Roll No…….. **Total No. of Printed Pages: [02]**

Total No. of Questions: [09]

B. Tech. (Textile Engg.) (Semester – 4th)

YARN MANUFACTURING – II

Subject Code: BTEXS1-402

Paper ID: [18112616]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) State the parameters to be tested for assessment of the performance of roving frame.
b) Give the influence of forward feed and backward feed on combing quality.
c) Give a comparison between dual speed drive and VPS drive as used in modern ring frames.
d) Define Fractionation efficiency of a comber.
e) State the general speed in rpm of the opening roller in rotor spinning machine.
f) State the problems of air jet spun yarns and that of the air jet spinning system.
g) Calculate the speed of the drafting unit-I and drafting unit-II of a Dref-3 friction spinning machine with the following particulars:
Count to be spun=10^s N_e, sliver weight = 2.62 g/m, delivery speed = 110 m/min, Core sheath ratio = 70:30 and drum speed = 3000 rpm.
h) A comber producing a sliver of 3.55 g/m at a rate of 170 m/min, while extracting noil at the rate of 140 g/min. Calculate the noil %.
i) State the factors to be considered for the design of cone drum in speed frame.
j) Compare 3/3 and 4/4 drafting systems in regards to their advantages and disadvantages.

Section – B **(5 marks each)**

Q2. A roving frame with all the drafting rollers of same diameter has the following processing conditions:
Feed sliver count $0.15^s N_e$, roving diameter 1.1 mm, draft=10.5, roving twist multiplier 1.20, back drafting roller speed = 22 rpm, bottom roller diameter=25.4 mm. Then calculate
i) Spindle speed in rpm and
ii) Production rate per spindle in Kg/hr.
Assume a utilization percentage of 85%.

Q3. The comber technical data are given below:
Lap feed/cycle= 6mm, noil extraction = 20%, number of heads = 6, linear density of lap = 60 Ktex, nips/min = 250, efficiency = 90%.
Calculate (i) Weight of lap fed per hour and (ii) weight of sliver produced per hour.

Q4. With the help of a neat sketch, describe the twist insertion principle in rotor spinning system. Also discuss the effect of rotor speed and rotor groove geometry on the properties of the yarn.

Q5. With the help of a suitable diagram discuss the building mechanism of a speed frame.

Q6. Arrange, in order of importance, the fibre quality parameters required for air jet spinning machine. Discuss the ways to minimize the problems of air jet spun yarn.

Section – C **(10 marks each)**

Q7. a) Give a comparative assessment of the structures of ring spun yarn and rotor spun yarn and hence compare their mechanical properties.

b) Give an assessment of end breakage in ring spinning and suggest the remedial measures.

Q8. a) A ring frame produces 80s Ne combed yarn. The spindle speed is 14500 rpm, TM = 3.8, ring diameter = $1\frac{7}{8}$ inch, bare bobbin diameter = $1\frac{1}{16}$ inch, full bobbin diameter = $1\frac{3}{4}$ inch. The working efficiency of the machine is 91% and hank of the roving fed, change pinion and twist wheel used are 1.5 hank 32T and 40T respectively. Find the production, the traveler speed, draft constant and the twist constant of the machine. Also find the angle of pull.

b) Discuss the role of yarn delivery speed, friction ratio and drum speed on quality of friction spun yarn. Also define friction ratio.

Q9. a) Two rovings with a CV of 8% each are fed into a spinning zone, and if the spinning unit adds 8% CV, then calculate the CV of the output yarn.

b) Mentioning the importance, write a short note on spinning geometry in ring spinning and compare it with that in compact spinning.