

CS/B.Tech/(TT-NEW)/SEM-4/TT-402/2013

2013

FABRIC FORMATION - I

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 any *ten* of the following :

10X1 = 10

i) The yarn tension in weft knitting is critical and the most common taper angle of cones used in practice is

a) 2° 30'

b) 3° 30'

c) 4° 20'

d) 5° 57'

ii) Stepped precision winding is a

a) combination winding

b) random winding

c) precision winding

d) sectional winding.

iii) How long will take for a winder to wind 3 lb of 20 Ne

yarn if the winder operates at 700 yd/min with

efficiency 87% ?

a) 86.2 min

b) 82.8 min

c) 83.2 min

d) 85.6 min.

iv) To achieve the incline or wedge in section warping, it is necessary for either the mill or the head stock to move sideways. The rate at which this movement occurs is dependent on the angle of incline (θ), the thread spacing and the depth of yarn (D) to be placed on to the mill. Hence

a) Total traverse per section = $2 D/\tan \theta$

b) Total traverse per section = $D/2\tan \theta$

c) Total traverse per section = $D/\tan \theta$

d) Total traverse per section = $D \tan \theta$

v) The full diameter of a pirn wound from cotton yarn is 32 mm and the bare-pirn diameter at the nose of the chase is 14 mm. The chase angle when the traverse is 34 mm, is

a) $14^\circ 49'$

b) $14^\circ 10'$

c) $16^\circ 49'$

d) $13^\circ 39'$.

vi) For direct warping a major problem in creeling is the amount of time required at the end of a run regarding replenishment and in all the creel systems available the most efficient one for short runs is

a) Duplicate creel

b) Magazine creel

c) Truck creel

d) Reversible creel.

vii) High pressure squeezing in conjunction with high size concentration

- a) increase dry pick-up
 - b) lay the hairs more closely to the body of yarn
 - c) lower energy consumption
 - d) improve the yarn strength.
- viii) The weight of the size paste on 100 kg of bone dry yarn

at the nip of squeeze rollers can be defined as

- a) Size concentration
- b) Take-up
- c) Size percentage
- d) % cover.

ix) Use of the adhesive agent in the size paste

- a) makes the yarn pliable
- b) increases the strength of yarn
- c) reduces flexibility of yarn.

x) Recently pre-wet sizing technology has been developed.

The main advantage of this process can be said to be

- a) reduce in size add-on and hairiness, improved size adhesion and increased abrasion resistance.
- b) more size add-on as hot water treatment is done before entering the size bath.
- c) less liquor pick-up, less liquor concentration and higher modularity
- d) High liquor pick-up, high liquor concentration and saving in energy.

xi) The number of kg of paste on 100 kg of oven dry yarn as it leaves the tip of the squeeze rollers can be defined

as

- a) % size
- b) % pick-up

- c) % concentration
 - d) % cover.
- xii) Lifting plan is the combination of
- a) ends and picks
 - b) ends and healds
 - c) picks and healds.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3X5 = 15

2. Coil angle of cone from base to tip is not constant. Why ?
How is the coil angle of cone determined ?
3. Calculate the time for winding 60,000 lbs of 54s cotton yarn on 500 numbers high speed winding drums, each of which has calculated rate of winding of 630 yds/min (efficiency = 90%).
4. Creel capacity of direct warping machine is 700 and the running speed is 800 m/min with 62% efficiency. For 30 tex cotton yarn find the production per 8 hour shift.
5. Photoelectric type yarn clearers are having edge over capacitor type clearer. Why ?
6. Define the following :
 - a) Coil angle
 - b) 'Wind' of a pirn
 - c) Revolution gain
 - d) Magazine creel
 - e) Repeat of weave.
7. A 20 tex cotton warp containing 5000 ends has 10% size added. In each kg of size paste, there are 50 g of solid ingredients (oven dry mass). The maximum drying capacity

of the drying zone is 500 kg/h. Calculate the maximum running speed which ensures that the regain of the sized yarn on the loom beam is 10%.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3X15 = 45

8. a) Discuss about the disadvantages of constant speed spindle driven winder. 5

b) Making of larger diameter package on constant speed spindle driven winder is limited. Explain. 3

c) Calculate the angle of wind on a 10 cm diameter cheese being wound on a precision winder with traverse of 10 cm and traverse ratio of 2.2. 4

d) Cross wound package is a self supported package. Explain. 3

9. a) Derive the relation between chase angle (θ), empty diameter (d), maximum diameter and chase length of a pirn.

Determine the chase angle of the pirn for the following data :

i) Nose diameter = 14 mm
ii) Maximum diameter = 32 mm
iii) Traverse length = 34 mm. 4 + 3

b) Why is bunching motion incorporated in pirn winding machine ? 3

c) Explain the mechanism of winding of yarn on with base and without base pirn with suitable diagram. 5

10. a) Under what circumstances would you suggest the use of sectional warping ? 5

b) Prove that total volume of yarn on section warper is

$$V = 3.14 n s l \sin^2 (\alpha + \frac{d}{2D})$$

where

d = barrel diameter

D = diameter of full barrel

α = angle of inclination / cone angle

n = number of section and width of each is s

l = cone oblique length. 5

c) In a sectional warping machine the taper angle (α) is

13.6° . The warping drum diameter is 70 cm. The

number of sections on the beam is 10 with each of

width of 18 cm. Cone oblique length is 80 cm.

Determine the total volume of yarn in m^3 . 5

11. a) Justify the object of warping process. 3

b) Classify the creels used in warping. 5

c) What will happen if the length measuring motion on a beam warping machine is not reliable ? 2

d) A full beam of 30 tex cotton yarn is 2400 m in length and contains 420 ends. At a warping speed (exclusive of stoppages) of 600 m/min the end breakage rate is 0.5 per 1000 ends per 100 m warped. The stoppage time for repairing break is 0.9 min per break. Each beam change takes 5 min and every beam plus creel change takes 15 mins. If the supply package contains sufficient yarn for 3 beams, determine running efficiency and weight of each package. 5

12. Why is pirn winding tension so important ? Show only with sketches the features of three basic type of pirns in common use. Describe with a neat schematic diagram the principle of

pirn winding on a modern machine.

2 + 3 + 10

13. What is Sizing ? What are the purposes of Sizing ? Discuss

'Sizing-Weaving Curve' of 'Size Take-up%' & weaving

efficiency'. The Weight of sized yarn on a beam was found to

be 82.5 lbs. The beam contains 1050 yds of warp whose

count before sizing was 50s Ne, If the No. of ends in warp is

3000, calculate the following :

a) the weight of size on the yarn

b) The % of size put on the yarn.

1 + 4 + 5 + 5

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