Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech/(APM-NEW)/SEM-4/APM-401/2013

2013

BASICS OF CHEMICAL PROCESSING OF TEXTILES

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10

   i) Degree of cross linking in the polymer system of a fibre significantly influences that fibre's

      a) T_g

      b) T_m

      c) Elastic-plastic nature and tenacity

      d) Crystallinity.

   ii) Polyester produced by micro-organisms is

      a) Polyethylene terephthalate

      b) Polyhydroxy alkanoate

      c) Polyhydroxy lactanoate

      d) Polyhydroxy caprolactone.

iii) Auxochrome tends to be

a) Polar b) Non-polar

c) Inert d) Hydrophilic.

iv) Molecules of fluorescent brighteners contain

a) Covalent bonds

b) Conjugated bonds

c) Hydrogen bonds

d) Co-ordinate bonds.

v) Fabrics having wavy selvedges can be signed by

a) Roller singeing machine

b) Plate singeing machine

c) Gas singeing machine

d) Diffused infrared radiations.

vi) The P/C fabric to be desized is impregnated with a solution of a desizing enzyme kept at 60°-70°C allowing at least

a) two dips in the liquor

b) three dips in the liquor

c) four dips in the liquor

d) five dips in the liquor.

vii) The M : L in kier is usually

a) 1 : 10 b) 1 : 20

c) 1 : 40 d) 1 : 5.

viii) In case of P/C blends the fabric is scoured continuously in

a) Vaporlok type machine

b) Winch machine

c) Jigger machine

d) Jet dyeing machine.

ix) If 3% shade is required to be dyed on 4 grams of cotton yarn using a solution of 1 gram of dye in 200 ml water (*i.e.*, 0·5 gram in 100 ml water), the stock dye solution required would be

a) 26 ml b) 24 ml

c) 28 ml d) 34 ml.

x) Remazol dyes react with cellulose by the mechanism of

a) Nucleophilic addition

b) SN1

c) SN2

d) Summarmann substitution.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Explain why —

   a) nylon is flexible but polyester is rigid.

   b) cotton is highly crystalline in nature but still it is used as a good summer garment. 2 + 3

3. a) What do you understand by the terms 'Auxochrome' and 'Chromophore' ?

   b) Why is a pinch of soda ash added during pasting of direct dye ?

   c) How is the efficiency of mercerization determined ? 1 + 2 + 2

4. a) Why is soaping essential in case of sulphur dyeing ?

   b) Nylon fibre is particularly susceptible of uneven dyeing. Why ?

   c) Write the time-temperature profile of cold brand reactive dye. 1 + 2 + 2

5. a) What is the ideal process sequence used in textile wet processing ?

   b) Why is there a difference between scouring of cotton and wool ?

   c) Write the stepwise hydrolysis of starch. 2 + 2 + 1

6. a) Both wool and silk and protein fibres but in what respect are they different from each other ? Mention a confirmative test to identify wool from silk.

   b) Differentiate between dyeing and printing. 3 + 2

7. a) Name the basic styles of printing and differentiate between them.

   b) What is a motif ?

   c) Write the difference between a dyestuff and a pigment. 2 + 1 + 1

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. a) What is the objective of singeing ?

   b) Describe with a neat sketch the different types of singeing machines with relative merits and demerits. 2 + 13

9. a) Why is desizing essential ? What kind of material is present in the size ? Name different methods of desizing. Describe the hydrolytic desizing process with relative merits and demerits. 2 + 1 + 2 + 5

   b) What is enzyme ? Write the names of different enzymes of different sources mentioning concentration, pH and temperature for their specific use. 1 + 4

10. a) What are the changes taking place during scouring ? Describe the scouring of wool. 2 + 4

    b) What is degumming ? What is the objective of bleaching ? Name different types of bleaching methods. Write the reactions involved in H_2O_2 bleaching. 1 + 1 + 1 + 2

    c) Describe with a neat sketch a continuous scouring and bleaching process of 100% cotton with merits and demerits. 4

11. a) Why are after treatments of direct dye essential ? Name the after treatments of direct dyes. 2

    b) Differentiate between acrylic and modacrylic fibres. 2

    c) Classify reactive dyes and also write the mechanism of fixation. 4

d) Write the temperature and chemical concentration chart according to the types of vat dyes. 3

e) How is vat dye applied on the cotton fabric ? 4

12. a) Write the structure of nylon polymer. What are the factors that characterizes nylon fibre ? Write the chemical equation representing dyeing of nylon. How the uptake of acid dye during dyeing of nylon varies with the variation of pH ? Name the types of leveling agents used during acid dyeing of nylon and mention at least one example of each. 1 + 1 + 2 + 2 + 2

b) What are the effects generally observed during or after mercerization ? Differentiate between liquid ammonia and NaOH mercerization. 2 + 2

c) How is sulphur dye applied to cotton fabric ? 3

13. a) Why is polyester normally dyed with only disperse dyes ? Name different methods of dyeing of polyester. What is a carrier ? Why is it used in dyeing of polyester ? Describe a suitable method of dyeing of PET. 1 + 2 + 1 + 1 + 3

b) What is mordant ? Why is it essential ? Name a mordant and show how it increases the affinity of basic dye towards cotton fibre. 1 + 2 + 4