1. **What is combing?**

   Ans: Comber is a process by which quantity of short fibers and remnant fragments of impurities present in a carded or drawn sliver are minimized to give a clean sliver, having more of a rectangular staple diagram, with the vast majority of the constituent fibers in a straightened and parallel state.

2. **How does combing affect yarn strength, evenness and imperfections?**

   Ans: Combing improves the yarn strength, evenness and decreases the imperfections due to removal of short fibres and making the fibres more parallel. The percentage improvement in these properties depend upon the amount of noil extracted. The percentage improvement is greater with removal of higher amount of noil.

3. **What are the objectives of combing?**

   Ans:
   - Removal of short fibers (pre-determined quantity)
   - Removal of remaining impurities
   - Removal of neps and slubs
   - Straightening and parallelization of the long fibers which are retained
   - Formation of slivers having maximum possible evenness
   - Elimination of short fibers improves the staple length and also affects the fineness of raw material.

4. **What will happen if carded material is presented as such to comber?**

   Ans: Majority of the fibre hooks in a carded sliver are trailing. Hooks can be straightened out by comber needles provided they are presented in leading position. If the trailing hooks are presented as such, they behave like short fibres and escape into noil.
5. How we can make majority hooks (trailing) from card sliver to present as leading hooks to comber?

Ans: In order to make the major hooks take the leading position, there should be even passages or even reversals between the card and the comber.

6. For good quality combing, what are the requirements should the feed lap meet?

Ans:
- The condition of fibres in terms of orientation and parallelization as they are feed to the combing head is a very critical parameter which decides the combing performance. If the fibres are more parallel and oriented parallel to the length of the lap, it is better in terms of combing performance.
- The thickness of the lap is important in the sense that the combing needles should be able to penetrate into the thickness of the lap. If the lap is too thick, the fibres present at the bottom of the lap will not get combed properly. This will also put too much stress on the combing needles. If the lap is too thin, then the production rate will suffer.
- The lap should be even across the width as well as along the length. If it is not even across the width, then the lap is not going to be held tightly at places across the width, which will result in pulling out of the fibres in lumps and good fibres may end up in going with the noil.
- Combing operation removes the leading hooks present in the feed lap preferentially. So, there should be even number of processes between the card and the comber.

7. What is backward or reverse feed?

Ans: If the feeding takes place when the nippers are going backwards, then it is called as backward or reverse feed.

8. What do you mean by noil in comber?

Ans: It represents the amount of short fibres removed by the combing process.

\[
\text{Noil(\%)} = \frac{\text{Mass of noil \times 100}}{\text{Mass of (noil + combed sliver)}}
\]
9. How are the neps removed by comber?

Ans: In the combing process, neps get either removed as noil or straightened due to the action of the combing needles or inter fibre rubbing and sliding.

10. What is detachment setting? How does the noil extraction change with this setting?

Ans: This refers to the distance between the clamping line of the nippers and the nip line of the detaching rollers when these parts are at their closest spacing. The detachment setting provides the chief means for influencing the level of noil elimination. Wide detachment setting results in a high level of noil elimination; a closer setting is associated with a lower noil level.

11. What do you mean by symmetric and asymmetric web condensation methods?

Ans: If the combed web is condensed at the central line of the combed web, then it is called as symmetric web condensation. This kind of condensation generates more short term irregularities. In contrary to this, if the condensation point is not in the central line of the web and lies on one side or away from the central line then it is called as asymmetric web condensation. In this case, there is chance for reduction in the irregularity of the fibre web as it condenses into the sliver due the possibility of overlapping of the thick and thin places in the web.

12. How piecing irregularity is generated in combing machine?

Ans: After combing of the fringe, the detaching rollers draw some of the combed feedstock out of the sheet, protruding from the nippers. This produces a tuft with a length dependent upon the staple length, but lacking any internal coherence. The sliver produced in this way has wave-like structure, i.e. it exhibits periodic thin and thick places.
Roving FAQ's

1. What is the need for roving frame in the ring spinning system?
   Ans: In ring spinning system, conversion of sliver into yarn through a single step has not succeeded since the total draft needed is in the range 300-500 which is very difficult to apply on sliver in a single step and obtain good quality yarn. Sliver cans occupy large space in comparison to the space of one spinning position of ring spinning frame, so there is need to have finer strand wound on smaller packages, which the roving operation satisfy. Sliver is a thick, untwisted strand that will lead to more hairs and fly while converting it directly to yarn when high draft is applied. In contrary, rovings are finer and twisted so the chances for generation of hairs and fly are less with roving operation.

2. What are the objectives of the roving operation?
   Ans:
   - Attenuation of the sliver
   - Protective twist insertion.
   - Winding the roving on a suitable package.
   - Conversion of sliver to roving

3. What is the difference between the flyer lead and bobbin lead method of roving winding?
   Ans:  
   In flyer Lead, flyer surface speed is faster and flyer winds the roving on the bobbins surface
   In Bobbin Lead, bobbins surface speed is faster and bobbin winds the roving onto itself

4. Why bobbin lead method of roving winding is preferable than the flyer lead method for cotton?
   Ans: With bobbin lead, in case of roving break, the direction of roving on the bobbins provides stable outer layer. The drive to the spindle is shortest hence it starts faster than the bobbins. This leads to more roving breaks in flyer lead while starting. For cotton system, because of the advantages of bobbin lead method and the difficulties associated with flyer lead method, the bobbin lead method is always used.

5. What are the functions of the builder motion in a roving machine?
   Ans:
   - The rotational rate of the bobbin should be reduced for layer formation
   - Shorten the lift after each layer to form tapered ends on the bobbin
   - Reverse the direction of movement of the bobbin rail after each layer formation
   - The speed of the movement of the bobbin rail should be reduced after formation of every layer, as it will take more time to lay one coil as the bobbin builds up.
6. What are the differences in spinning conditions between front and back rows of spindles?

Ans:
- The angle of approach of the roving to the flyer top is different for the two rows. This will create different rolling conditions at the entry point of the roving to the flyer top.
- Both rows of spindles will have different spinning triangles
- Difference in the unsupported lengths, i.e the lengths between the drafting arrangement and the flyer top.
- Difference also occurs in twisting of roving which leads to variation in fineness between the front and rear ends.

7. What is the purpose in going for top mounted flyers?

Ans: Top mounted flyer allows automation of the doffing operation. The flyer is supported at top and driven by gear wheel running by toothed belts. Also, the top mounted flyers also enable to have constant angle of wrap and similar spinning triangles for the roving with the front delivery roller for both front and back rows of spindles. This is obtained by having longer extension sections on top of the back row of spindles.

8. What is the advantage in introducing false twist in the roving by the spindle top insert?

Ans: Spinning triangle is reduced so that quality of roving is improved. Fly and lap formation also reduced. False twist enables compact rovings which increases the bobbin capacity and leads to higher flyer speeds.

9. What is the roll of spacers in apron drafting system?

Ans: Pressure is applied by top aprons on the lower aprons and the distance between them decides the intensity of fibre clamping and fibre guidance. The apron arrangement must permit precise adaptation of the minimum distance to the fibre volume. It is done by placing “spacers” between the nose bar of the lower apron and the cradle edge of the top apron, i.e at the exit opening.

10. What is the function of pressure arm in roving frame flyer?

Ans: The pressure arm made up of steel yoke is attached to the lower end of the hollow flyer leg. It guides the roving from exit of the flyer leg to the package. The roving is wrapped two or three times around the yoke. No. of turns determines the roving tension and package hardness. If this is high, then a hard, compact package is obtained. If it is too high, false drafts or roving breaks may happen.
**Ring Spinning Machine**

**FAQ'S**

1. What are the objectives of ring spinning?

   Ans: There are three objectives for ring spinning:
   - To draw the roving to the desired degree of fineness.
   - To impart sufficient twist to the emerging strand of fibres to from continuous yarn
   - To wind up the spun yarn into some convenient package form.

2. What is the role of aprons in ring spinning?

   Ans: The object of aprons is to control the short fibres which are also known as floating fibres to the possible extent and help to produce regular and stronger yarns with greater drafts.

3. Why spacers are used between the two aprons?

   Ans: The front tips of aprons are not to be too far apart or too close. Wider gap fails to control the floating fibre movement. If the gap is less, the pressure between the aprons will be high. The fibres gripped by the front-rollers will suffer undue strain and the result will lead to high mass variations in the resultant yarns.

4. What is the need for the top roller cots?

   Ans: These are needed to avoid the fibres getting crushed or damaged, and also to give a proper grip on the fibres when they are being drafted.

5. Why the top rollers are loaded?

   Ans: In any pair or rollers in the roller drafting system, the bottom roller is positively driven while top roller is negatively driven through the friction between fibre fleece and the bottom roller; and the friction between the fibre fleece and the top roller. The self weight of the top rollers themselves is not sufficient and has to be assisted by some suitable external devices. Such devices are known as "roller-weighting devices"

6. What is roller setting in ring spinning? What is its importance?

   Ans: The distance between the central axes of two pairs of rollers is called as roller setting. If the pairs of rollers are set too wide apart, there will be plucking of the fibres instead of even attenuation, and the material that comes forward is full of thick and thin portions. On the other hand, if they are set too close, drafting becomes difficult and many of the long fibres get gripped by both the pairs momentarily. The fibres get either damaged or broken.
7. What is the typical range of break draft used in 3/3 drafting system?

Ans: Break draft lies in the range of 1.13-1.38.

8. What type of ring and traveler are used in manmade fibre spinning?

Ans: Anti-wedge rings with spin or clip type of travelers are most suitable for man-made fibre processing. The cross section of the travelers should be half round.

9. Can we use same traveler numbers for polyester, viscose and cotton fibre spinning?

Ans: Travelers for polyester blends have to be about 4-5 numbers heavier and those for viscose, 3-4 numbers heavier as compared to travelers used for 100% cotton yarns.

10. What is the purpose of spindle brake?

Ans: While end breakage of yarn occurs during spinning, respective spindle will be stopped by pressing spindle brake for piecing the yarns and start the spinning again. At high spindle speeds, it is difficult to stop the spindles without the spindle brake.

11. What are winding and binding coils?

Ans: During the process of spinning, twisted yarn is wound over the spindle cop. For winding to occur, ring rail is moving up and down to wind the yarn. Yarn wound during the slow upward movement of ring rail is called winding coil, whereas yarn wound during downward movement is called binding coil.

12. What is the V drafting arrangement in ring spinning?

In a normal 3/3 drafting arrangement, the back top roller is shifted rearward relative to the bottom roller. The larger encircling curve produces an additional fibre guidance zone.

13. How much should be the hardness of top roller covering in ring spinning machine?

Ans: Covering lies in the various ranges:
   Soft - 60° to 70° shore
   Medium - 70° to 90° shore
   Hard – above 90° shore

14. What will happen if drafting roller hardness is very low?

Ans: Covering having hardness less than 60° shore is normally unsuitable because they cannot recover from the deformation caused by squeezing out on each revolution of the roller. Also they wear out at the faster rate.
15. What are all the possible ways of applying top roller pressure?

Ans: Generally three kinds of weighting systems are used:
   1. Spring weighting
   2. Pneumatic weighting
   3. Magnetic weighting

16. What is the maximum speed of spindle in the present day ring frames?

Ans: Mechanically it can go up to 28,000 rpm but due to traveler speed constraint, it is limited.

17. What is the need to place separators between spindles?

Ans: If a break occurs in the spinning triangle, then the untwisted fibre assembly may combine with yarn from the nearby spindle. In order to prevent this happening, separator plates or aluminum or plastics material are arranged between the individual spindles.

18. What is the task of traveler in ring spinning?

Ans: The traveler imparts twist to the yarn and enables winding of the yarn on the cop.

19. What kind of traveler is used for synthetic and blend materials?

Ans: Travelers with a half round profile allow high speeds as a result of the good seating upon the ring. This profile keeps yarn free from damage.

20. What is the influence of traveler mass?

Ans: Traveler mass determines the magnitude of frictional forces between the traveler and the ring, and these in turn determine the winding and balloon tension.

21. If the traveler mass is too small, what will happen in ring spinning?

Ans: If the traveler mass is too small, the balloon will be too big and the cop too soft. The cop content will be less due to softer packing of the cop.

22. What is the effect of high traveler mass?

Ans: A high traveler mass leads to high yarn tension and this in turn will lead to higher end breakage rate.
23. Why traveler clearer is used?

Ans: Due to deposition and entangling of flying loose fibres and untwisted fibres on traveler, mass of traveler is increased that result in increased yarn tension which finally induce an end break.
Ring Spun Yarns
FAQ’S

1. How fibre length affects ring spinning?

Ans: A longer fibre can be spun to a finer counts and gives a better spinning performance. In general, the longer the fibre, the higher the yarn tenacity. Too long a fibre gives processing problems specially in carding. Productivity at ring frame also increases because the yarn spun from a longer fibre needs a lower twist. But the shorter fibre increases the harshness and requires more twist to spin the yarn. The quality of the yarn made from shorter fibre is usually poor.

2. What is spinning triangle?

Ans: In the delivery roller nip point, fibres are getting twisted together and the yarn is formed. The twist inserted due to traveler rotation, reaches the front roller delivery point, where the fibres are arranged in triangle fashion. This is called spinning triangle.

3. What should be the min. number of fibres in the yarn cross section for better spinning performance in ring frames?

Ans: It should be around 85 for 38 mm and 68 for 51 mm fibre.

4. How finer fibre affects spinning performance?

Ans: A fine fibre in ring spinning gives finer yarns. It also leads to more even yarns. Also low twist is required because of greater interfibre friction. However, it can lead to excessive neps at carding.

5. What is the formula to calculate the number of fibres in a yarn cross section?

Ans: \( N = \frac{5315}{\text{fibre denier}} / \text{yarn count (Ne)} \)

6. What is the minimum fibre strength needed for spinning?

Ans: Minimum fibre strength is 0.6 to 0.7 gf/denier

7. What is crimp? How does it affect spinning?

Ans: It is defined as the waviness of a fibre. It increases the inter fibre friction which helps in spinning process. It also produces yarns and fabrics having a greater bulk and a softer feel.
8. What is the TM used for production of Polyester/Viscose blended yarn?

Ans: Twist Multiplier for P/V yarn is 3.0-3.5

9. What is the formula used for TPI?

Ans: TPI = TM × \( \sqrt{\text{Count}(Ne)} \)

10. How the periodic variation occurs in drafting zone?

Ans: If drafting roller has eccentric part or the uneven covering of roller result in periodic variation.
New Spinning systems
FAQ’S

1. What are all the merits of rotor yarn over ring spun yarn?

Ans:
   a. Fibres are compactly oriented.
   b. More abrasive strength
   c. Production speed is 200 m/min whereas ring spinning production speed is 20 m/min
   d. More uniformity of yarn
   e. Hairiness is less
   f. Elimination of cop to cone winding, i.e Direct package is obtained
   g. Elimination of conversion of sliver to roving

2. What is electrostatic spinning?

Ans: In electrostatic spinning, fibres coming from drafting rollers are charged that forms dipoles of fibres. Twisting element has the opposite charge, due to electric field, drafted fibres are attracted towards it and the yarn is formed.

3. What is the limitation of rotor yarn?

Ans:
   a. Strength of yarn is less due to less migration of fibres
   b. Finer count is not possible

4. How evenness is improved in the rotor yarn?

Ans: Evenness of yarn is increased by means of back doubling

5. How to calculate back doubling?

Ans: Back doubling = Rotational speed of rotor/Lead of the yarn at the separation point
\[
\text{Back doubling} = \frac{\pi D \times \left( \frac{t}{m} \right)}{1000}; \quad D = \text{Rotor diameter}; \quad t/m = \text{twist per metre}
\]
\[
t/m = \frac{\text{Rotor rotational speed(rpm)}}{\text{Withdrawl speed(rpm)}}
\]
6. How much will be the piecing level of rotor yarn?

Ans: 2-3% of piecing will present in the rotor yarn.

7. Why electrostatic spinning is not successful?

Ans:
   a. In electrostatic spinning, charging of fibres depends upon air humidity. So machine need to be air conditioned.
   b. The charge and attraction of fibres depends upon its mass, so short fibre behave differently from long fibre.
   c. Number of fibres should be controlled in the cross section of yarn.

8. What are the demerits of air-vortex spinning?

Ans:
   a. Controlling of correct, ordered binding of the fibres to achieve adequate strength.
   b. Variability in the twist level of the spun yarn.

9. What are the advantages of friction spun yarn?

Ans:
   a. Low yarn-production cost
   b. Elimination of rewinding
   c. Low end-breakage rates
   d. No wrapping fibres
   e. Optically good mass evenness
   f. Smooth yarn appearance

10. What count of yarn is produced from Dref-2 process?

Ans: Count of the yarn is 0.18-5 Ne; 120-3300 tex
11. What kind of yarn is produced from Dref-3 spinning?

Ans: The Dref-3 spinning system produces bundled yarn according to the friction spinning principle.

12. Where the bundled yarn is used?

Ans: It is used in home textiles, sport and leisure clothing, technical products.

13. Which navel is suitable for processing synthetic fibre in rotor spinning? Why?

Ans: Steel novels. Because at higher speeds, steel novel has the advantage of better heat conduction and hence less heating of the fibres, so that fibre damage can be avoided.
1. Why doubled yarns are preferred?

   Ans: The object of doubling is to double the individual threads. Doubling avoids unevenness and the strength of doubled yarn is correspondingly better than the single thread. So doubled yarns are preferred.

2. Why tensioning device is so important in doubling machine?

   Ans:
   a. Even tensioning of yarns maintains uniform twisting of doubled yarns.
   b. Snarling of doubled yarns is avoided
   c. Uniform strength of doubled yarn is ensured

3. Why doubled yarns are twisted?

   Ans: The purpose of this operation is to unite, by twisting, two or more doubled yarn ends, in order to obtain a stronger yarn. It is a two-stage process namely doubling and twisting.

4. How ring doubler is different from ring frame spinning?

   Ans: This is similar to ringspinning frames, except that they are fed by packages of doubled yarn and via a feeding cylinder that consists of a metal shaft with pressure cylinders to keep winding speeds constant.

5. What are the merits of TFO over ring doubler?

   Ans: Two twists are inserted for each turn of the spindle and this means higher output rates.
   Direct winding of large packages is possible with fewer knots and the possibility of carrying out 2-ply assembly directly on the machine. It is possible to have different spindle gauges ranging from 200, 240 and 300 mm.
6. What are the special features one can expect from modern TFO machine?

Ans: The modern TFO has pneumatic threading systems and an automatic tying carriage, a package lifting system, and slowing of the machine in the event of yarn breaks or the package running out (following breaks, this slowing action is delayed to allow the twisted yarn to finish winding and thus to avoid damaging the surface of the package), a travelling blow/suction cleaner.

7. Name the two stage twisting machine?

Ans: Two for one twister and three for one twister.

8. Why some times waxing is required in TFO?

Ans: Waxing is applied in some machines, in order to reduce the effect of friction on the yarns, oil is applied through a device located on the spindle head and comprising a tank and a bush that, by capillary action, allows the oil to rise, reaching the yarn contact zone. This operation is carried out before the first twisting stage.

9. What are the two stages of doubled yarns?

Ans: Doubling and twisting

10. What are all the methods followed to produce double yarns?

Ans:
   a. Ring doubler
   b. Uptwister
   c. Two for one twister
   d. Three for one twister