

Major Exam
TX L222 Yarn Manufacture II


Date: 21.11.2023

Total Marks: 40

Attempt all the questions. Q. No. 1-13 has 2 marks each, Q. No. 14 has 4 marks and Q. No. 15 and 16 have 5 marks each. Give explanations and show calculations where asked. Write brief and to the point answers.

1. Explain why the boundary length for noil extraction in a rectilinear cotton comber in backward feeding is higher than the forward feeding.
2. What is the basic difference in the principle of formation of a conical package in roving and ring frame? Why the thickness of deposited yarn layers decreased during cop-building?
3. In ring spinning, among ring and traveller, which has the higher hardness and why?
4. Explain why a heavy traveller is preferable as compared to a lighter traveller if it is permitted to use in ring spinning.

5. In ring spinning, how the winding condition is maintained? What is the effect of traveller speed variation on yarn twist?
6. Why very high draft is required for open end spinning? How this high draft can be achieved?
7. Indicate which yarn spinning technology among rotor and air-jet spinning is most suitable for producing the following types of yarns and explain why:
 - (a) Smooth and lustrous 5 tex yarns made from cotton/polyester blend
 - (b) Yarns used for denim fabrics
8. Arrange the tenacity values of a ring, rotor and air-jet spun yarn in increasing order. Explain the reason.
9. Explain why a rotor-spun yarn is more even as compared to a ring spun yarn?
10. Among ring and rotor yarns, which show superior strength under rubbing and why?

11. What type of twisting mechanism (true or false or both) works in rotor spinning? Explain
12. In a ring frame, the winding tension is 30 cN, the frictional resistance on the traveller is 22.5 cN, what will be the frictional co-efficient when the bobbin to ring diameter ratio is 3:4. Show step by step calculations.
13. A traveller is running at 30 m/s on a ring diameter of 5 cm at 11,500 rpm. The weight of the traveller is 90 mg. The traveller CG is at a distance of 3 mm from inside ring diameter. How much centrifugal force will be exerted on the ring by the traveller? Show the calculations.
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14. Derive mathematical expressions to prove the following:
- During bobbin building in a roving frame, after deposition of each layer, the bobbin speed needs to be reduced linearly.
 - The winding tension in a ring frame varies linearly with the traveller weight.
15. A traveller slides at 25 m/s at 3 cm bobbin diameter on a 50 mm diameter ring. What is the spindle speed (rpm)? [Given: The full roving bobbin of 1.5 kg exhausts in 60 hours of continuous running of ring frame, Roving bar $k = 1.0$ Ne, Break draft = 1.10, Assume there is no invisible loss of fibres and the ring frame is running at 100% efficiency, Drafting system- 3 roller double apron type with main draft of 25].
16. A ring frame with 1000 spindles is producing cotton yarns of 20 twist/inch (after cone winding) with 5.0 twist multiplier (TM). If the bobbin speed is 31.4 m/s at a bobbin diameter of 3 cm and the running efficiency of the machine is 90%, what will be the productivity of the machine (kg/hour)?

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