



FEDERAL UNIVERSITY OF  
TECHNOLOGY, MINNA

DEPARTMENT OF

CHEMISTRY

SECOND SEMESTER EXAMINATION 2021/2022  
ACADEMIC SESSION

COURSE CODE: CHM524 COURSE UNIT: 3

COURSE TITLE: SELECTED TOPICS IN INDUSTRIAL  
CHEMISTRY

INSTRUCTION: ANSWER ANY FOUR (4) QUESTIONS

TIME: 2 HOURS 30 MINUTES

---

**Q1(a)** Starting with aniline, outline the various steps involved in the preparation of

methyl orange dye. (3 Marks)

(b) Give reasons for the suitability of the following alloys in their application.

(i) Stainless or Galvanized steel (ii) Aluminium and Magnesium alloy

(iii) Copper – Nickel alloys (iv) Nickel based superalloys

(v) Single Crystals alloy  
(5 Marks)

(c) Differentiate between atomic and nanostructure.  
(5 Marks)

(d) Briefly explain soft and hard soap.  
(2 Marks)

**Q2** (a) Enumerate three basic characteristics of food that food analysts are interested in. Justify the importance of these characteristics to the food processors and consumers (6 marks)

(b). Outline the three basic steps a quality control chemist must consider for optimum process

condition in a food processing industry and justify the importance of each step (6 marks)

(c). Give three mandatory standard recommended by government regulatory agencies for any processed food and food products. (3 marks)

**Q3** (a) Explain the following;

(i) Acid dyes                      (ii) Basic dyes                      (iii) Food dyes  
(6 Marks)

(b) Discuss the extractive metallurgy process.  
(3 Marks)

(c) Briefly explain the following as applied to industrial metallurgy process.

(i) Annealing                      (ii) Quenching                      (iii) Tempering.  
(5 Marks)

(d) Write the general equation for saponification process using NaOH  
(1Mark)

**Q4**(a) Describe the chemistry of glycogen in a slaughtered meat animal and state the significant of the reaction on the safety of the meat animal to the consumer  
(5 marks)

(b) Explain the term 'Protein Denaturation'  
(4 marks)

(c) State the significance of the analysis of the following in foods

i. Iodine value                      ii. Peroxide value                      iii. Acid value  
(6 marks)

**Q5** (a) Write short note on the following.

(i) Metal alloys (ii) Semiconductors  
(5 Marks)

(b) Give four examples of pigment dyes  
(2 Marks)

(c) State two food regulatory agencies in Nigeria and state three roles each plays in ensuring that the standard of processed foods are upheld by food processing industries.

(4 marks)

(d) Outline and explain the basic factors that determine the type and quality of milk.. What are those criteria that affect the stability of caesin micelle  
(4 marks)