

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN INDUSTRIAL CHEMISTRY

CHIN 447: DYES, PIGMENTS AND FIBRES

STREAMS: BSC (INDUSTRIAL CHEMISTRY)

TIME: 2 HOURS

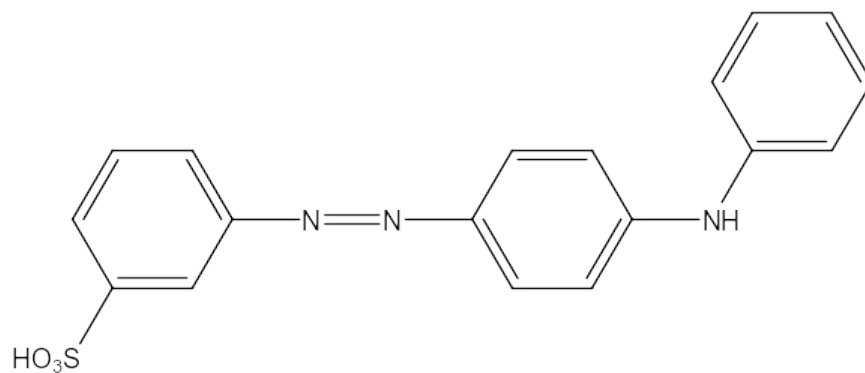
DAY/DATE: THURSDAY 23/09/2021

5.00 P.M – 7.00 P.M.

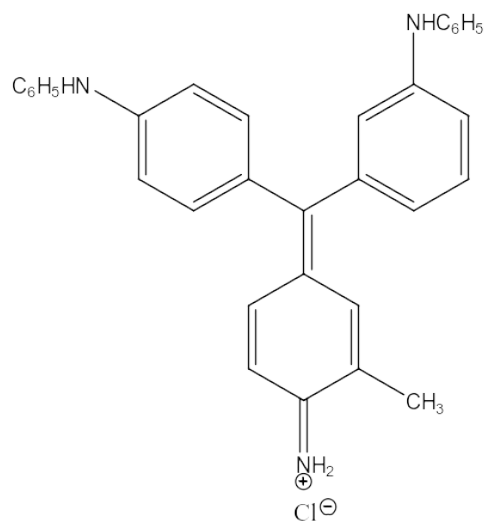
INSTRUCTIONSAnswer question **One** (Compulsory) and any other **Two** questions**QUESTION ONE [30 MARKS]**

(a) Discuss two methods of classifying dyes (4 marks)

(b) Metanil Yellow (Acid Yellow 36) is an azo dye that is extensively used as a colorant in the textile industries. Describe, with the aid of relevant equations, the industrial manufacture of Metanil Yellow starting with nitrobenzene (4 marks)

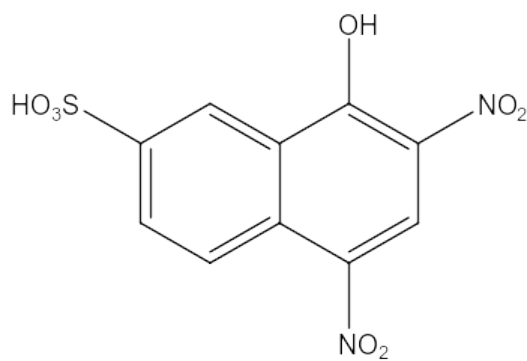


(c) Aniline blue (diphenyl rosaniline) is a triphenylmethane dye that is used to directly dye wool and silk. Describe, with the aid of relevant equations, the industrial manufacture of aniline blue starting with aniline (6 marks)



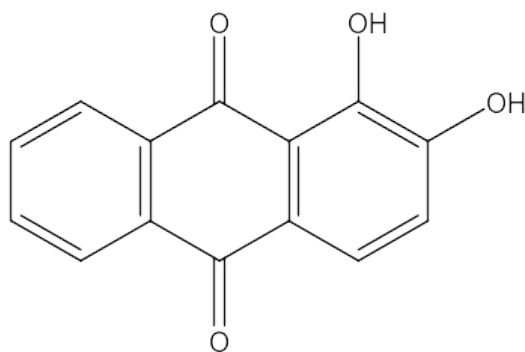
Aniline Blue

(d) Describe, with the aid of relevant equations, the industrial manufacture of Naphthol Yellow S **(3 marks)**



Naphthol Yellow S

(e) Describe the industrial manufacture of alizarin **(6 marks)**



Alizarin

(f) Discuss the industrial production of polyester fibre **(7 marks)**

QUESTION TWO [20 MARKS]

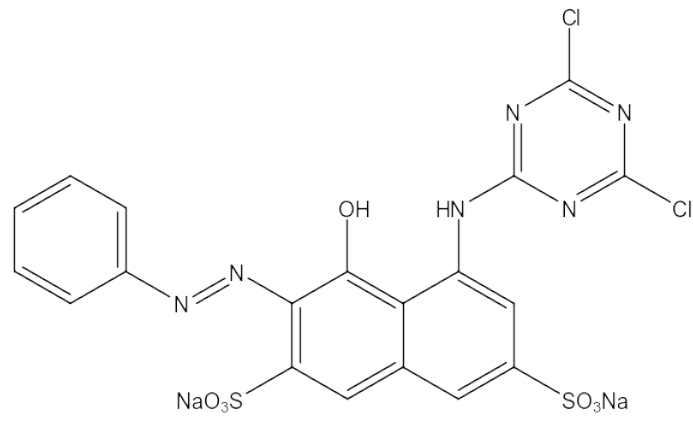
- (a) State three properties of titanium dioxide that makes it the most important white pigment
(3 marks)
- (b) Discuss the production of titanium dioxide pigments using the sulphate process (9 marks)
- (c) Indigo is extensively used to dye denim blue:
- (i) Describe one method for industrial manufacture of indigo (6 marks)
- (ii) How is indigo applied to fabrics? (2 marks)

QUESTION THREE [20 MARKS]

- (a) Discuss the industrial production of lithopone, a white pigment that used in coatings and plastics
(8 marks)
- (b) State the roles of the following constituents in an oil paint (12 marks)
- (a) base (b) extender (c) carrier (d) drier (e) solvent (f) coloring pigment

QUESTION FOUR [20 MARKS]

- (a) Discuss the industrial manufacture of cadmium pigments using the precipitation process
(6 marks)
- (b) Describe the industrial production of Prussian blue (4 marks)
- (c) State six characteristics of an ideal paint (3 marks)
- (d) Describe, with the aid of relevant equations, the industrial manufacture of Procion Red dye
(7 marks)



Procion Red dye
