



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
2020_1 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

- 1a. Why is water gas often called 'blue gas'? (2 mks).
- 1bi. State the reaction involved in water-gas shift reaction. (2 mks)
- 1bii. What is the main use of water-gas shift reaction? (2 mks).
- 1c. State two major component elements of fossil fuels. (2 mks).
- 1d. What are the three divisions of biomass? (2 mks)
- 1e. Define the term lignin (2 mks).
- 1f. State four types of variable cost in industrial production (2 mks).
- 1g. Mention two uses of cod liver oil. (2 mks).
- 1h. State two common methods for the isolation of essential oils. (2 mks).
- 1i. Describe the *drying* step in the manufacture of cane sugar (2 mks).
- 1j. State two types of vanishes. (2 mks).
- 1k. State two advantages of plastics. (2 mks).
- 1L. What do you understand by Oil-well cements ? (1 mk).

QUESTION TWO

- 2a. Explain briefly, with the aid of a labelled diagram, the four periods involved in the manufacture of water gas. (7mks)
- 2bi. Explain briefly the term *carbureted water gas*. (2mks).
- 2bii. What are the chemical constituents of carbureted water gas? (2mks)
- 2biii. State the major uses of carbureted water gas. (2mks).
- 2c. List two main industrial methods of producing hydrogen. (2mks).

QUESTION THREE

- 3ai. List four major sources of water pollution. (2mks)
- 3a. Give reason why clean or unpolluted rain is weakly acidic (2mks)
- 3b. Explain briefly each of the following terms:
- (i) Biochemical oxygen demand (3mks)
 - (ii) Chemical oxygen demand (3mks)
- 3c. State two major sources of nuclear waste. (2mks)
- 3d. Explain the term *Green-house Effect*. (3mks)

QUESTION FOUR

- 4a. Explain briefly three major types of fixed costs in industrial production. (6 mks)
- 4b. State
- (i) Four factors increasing the technical risk of an industrial process. (4 mks)
 - (ii) three important questions for process evaluation. (3 mks)
- 4c. What is steam reforming? (2 mks)

QUESTION FIVE

- 5a. State two major disadvantages of plastics. (3mks)
- 5b. Explain briefly the difference between Thermosetting Thermoplastic plastics. (12mks)