



MUEO

MOI UNIVERSITY

OFFICE OF THE DEPUTY VICE CHANCELLOR
(ACADEMICS, RESEARCH & EXTENSION)

UNIVERSITY EXAMINATIONS

2016/2017 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER EXAMINATION

FOR THE DEGREE OF

BACHELOR OF ENGINEERING

IN

INDUSTRIAL AND TEXTILE ENGINEERING

COURSE CODE: MIT 232

COURSE TITLE: INDUSTRIAL CHEMISTRY

DATE: 8TH JUNE, 2017 **TIME:** 2.00 P.M. - 5.00 P.M.

INSTRUCTION TO CANDIDATES

- SEE INSIDE.

THIS PAPER CONSISTS OF (3) PRINTED PAGES

PLEASE TURN OVER

Instructions:

1. This paper contains seven questions, all carrying equal marks.
2. Attempt any five questions.
3. Do not write anything on the question paper.
4. Unauthorized electronic gadgets e.g. mobile phones are not allowed in the exam room.
5. Examination duration is 3 hours.

Question 1

- (a) Explain the following conditions in industrial water:
 - (i) Alkalinity. 2 marks
 - (ii) Acidity. 2 marks
- (b) Give the causes of water hardness. 2 marks
- (c) Illustrate the outcome of adherence to water quality in industry. 4 marks
- (d) An alkaline buffer and a few drops of Eriochrome Black T (the indicator) were added to 200 cm³ sample of water and a volume 3.5 cm³ of 0.10 mol dm⁻³ EDTA was used in titration. Find the concentration of calcium and magnesium ion in the water. 4 marks

Question 2

- (a) Mention the two water sources. 2 marks
- (b) Describe any two methods of water softening. 6 marks
- (c) Explain any six processes of water treatment for industrial use. 6 marks

Question 3

- (a) State the main problems caused by hard water inside a boiler system. 2 marks
- (b) Describe any five physical properties of ideal water. 5 marks
- (c) Distinguish between gross calorific value fuel and net calorific value of fuels. 2 marks
- (d) Outline the characteristics of a good fuel. 5 marks

Question 4

- (a) With reference to fuels, define:
 - (i) Cloud point. 2 marks
 - (ii) Pour point. 2 marks
 - (iii) Fire point. 2 marks
- (b) Explain any four types of coal and give their estimated carbon content. 8 marks

Question 5

- (a) Define cracking in Petroleum. 1 mark
- (b) Discuss the steps involved in refining crude oil. 6 marks
- (c) Classify gaseous fuels. 4 marks
- (d) Give the uses of liquefied Petroleum gas (LPG). 3 marks

Question 6

- (a) With reference to lubricants:
 - (i) Describe viscosity 4 marks
 - (ii) List three types and their uses. 3 marks
 - (iii) Explain any seven of their properties. 7 marks

Question 7

- (a) Explain nonionic surfactants.
- (b) Describe the washing activity of a surfactant.
- (c) Classify soils/ stains as applied in textiles.

2 marks

4 marks

8 marks