**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**DEPARTMENT OF CHEMISRY**

**2022_1 EXAMINATION**

*COURSE CODE: CHM 304*                                    *CREDIT UNIT: 2*
**COURSE TITLE:** COLOUR CHEMISTRY AND TECHNOLOGY        **TIME:** 2 HRS
**INSTRUCTION:** *Answer question 1 and any other 2 questions*

Questions 1
a.      How would you describe dyes?                                                   (4 mark)
b.      State the basic difference between additive and subtractive primary colours. (9 mark)
c.      What are colour modifiers?                                                     (4 marks)
d.      Explain the effects of successive addition of methyl groups to Pararosanil dye. (4 marks)
e.      Outline any four fundamental technical features of high temperature high pressure soft
        flow dyeing machine.  (4 marks)
f.      State any five factors that affect the selection of pigments (5 marks)
                **[Total marks =======30 marks]**

Question 2
   (a) (i) List any two types of pigments you know                                     (3 Marks)
     (ii) Make a distinction between natural and synthetic organic pigments           (4 Marks)
   (b) What are the limitations of natural pigments?                                   (6 Marks)
   (c) Outline any three important characteristics of organic pigments                (3 Marks)
   (d) With four reasons discuss why inorganic pigments are more preferred than their organic
      counterparts.                                                                    (4 Marks)
                **[Total marks =======20 marks]**


*Question 3*

(3a) State four classes of fibres based on their origin and two natural sources of fibres
                                                                                       (4 Marks)

b) Write short notes on the following:
        i) Vat Dyes                                                                    (4 ½ marks)
        ii) Reactive dyes                                                              (4 ½ marks)
        iii) Sulphur dyes                                                              (4 marks)
 c) Explain briefly three dyeing patterns                                             (3 Marks)
                **(Total marks ============ 20 marks)**

*Question 4*

(a) Discuss the merits of Overflow Dyeing Machine. (10 marks)
(b) Explain briefly the dyeing process of leather (10 marks)
                **(Total marks =========== 20 marks)**

*Question* 5
(a) The International Trade Commission classified dyes in to twelve (12) types. Discuss (12 marks)
**5b.** With the aid of a structure, show Urethane linkage (3 marks)
5c)  Give a definitive structure of a cationic direct dye. (3 marks)
5d)  Outline the primary colours that would be required to produce the following secondary colours:
 (i)   Violet  (1 mark)
 (ii)  Black (1 mark)
                **(Total marks =========== 20 marks)**