



**EXPONENTIAL CAREER CAMPUS**  
**SACHIN GUPTA AIR 1 GATE 2016**

**TF 2006**

1. In the context of bast fibres, an ultimate refers to
  - A. A single cell primarily made of cellulose
  - B. The smallest crystallite in the fibre
  - C. A microfibril in the fibre
  - D. The largest possible bundle of cells
2. The commercial textile grade acrylic fibre is
  - A. A homopolymer of acrylonitrile
  - B. A homopolymer of acrylamide
  - C. A copolymer containing at least 85% of polyacrylamide moiety
  - D. A copolymer containing at least 85% of polyacrylonitrile moiety
3. The commercial grade polypropylene is
  - A. Isotactic
  - B. Atactic
  - C. Syndiotactic
  - D. Smectic
4. In air jet spinning system, P1 and P2 are the supply of air pressures at rear nozzle (entry side) and the front nozzle (delivery side), respectively. The relationship between P1 and P2 is
  - A.  $P1 < P2$
  - B.  $P1 > P2$
  - C.  $P1 = P2$
  - D.  $P1 \geq P2$
5. The draft between feed roller and licker-in in a carding machine is approximately
  - A. 100
  - B. 500
  - C. 1000
  - D. 2000
6. Spinning-in coefficient refers to
  - A. Spinning limit
  - B. Limiting CV% of yarn
  - C. Intensity of migration
  - D. Spun-in fibre length
7. The type of fibre preferred for Hydroentanglement (Spunlacing) is

- A. Hydrophilic, fine and oval in cross section
- B. Hydrophilic, long and round in cross section
- C. Hydrophobic, long and round in cross section
- D. Hydrophobic, fine, long and round in cross section
8. As compared to a 1x1 rib fabric, a 2x2 rib fabric would be
- A. Thicker and narrower
- B. Thicker and heavier
- C. Heavier and wider
- D. Thicker and wider
9. The approximate unwinding speed (m/min) from supply package on a Gabler type rapier weaving machine working with weft insertion rate equal to 1200 m/min at the time of loop transfer is
- A. 1200
- B. 600
- C. 200
- D. 0
10. The percentage range of the uniformity ratio for cotton fibres in general is
- A. 40-50
- B. 55-65
- C. 70-80
- D. 85-95
11. At 280% level setting on imperfection testers for nep counting, a nep will be counted if mass per unit length place based on 1mm length is equal to or greater than
- A. 180%
- B. 280%
- C. 380%
- D. 480%
12. The unit of shear rigidity
- A. N.m
- B. N/m
- C. N/(m.deg)
- D. N.deg/m



**13.** The concentration (g/l) of sodium hydroxide used for mercerization of cotton is in the range

- A.  $50 \pm 50$
- B.  $150 \pm 50$
- C.  $250 \pm 50$
- D.  $350 \pm 50$

**14.** Which of the following chemicals is not an oxidative bleaching agent

- A. Thiourea Dioxide
- B. Hydrogen Peroxide
- C. Peracetic Acid
- D. Sodium Bromate

**15.** A fabric is to be dyed in 4% shade on a continuous dyeing machine. The padding mangle of the machine is set at 80% expression. The concentration (g/l) of the dye in the padding bath should be

- A. 32
- B. 40
- C. 50
- D. 56

**16.** The sodium extract of fibre X was prepared by fusing the fibre with sodium metal and dissolving in distilled water. One portion of the extract was boiled and as the vapors were made to contact a glass rod dipped in dilute HCl, white fumes were observed. To the second portion of the extract, acidified lead acetate solution was added which resulted in the formation of black precipitate. The fibre X is

- A. Polyester
- B. Silk
- C. Acrylic
- D. Wool

**17.** It is desired to quantitatively determine the amorphous orientation of nylon fibres. For amongst the following, the instrument / group of instruments suitable is

**P** Infrared spectrometer

**Q** Wide angle X-ray diffractometer

**R** Scanning electron microscope

**S** Polarizing microscope

- A. Q
- B. P, S
- C. Q, S
- D. R, S

**18.** Determine the correctness or otherwise of the following assertion (a) & reason (r)

Assertion: The viscosity of the solution of sodium cellulose xanthate first decreases and then increases during the process of ripening – an important unit operation of viscose manufacturing

Reason: The viscosity initially decreases because of dexanthation and then rises as the distribution of xanthate groups along the cellulose molecule becomes more uniform with time

- A. Both (a) and (r) are incorrect
- B. (a) is incorrect but (r) is correct
- C. Both (a) and (r) are correct
- D. (a) is correct but (r) is incorrect

**19.** There are three major unit operations in the polymerization of nylon 6, i.e. ring opening, polyaddition and polycondensation. Consider the following statements and choose the correct set of answers

**P** Water is added during ring opening

**Q** Water is added during polyaddition

**R** Water is released during polycondensation

**S** Water dissolves polycaprolactam

The set of correct statement is

- A. P, R
- B. P, R, S
- C. P, Q, R
- D. R, S

**20.** In the manufacturing of PET, the principal compound/s involved during polycondensation step is/are

- A. MEG (monoethylene glycol) and DMT (dimethyl terphthalate)
- B. EG (ethylene glycol) and PTA (purified terphthalate)



- C. DBT (dibutyl terephthalate)
- D. DGT (diethylenglycol terephthalate)

**21.** The solution viscosity of a batch of nylon 6 ships was found to be lower compared to that of the production average. From among the following, choose the correct set of statements with respect to this batch

- P** Acid dye uptake of the resultant fibre would be higher
- Q** The ratio of carboxylic to amino groups would increase significantly
- R** Melt flow index would decrease significantly
- S** Throughput rate would increase if the melt spinning conditions are kept same

- A. P, Q
- B. P, R
- C. Q, R
- D. P, S

**22.** Spin drawing is used generally to produce type cord grade filament yarn. In this process

- A. Spinning and drawing are carried out in a single step
- B. Melt spinning is done at lower speed followed by drawing at higher speed
- C. Melt spinning is done at higher speed followed by drawing at lower speed
- D. Spinning and drawing speeds differ based on required draw ratio

**23.** Annealing is a process of keeping a material at an appropriately high temperature for a specified period of time. Consider the following statements in the context of fully drawn thermoplastic filament yarn which is subjected to free annealing

- P** The stored energy is released
- Q** The crystallinity of the yarn decreases
- R** Overall orientation of the yarn increases
- S** The yarn becomes dimensionally more stable

- A. P, Q
- B. R, S
- C. Q, R
- D. P, S

**24.** Sometimes false twist texturing machines are provided with interlacement nozzles just before the winding unit. Choose the correct set of answers from the following

- P** This allows to produce false twist and air jet textured yarn

**Q** This reduces stretch in the resulting yarn to make it suitable for making suiting fabrics

**R** This helps eliminate the twisting operation which otherwise is necessary before fabric manufacturing

**S** This increases the cohesiveness between filaments of textured yarn

A. P, Q

B. R, S

C. Q, R

D. P, S

**25.** Match the machine components with their primary functions in spinning preparatory line and choose the correct alternative from amongst the A, B, C and D

**Group I**

**P** Pressure bar

**Q** Crushing roller

**R** Mote knife

**S** Autoleveller

**Group II**

**1** Crushing the coarse

**2** Removing trash

**3** Improving evenness

**4** Controlling short fibres

**5** Applying pressure on top roller

**6** Cleaning card web

A. P4-Q6-R2-S3

B. P2-Q1-R3-S5

C. P5-Q1-R6-S3

D. P5-Q2-R3-S6

**26.** Match the components with their primary function in a roving frame and choose the correct alternative form amongst A,B, C and D

**Group I**

**P** Grooved flyer top

**Q** Pressure arm

**R** Condenser

**S** Spacer

**Group II**

**1** Guide the roving up to the package

**2** Insert twist

**3** Control roller pressure

**4** Reduced fly

**5** Insert false twist

**6** Achieve controlled drafting

A. P5-Q3-R1-S6

B. P2-Q3-R6-S1



C. P1-Q6-R4-S3

D. P5-Q1-R4-S6

27. In the context of combing cycle, consider the following process sequences

**P** Lap feeding » Cylinder combing » Forward movement of nipper » Top comb lowering

**Q** Lap feeding » Top comb lowering » Cylinder combing » Detaching

**R** Cylinder combing » Nipping » Top comb lowering » Forward movement of nipper

**S** Nipping » Cylinder combing » Forward movement of nipper » Detaching

The set of correct statement is

A. P, Q

B. P, S

C. Q, R

D. R, S

28. 4.93 ktex sliver is fed in a rotor spinning machine with opening zone draft of 1400. The draft in the transport duct is 5 and the sliding draft on the rotor wall till the rotor groove is 2.

If the back doubling within the rotor is 125., the approximate linear density (tex) of the put yarn is

A. 44

B. 39

C. 24

D. 29

29. Consider the following statements with reference to the properties of rotor spun yarn vis-a-vis the equivalent ring spun yarn

**P** Breaking strength is lower & abrasion resistance is higher

**Q** Hairiness is lower and surface is more lustrous

**R** Bending rigidity is higher & abrasion resistance is lower

**S** Diameter and uniformity are higher

The set of correct statement is

A. P, Q

B. P, S

C. Q, R

D. P, Q, R, S



**30.** An idealized hexagonal closed packed yarn has seven layers of 1.2 dtex fibres. The approximate count ( $N_e$ ) of yarn is

- A. 29
- B. 39
- C. 49
- D. 59

**31.** The direct twist factor of a single 29.5 tex P/V yarn is  $38.28 \text{ tpcm.tex}^{1/2}$ . To keep twist per unit length same, the indirect cotton twist multiplier ( $\text{tpi.Ne}^{-1/2}$ ) of 30 Ne cotton yarn will be approximately

- A. 2.95
- B. 3.27
- C. 2.27
- D. 3.83

**32.** Consider the following statements with reference to compact spinning vis-a-vis ring spinning

**P** The size of the spinning triangle is smaller

**Q** The yarn hairiness is lower

**R** The draft is higher

**S** The twist loss is lower

The set of correct statement is

- A. P, Q
- B. P, R
- C. Q, R
- D. R, S

**33.** The passage of yarn is a two-for-one twister is

Yarn feed package (1) → Freely rotating yarn guide arm (2) → Rotating spindle (3) → Yarn take up roller (4) → Take up package (5)

The direction of twist between different points is

- A. 'S' between 1&2 and 'Z' between 2&3
- B. 'S' between 1&3 and 'S' between 3&4
- C. 'Z' between 1&2 and 'S' between 2&3

D. 'S' between 1&2 and 'Z' between 3&5

**34.** The traverse (cm) of the headstock of a sectional warping machine for winding a section of 10 cm thickness from a warp sheet of 30 cm width on a drum of 250 conicity is approximately

- A. 10
- B. 20
- C. 30
- D. 40

**35.** Determine the correctness or otherwise of the following assertion (a) & reason (r)

Assertion: Loom for production of lightweight cotton dress material has lower free length of warp than the one employed for weaving silk Chiffon

Reason: Free warp length affects maximum strain in warp sheet

- A. Both (a) and (r) are true
- B. Both (a) and (r) are false
- C. (a) is true but (r) is false
- D. (a) is false but (r) is true

**36.** Determine the correctness or otherwise of the following assertion (a) & reason (r)

Assertion: High pressure squeezing on a sizing machine leads to higher rate of production

Reason: Interruption in production process caused by thread breaks etc., are less in high pressure squeezing system

- A. Both (a) and (r) are true
- B. Both (a) and (r) are false
- C. (a) is true but (r) is false
- D. (a) is false but (r) is true

**37.** If the number of valves operating the relay jets of an air jet loom is increased then

- A. Net air consumption goes up but the blowing duration of each jet goes down
- B. Net air consumption goes up and so does the blowing duration of individual jets
- C. Net air consumption goes down but the blowing duration of each jet goes up
- D. Net air consumption goes down and the blowing duration of each jet also goes down

**38.** In a honeycomb weave repeating on eight ends and eight picks the lowest point of the honeycomb cell formed on the fabric lies at the intersection of

- A. The fifth warp thread with the fourth weft thread



- B. The fifth warp thread with the fifth weft thread
- C. The fourth warp thread with the fourth weft thread
- D. The fourth warp thread with the fifth weft thread

39. Terry pile weaving is carried out by

- A. Moving the reed away from the fell of the cloth after the insertion of the fast pick
- B. Moving the fell of the cloth away from the reed after the insertion of loose pick
- C. Holding the reed in its position after insertion of the loose pick
- D. Holding the cloth fell and the reed in their position after insertion of loose pick

40. A carded web of 30 g/m<sup>2</sup> and 1 m width is converted into a batt of 300 g/m<sup>2</sup> and 2.5 m width by a cross lapper. The card delivers the web at 20m/min. The batt out of the cross lapper approximately at the speed (m/min) of

- A. 1
- B. 2.5
- C. 5
- D. 8

41. If A is the area of cell wall of a cotton fibre and p is its perimeter, the degree of cell wall thickness is given by

- A.  $A/p$
- B.  $p/A$
- C.  $4\pi A/p$
- D.  $4\pi A/p^2$

42.

**Group I**

P Short fibers

Q Uniformity ratio

R Micronaire Value

S Maturity Ratio

**Group II**

1 Less than 12.5 mm

2 Less than 25 mm

3 75 to 85

4 40 to 50

5 0.2 to 1.2

6 2 to 6

- A. P2-Q4-R6-S5
- B. P2-Q4-R5-S6
- C. P1-Q3-R6-S5

D. P1-Q3-R5-S6

43. CV(%) of 20 tex cotton combed yarn is 12.32%. If the cotton fibre fineness is 1.2 dtex, index of irregularity will be depend on

- A. 1.0
- B. 1.5
- C. 2
- D. 2.5

44. In the classmat defect classification matrix match the nature of faults with the class and choose the **INCORRECT** alternative from among A, B, C and D

**Group I**

P Short thick fault

Q Long thick fault

R Thin fault

**Group II**

1 B2

2 C3

3 D4

4 E

5 H2

6 I2

- A. P3
- B. Q4
- C. P5
- D. R6

45. In connection with tear strength testing, which of the following is not correct

- A. Higher yarn strength increases tear strength
- B. Higher fabric cover increases tear strength
- C. Lower yarn to yarn friction increases tear strength
- D. Higher float weave increases tear strength

46. For a textile fabric, if  $P_0$  is initial pressure and  $T_0$  is corresponding thickness, at pressure  $P_1$  thickness is  $T_1$  and at pressure  $P_2$  thickness is  $T_2$ , where  $P_2 > P_1 > P_0$  and  $P_1 = (P_2 - P_0)/2$

- A.  $(P_1 - P_0)/(T_0 - T_1) > (P_2 - P_1)/(T_1 - T_2)$
- B.  $(P_1 - P_0)/(T_0 - T_1) = (P_2 - P_1)/(T_1 - T_2)$
- C.  $(P_1 - P_0)/(T_0 - T_1) < (P_2 - P_1)/(T_1 - T_2)$
- D.  $(P_1 - P_0)/(T_0 - T_1) > (P_2 - P_0)/(T_0 - T_2)$

47. Choose the incorrect statement from the following in the context of dyeing



- A. Rate of dyeing is inversely proportional to the radius of the fibre
- B. Rate of dyeing is inversely proportional to the square root of the tex of the fibre
- C. In the dyeing of cotton with direct dyes heat is generated
- D. Lower the tex of the fibre deeper is the shade

48. In the context of vinyl sulphone reactive group based reactive dyes, choose the incorrect statement from the following

- A. They react with cotton via nucleophilic addition mechanism
- B. They require an electrolyte for fixation
- C. They form an ether bond with cotton
- D. They are dyed from alkaline medium

49. In the context of classification of acid dyes into leveling, milling and super milling dyes consider the following statements

P Substantivity of the dyes for wool

Q Diffusion of dyes into the fibre

R Washing fastness of dyes

S pH of dyeing

The set of correct statement is

- A. P, Q, S
- B. P, R, S
- C. P, Q, R
- D. P, Q, R, S

50. Determine the correctness or otherwise of the following assertion (a) & reason (r)

Assertion: Disperse dyes are dyed on polyester fibres at 130°C from an aqueous dispersion of the dye

Reason: The disperse dye is partially soluble in water during dyeing at 130°C and it is dissolved dye that is taken up by the polyester fibre during dyeing

- A. Both (a) and (r) are true and (r) is the correct reason for (a)
- B. Both (a) and (r) are true and (r) is not the correct reason for (a)
- C. Both (a) and (r) are false

D. (a) is true but (r) is false

51. For pigment printing, emulsion thickeners are used where approximately 70-80 parts of oil is emulsified in 20-30 parts of water binder mixture

**P** The emulsion thickener for pigment printing is water in oil emulsion

**Q** The emulsion thickener for pigment printing is oil in water emulsion

**R** In the emulsion thickener oil forms the external phase of the emulsion

**S** In the emulsion thickener water forms the external phase of the emulsion

The set of correct statement is

A. P, Q

B. Q, S

C. Q, R

D. P, S

**52.** A polyester fabric was padded with a dischargeable disperse dye and dried at 90- 100 °C. It was then printed with a printing paste having a non-dischargeable disperse dye and zinc sulphoxylate formaldehyde, steamed in HT steamer, washed, reduction cleared, washed and dried. This style of printing is called

A. Resist Print

B. Discharge – Resist

C. Over printed discharge style

D. Discharge Print

**53.** The fire retardants used for textile materials are based on a range of strategies, such as

**P** Exclusion of oxygen

**Q** Modification of pyrolysis route

**R** Vapor-phase fire-retardant action

**S** Synergistic flame retardant effects

A. P, Q

B. Q, S

C. Q, R

D. P, S

**54.** A cotton fabric was padded with THPC urea complex and dried. This dried fabric was passed through an ammonia cure reactor into which ammonia gas was fed. An exothermic cross-linking reaction occurs within the fibre microstructure to impart flame retardancy. The

set of mechanisms applicable is

A. Q, S

B. P, R



C. Q, R

D. R, S

55.

Group I	Group II
P Milling	1 Differential friction effect caused by the scales on the fibre surface
Q Felting	2 Release of stresses and strains introduced into the garments during manufacture
R Setting shrinkage	3 Realignment of intra- and inter- molecular interactions
S Relaxation shrinkage	4 Subjecting the wool to randomization by mechanical action

A. P1-Q3-R2-S4

B. P4-Q1-R3-S2

C. P2-Q4-R1-S3

D. P4-Q2-R3-S1

56. Aminosilicones are used as softeners in the finishing of fabrics. Among the following choose correct set of statements that are applicable to aminosilicones

P They react with cotton

Q Treated fabrics tend to turn yellow

R They are applied from acidic medium

S They require catalyst for fixation by curing

The set of correct statement is

A. P, Q

B. P, R

C. Q, R

D. Q, S

**Common Data for Questions 57, 58, 59:**

One hundred 1.5 dtex polyester fibres with density of  $1.35 \text{ g/cm}^3$  are tested on a CRE tensile tester. 95% confidence range of main tensile properties are as follows

Tenacity (gf/tex) :  $35 \pm 5.32$

Elongation (%) :  $30 \pm 7$

Initial Modulus (gf/tex) :  $35 \pm 9$

57. 99% confidence range of tenacity in gf/tex is

A.  $35 \pm 3$

- B.  $35 \pm 5$
- C.  $35 \pm 7$
- D.  $35 \pm 9$

**58.** If 95% confidence range elongation (%) with same error percentage is required to be  $30 \pm 5$ , the number of samples required to be tested is

- A. 99
- B. 129
- C. 149
- D. 169

**59.** The average initial modulus in GPa is

- A. 10.58
- B. 7.58
- C. 5.58
- D. 2.58

**Common Data for Questions 60, 61:**

The following data refers to a cone winding process:

Package diameter = 20 cm

Package height = 25 cm

Drum diameter = 8 cm

Scroll of the drum = 2.5

Winding speed = 1000 m/min

**60.** The number of coils on the surface of the package is

- A. 0.5
- B. 1.0
- C. 1.5
- D. 2.0

**61.** The rpm of the drum is approximately

- A. 3,000
- B. 3,400
- C. 3,700
- D. 4,000



**Linked Answer Questions 62 & 63:**

**62.** A typical textile fibre is a two phase entity consisting of crystalline and amorphous fractions. Theoretically the crystalline fraction could be expressed as mass fraction ( $X_{cm}$ ) or as volume fraction ( $X_{cv}$ ). If  $\rho_c$ ,  $\rho_a$ , and  $\rho_f$  are the densities of crystalline fraction, amorphous fraction and the fibre respectively, the  $X_{cv}$  is given by

- A.  $(\rho_f - \rho_a)/(\rho_c - \rho_a)$
- B.  $(\rho_f - \rho_a) \cdot (\rho_c - \rho_a)$
- C.  $\rho_f(\rho_f - \rho_c)/(\rho_c - \rho_a)$
- D.  $(\rho_c - \rho_a)/(\rho_f - \rho_a)$

**63.** If the  $\rho_c = 1.4$ ,  $\rho_a = 1.2$  and  $\rho_f = 1.25$ , then  $X_{cm}$  is equal to

- A. 0.18
- B. 0.28
- C. 0.38
- D. 0.48

**Linked Answer Questions 64 & 65:**

**64.** A carding machine, working at 90% efficiency, has cylinder radius 0.63m, cylinder surface speed 1600 m/min, doffer surface speed 40 m/min and production rate 10.8 kg/h. Assuming that there is no draft between doffer and delivery roller, the linear density (ktex) of card sliver will be approximately

- A. 5
- B. 4
- C. 3
- D. 2

**65.** If the mass of fibre presented to the doffer per revolution of cylinder is 3.3 gm, the transfer coefficient of the carding machine will be approximately.

- A. 0.10
- B. 0.15
- C. 0.20
- D. 0.25

**Statement for Linked Answer Questions 66, 67:**

The following data refers to a square fabric

Fabric construction: 2/2 Twill

Count of yarn: 60 tex

Crimp in yarn: 5%

**66.** Applying Brierley's formula of maximum sett and using the values of constant for cotton

namely,  $m = 0.39$  and  $k = 200$ , the number of yarns/dm works out to be

- A. 180
- B. 210
- C. 230
- D. 260

**67.** The corresponding weight of the fabric in GSM works out to be

- A. 200
- B. 240
- C. 270
- D. 290

**Statement for Linked Answer Questions 68, 69:**

A 60 GSM fabric developed recently contains 30% linen, 50% cotton and 20% polyester. Regain values of these fibres in standard conditions are 12%, 7.5% and 0.4% respectively

**68.** The percentage moisture regain of fabric in standard conditions will be

- A. 5.27
- B. 6.27
- C. 7.27
- D. 8.27

**69.** The above fabric is to be dried till 75% moisture is removed. The GSM of the dried fabric will be approximately

- A. 53
- B. 55
- C. 57
- D. 59

**Linked Answer Questions 70, 71:**

**70.** 5 ml of concentrated sodium hypochlorite solution X is diluted to 100 ml with water. A 10 ml aliquot of this solution required 19.7 ml 0.1 N  $\text{Na}_2\text{S}_2\text{O}_3$  for titration. The active chlorine content (g/l) of the original solution is approximately

- A. 100



- B. 120
- C. 140
- D. 160

71. The volume (in liters) required of the solution X to give 2.5 g/l active chlorine in a saturator of a J-box containing 900 liters of water is approximately

- A. 18.75
- B. 22.5
- C. 16.00
- D. 14.06