6 mks

5b. Outline six (6) characteristics of glass. 6 mks

5c. Mention any three common type (group) of biomass you know. 3 mks