

2013

YARN FORMATION – III

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

(Objective Type Questions)

1. Answer the following questions : $10 \times 1 = 10$

A. Choose the correct alternatives for the following :

$4 \times 1 = 4$

i) Which one of the following types does not use roller drafting system ?

- a) Rotor spinning
- b) Air-jet spinning
- c) Electrostatic spinning
- d) Dref-III friction spinning.

ii) Which of the following is not false twisted element ?

- a) Navel in rotor
- b) Friction drums in Dref-III
- c) 2nd twist nozzle in MJS
- d) Parallelisator in Dref-II.

iii) Hollow spindle spinning is used to produce

- a) self twist yarn b) twistless yarn
- c) wrap spun yarn d) siro yarn.

iv) Amount of draft in air-jet spinning can be reached

up to

a) 200

b) 100

c) 50

d) 25.

B) Match the following elements in Group I and Group II

and write the correct combination : 6

GROUP - I

GROUP - II

v. Rotor spun yarn

A. Wrapped and twisted
structure by false
twisting method

vi. Self-twisted yarn

B. Twisted by real
means along with
wrapper fibre

vii. Air-jet spun yarn

C. Alternative twisted
structure by false
twisting

viii. Wrapped yarn

D. Twisted structure
having self plying of
fibres

ix Sirospun yarn

E. Bonded yarn
structure having
false type of twisting

x. Solospun yarn

F. Twisted uniform yarn
structure with less
hairiness

xi. Compact yarn

G. False type of twisting
by hollow spindle
wrapping

xii. Bobtex yarn H. S or Z twisted with
double strand ply
twisting.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. “One approach regarding development of modern spinning has been done by existing ring-spinning modification, although there are several new spinning systems gaining commercial acceptance widely by another approach.” Justify this statement with illustration.
3. Derive an equation for back-doubling in rotor spinning and state the significance of back-doubling. $4 + 1$
4. Both the structure, of Dref III and air-jet spun yarn have core sheath type but the former is producing coarser yarn and the later finer yarn. Why ?
5. Differentiate between Siro and Solo yarns and mention their application area. $4 + 1$
6. State the principle and potential of vortex spinning regarding yarn formation.
7. Why is air-jet spun yarn producing stiffer yarn compared to ring spun yarn ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. a) “Open-end spun yarns (except rotor yarn) can be made by frictional means as well as by pneumatic means.”
Illustrate the important features of both types of spinning systems along with examples of spinning

- machines. Why cotton fibres cannot be spun in pneumatic system ? 8 + 2
- b) Discuss the similarities and differences between Master spinners and Dref-II. 5
9. a) Explain why tangential feed is better than radial feed in rotor spinning. 5
- b) A rotor is rotating at 80,000 rpm to produce 15s yarn of 3·8 TM from a 2nd passage drawing sliver of 0·12 hank. Find out feed roller speed, rpm of gyrating yarn inside, the rotor no. of back-doubling, fibre flux at collection groove in rotor, draft between feed to rotor groove and production (in kg/hr) of the machine.
[Rotor dia = 50 mm, No. of spinboxes = 250, Fibre decitex = 3·2] 10
10. a) Discuss different rotor bearing systems and explain which one is suitable for new generation high speed rotor. 7
- b) Explain the rotor yarn structure and identify the different class of fibres available in this structure. 8
11. a) Different fibre-feed mechanisms have been used by manufacturers of friction spinning machines. Illustrate these mechanisms in context with different models of friction spinning machines. How do these mechanisms influence the yarn structure ? 5 + 4
- b) Discuss the merits and demerits of friction spinning. 6
12. a) Explain the self twist spinning principle to produce two-fold yarn and show different twist zones in a self twisted yarn. 8
- b) Mention various feed material requirements of air-jet

- spinning system. 4
- c) Why does the 2nd nozzle of MJS spinning give higher rotation compared to 1st nozzle ? 3
13. a) Discuss the mechanism of cluster spinning. 6
- b) Classify different types of twistless spinning systems and explain their properties. 3 + 6

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