



**TF 2003**

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

1. Which of the following is a multi-cellular fiber?

- A. Cotton
- B. Flex
- C. Silk
- D. Cuprammonium rayon

2. Amongst the following fibres, the highest initial modulus is demonstrated by

- A. Cotton
- B. Wool
- C. POY polyester
- D. Jute

3. Which of the following fibres swells in acetone but does not dissolve in it?

- A. Polyester
- B. Cotton
- C. Acetate
- D. Triacetate

4. Lyocell is a

- A. Protein fibre
- B. Cellulosic fibre
- C. Polyamide fibre
- D. Polyester fiber

5. The fully drawn textile grade pp filament yarn is crystalline to the extent of about

- A. 20 %
- B. 35 %
- C. 50 %
- D. 75 %

6. The characteristics of fibre which cannot be measures using x-ray diffraction technique is

- A. Amorphous content
- B. Crystallinity
- C. Dichroic ratio
- D. Size of crystallite

7. The area under the stress-strain curve of a fibre represents its
- A. Toughness
  - B. Ductility
  - C. Tenacity
  - D. Elongation
8. The CV% of mass irregularity of yarn generally equals U% multiplied by
- A. 1.00
  - B. 1.25
  - C. 1.44
  - D. 1.82
9. The weight in mg of 1000 average length cotton fibres is around
- A. 1000
  - B. 100
  - C. 10
  - D. 5
10. In textile testing for a certain property the sample size is proportional to
- A. Square of CV
  - B. CV
  - C. Square root of CV
  - D. Cube of CV
11. The sum of crease angles in the warp and weft direction of a 67:33 polyester-viscose suiting cloth would be around
- A. 437
  - B. 400
  - C. 250
  - D. 100
12. The F test is used for
- A. Significance testing of dispersion
  - B. Significance testing of two means
  - C. Testing whether the frequency distribution is normal
  - D. Testing whether the frequency distribution is poisson



**13.** Which fibre is most difficult to be opened out?

- A. Cotton
- B. Viscose rayon

C. Polyester

D. Acrylic

**14.** Drawing and doubling operations on draw frame are mainly used to

A. Improve short and medium term variation in sliver

B. Improve long term variation in sliver

C. Improve sliver strength

D. Make the sliver finer

**15.** The purpose of using autoleveller is to improve

A. Fibre orientation in yarn

B. Yarn count cv%

C. Yarn strength

D. Yarn faults

**16.** The sequence of three major operations in forward feed combing is

A. Combing – detaching – feeding

B. Combing – feeding – detaching

C. Detaching – combing – feeding

D. Feeding – detaching – combing

**17.** In which would the twist density be the highest in ring spinning

A. Spinning zone yarn

B. Balloon zone yarn

C. Winding zone yarn

D. Bobbin yarn

**18.** In rotor spinning, the yarn tension is maximum

A. At yarn formation point

B. At the navel

C. Outside the doffing tube

D. In the radial portion of the yarn within the rotor

**19.** Length of 20 tex polyester/cotton yarn in km on a 20 kg cone will be equal to

A. 50

- B. 100
- C. 150
- D. 200

**20.** During production of a cone on a surface driven winder, the point of drive is

- A. At the centre of the package
- B. At the package base
- C. Near the package nose
- D. Near the package base

**21.** On a shuttle loom, the sley acceleration during the shuttle flight on the race board is

- A. Towards the front of the loom
- B. Towards the back of the loom
- C. First towards the front and then towards the back
- D. First towards the back and then towards the front

**22.** Restarting the loom after stoppage overnight will give

- A. Higher pick spacing
- B. Lower pick spacing
- C. Sometime higher and sometime lower pick spacing
- D. No change in pick spacing

**23.** Plain weft knitted fabric will have more stretch along

- A. Length
- B. Width
- C. Bias direction
- D. Same stretch in all direction

**24.** Anisotropy is maximum in

- A. Parallel laid web
- B. Cross laid web
- C. Composite laid web
- D. Air laid web

**25.** During the degumming of silk, sericin is preferentially hydrolyzed compared to fibroin because sericin is

- A. Amorphous and hydrophilic
- B. Crystalline and unoriented



- C. Hydrophobic
- D. Highly oriented

**26.** Which of the following mercerizing machines imparts maximum luster to cotton fabrics on mercerization?

- A. Pad-chain
- B. Pad-chainless
- C. Padless-chainless
- D. None of the above

**27.** Absorption of light in ultraviolet region and reflection in visible region is the phenomenon associated with

- A. Vat dyes
- B. Optical brightening agent
- C. Blueing agent
- D. Desizing agent

**28.** Which of the following equipment is suitable for continuous bleaching of cotton?

- A. J-box
- B. Kier
- C. Pad-roll machine
- D. Jumbo jigger

**29.** Despite weak dye fibre interaction, vat dye shows extremely good wash fastness on cotton because of

- A. Low molecular weight of dye
- B. High dye solubility in water
- C. Water insolubility of dye and dye aggregation
- D. High dyeing temperature

**30.** Most suitable pH for dyeing of cotton with indigo is

- A. 13-14
- B. 10.5-11.5
- C. 8.5-9.5
- D. 5.5-6.5

**31.** Which of the following techniques can be best used to separate a mixture of white PP and PET fibres of same dimensions?

- A. Optical microscopy
- B. Infrared spectroscopy
- C. Gravimetric analysis

D. Flootation

**32. Group 1**

- P Linen
- Q Polyester
- R Polyacrylonitrile
- S Nylon

**Group 2**

- 1 Unicellular fibre
- 2 Dissolves in acetone
- 3 Dissolves in formic acid
- 4 Cationic dyes
- 5 DMT
- 6 Bast fibre

- A. P6-Q5-R4-S3
- B. P1-Q5-R4-S3
- C. P1-Q2-R3-S4
- D. P2-Q1-R4-S6

**33. Group 1**

- P Polyester
- Q Polypropylene
- R Polyacrylonitrile
- S Modacrylic

**Group 2**

- 1 Addition polymerization
- 2 Melt spun
- 3 Ziegler Natta
- 4 Condensation polymerization
- 5 Halogen containing co-polymer
- 6 Hydrophilic

- A. P4-Q2-R1-S3
- B. P2-Q6-R3-S1
- C. P2-Q6-R4-S1
- D. P4-Q3-R1-S5

**34. Group 1**

- P pin texturing
- Q draw texturing
- R friction spinning
- S air jet texturing

**Group 2**

- 1 surging
- 2 stretch yarn
- 3 bulked yarn
- 4 high speed
- 5 poy



- A. P6-Q5-R3-S1
- B. P1-Q2-R4-S6
- C. P6-Q5-R1-S3
- D. P2-Q5-R4-S1

35. The repeat unit of nylon 6,10 is

- A.  $-\text{[C(O)-(CH}_2\text{)}_{10}\text{-C(O)-NH-(CH}_2\text{)}_6\text{-NH-]}_n$
- B.  $-\text{[C(O)-(CH}_2\text{)}_4\text{-C(O)-NH-(CH}_2\text{)}_{10}\text{-NH-]}_n$
- C.  $-\text{[C(O)-(CH}_2\text{)}_8\text{-C(O)-NH-(CH}_2\text{)}_6\text{-NH-]}_n$
- D.  $-\text{[C(O)-(CH}_2\text{)}_6\text{-C(O)-NH-(CH}_2\text{)}_{10}\text{-NH-]}_n$

36. Water is added to caprolactam during the polymerization of nylon 6. Its primary role is that of a

- A. Solvent
- B. Catalyst
- C. Heat sink
- D. Stabilizer

37. The monomer/s that actually polycondense/s during the polymerization of polyethylene terephthalate is/are

- A. Ethylene glycol
- B. Ethylene glycol and dimethyl terephthalate
- C. Diethylene glycol terephthalate
- D. Ethylene glycol and terephthalic acid

38. As a result of tension annealing of thermoplastic fibres

- A. Crystalline orientation decreases
- B. Elongation at break does not change
- C. Sonic modulus increases
- D. Melting point decreases

**Common Data for Questions 39, 40, 41:**

In the context of melt spinning, consider  $W$  as the mass output rate of the melt,  $n$  the number of filaments,  $d$  the diameter of spinneret hole,  $d_0$  the diameter of the filament at extrusion point,  $d_L$  the diameter of the filament at take up,  $\rho_0$  the density of the melt,  $\rho_L$  the density of filament,  $V_0$  the average extrusion velocity, and  $V_L$  the take up velocity



39. The expression for  $V_o$  will be

- A.  $4 W \div (n\rho_o\pi d^2)$
- B.  $W \div (n^2\rho_o\pi d^2)$
- C.  $4 W^2 \div (n^2\rho_o\pi d^2)$
- D.  $4 W \div (n\rho_L\pi d^2)$

40. The diameter ( $d_L$ ) of the single filament at the take up is equal to

- A.  $2[W^2 \div (n\pi\rho_o v_o)]^2$
- B.  $2[W \div (n\pi\rho_L v_L)]$
- C.  $[W \div (n^2\pi\rho_L v_L)]^2$
- D.  $2[W \div (n\pi\rho_o v_o)]^{1/2}$

41. Which of the following is the incorrect expression for the melt draw ratio?

- A.  $v_L \div v_o$
- B.  $d_o^2 \div d_L^2$
- C.  $d_L^2 \div d_o^2$
- D.  $\pi d_o^2 \div \pi d_L^2$

42. If  $\rho_a$  be the density of the amorphous region,  $\rho_c$  the density of crystalline phase and  $\rho$  the density of fibre, the mass fraction of crystalline phase ( $X_c$ ) of the fibre will be expressed by

- A.  $[(\rho - \rho_a) \div (\rho_c - \rho_a)] (\rho \div \rho_c)$
- B.  $[(\rho_c - \rho_a) \div (\rho - \rho_a)] (\rho_c \div \rho)$
- C.  $[(\rho_a - \rho_c) \div (\rho - \rho_c)] (\rho_c \div \rho)$
- D.  $[(\rho_c - \rho) \div (\rho_c - \rho_a)] (\rho_c \div \rho)$

43. A ply yarn is made by twisting together two yarns of 20s ne and 12 ne. Neglecting twist contraction, the resultant count (ne) of the ply yarn would be

- A. 32
- B. 16
- C. 15
- D. 8

**Common Data for Questions 44, 45, 46:**

A yarn is produced by blending two fibres X and Y whose particulars are given below

	X	Y
Fineness	2 denier	21 microns
Blend%	50	50

44. The denier of fibre Y is (take density of fibre y as 1.3 g/cm<sup>3</sup>)

- A. 1
- B. 2
- C. 3
- D. 4

45. The average denier of the blend is

- A. 2.10
- B. 2.66
- C. 1.66
- D. 3.00

46. The limit irregularity of a 200 denier yarn spun from this blend is

- A. 10.55
- B. 12.55
- C. 11.55
- D. 14.55

47. A blended yarn is produced by plying two yarns having the following specifications

	(i)	(ii)
Yarn tex	20	10
Mass irregularity (CV%)	15	20

The CV% of the ply yarn is expected to be around

- A. 10
- B. 11
- C. 12
- D. 13

48. Amongst the following fibre properties, which one correlates the best with the handle of the fabrics?

- A. Initial modulus
- B. Yield stress
- C. Tenacity at break
- D. Elongation at break

49. With an increase in pick density, the tensile strength of a fabric in warp direction

- A. Increases



- B. Decreases
- C. First increases and then decreases
- D. First decreases and then increases

**50.** The tear strength of 3/1 twill fabric having the same yarns in warp and weft and the same sett as a plain woven fabric will be

- A. Higher
- B. Lower
- C. Same
- D. Sometimes higher and sometimes lower

**51.** If the moisture regain of cotton is 8.5%, then the weight of water in kg in 100 kg of cotton will be

- A. 7.83
- B. 8.50
- C. 8.83
- D. 9.50

**52.** The units of bending rigidity of a fabric are

- A. mN/mm
- B. mN/mm<sup>2</sup>
- C. mN.mm
- D. mN.mm<sup>2</sup>

**53.** The hairiness of a ring yarn increases as

- A. Fibre length increases
- B. Heavier traveller is used
- C. Yarn is made finer
- D. Ring frame draft increases

**54.** The drape of a fabric is influenced the most by its

- A. Bending rigidity
- B. Tensile strength
- C. Elongation at break
- D. Bursting strength

**55.** The trash content in cotton fed to a beater is 4%. The waste extracted by the beater is 2%.

If the waste contains 60% trash, what is the cleaning efficiency of the beater?

- A. 25%
- B. 30%
- C. 35%
- D. 20%

56. If the ratio of winding-on diameter to ring diameter is 0.86, what is the angle of yarn pull?

- A. 300
- B. 600
- C. 370
- D. 270

57. An eight head comber is running at 200 nips/min. The lap feed is 60 ktex and noil level is 20%. If the lap feed/nip is 7mm, the production in kg/hr at 90% machine efficiency will be.

- A. 25
- B. 29
- C. 33
- D. 40

58. If the actual draft in a card is 90 and the mechanical draft 85, the waste % extracted by the card will be

- A. 5.0%
- B. 5.5%
- C. 6.0%
- D. 7.0%

59. The index of irregularity is the highest in the

- A. Sliver
- B. Roving
- C. Single yarn
- D. Plied yarn

60. A ring frame running at 14000 rpm is producing yarn at 15m/min. The difference in yarn twist (turns/cm) in the yarn when the package diameter changes from 20 mm to 36 mm will be

- A. 8.0
- B. 9.2
- C. 7.1



D. 10.1

61. Which of the following statements is correct in regard to the processing of micro denier fibre vis-a-vis normal fibre?

- A. Card production rate must be decreased
- B. Higher yarn twist is required on ring frame
- C. Less roller pressure is required on ring frame
- D. Drafting speed on draw frame must be increase

62. A single yarn of 30 tex is converted into two ply yarn. If the ratio of tenacities of the plied and single yarn is 1.2, the ratio of their breaking strengths will be

- A. 2.0
- B. 3.0
- C. 2.4
- D. 4.0

63. A yarn of 16 ne is spun on a 46mm diameter rotor spinning machine at 100 m/min. The measured  $t_m$  in the yarn is 4.4. Considering the loss in machine twist as 10%, the number of fibre layers within the rotor at the yarn formation point will be

- A. 100
- B. 111
- C. 120
- D. 130

64. In case of polyester – cotton blended yarn which one of the following statement is true

- A. Polyester fibre predominates on yarn surface
- B. The blended yarn id stronger than 100% polyester yarn
- C. Cotton fibre predominates on yarn surface
- D. The yarn is less extensible than 100% cotton yarn

65. **Group 1**

- P High drafting force
- Q Periodic variation
- R Drafting wave
- S Roller slip

**Group 2**

- 1 Low roller pressure
- 2 Long and fine fibres
- 3 Eccentric roller
- 4 Thick and thin places
- 5 Short fibres
- 6 spin finish

- A. P2-Q3-R4-S1
- B. P4-Q1-R3-S2
- C. P6-Q5-R2-S3

D. P6-Q1-R3-S5

**66. Group 1**

P Air jet spun yarn

Q Rotor spun yarn

R Dref-2 friction spun yarn

S Ring yarn

**Group 2**

1 Highest bending rigidity

2 Strongest

3 Most uniform

4 Weakest

5 Bulkiest

6 Core-strength

A. P3-Q2-R6-S1

B. P6-Q2-R1-S3

C. P1-Q3-R4-S2

D. P2-Q6-R1-S3

**67.** Increase in the taper angle on a sectional warping machine will require

- A. Increase in the traverse speed
- B. Decrease in the traverse speed
- C. No change in the traverse speed
- D. Increase in the warping speed

**68.** Size pick up increases with increase in

- A. Speed of the sizing machine
- B. Nip pressure
- C. Cylinder temperature
- D. Yarn stretch

**69.** Sley velocity in m/s at the front centre of the loom is

- A. 0
- B. 10
- C. 30

D. 50

**70.** A loom is designed to run at 500 picks per minute. If the fabric width is 2.5 m and weft crimp on the loom is 8%, the weft insertion rate in m/min on the loom will be



- A. 1000
- B. 1250
- C. 1350
- D. 1450

71. In shuttleless weaving, weft waste is minimum on

- A. Air-jet loom
- B. Water-jet loom
- C. Rapier loom
- D. Multi-phase loom

72. A design repeating on 45 cm along the length and 30 cm along the width of the fabric having 40 ends and 35 picks per cm will require a jacquard capacity of

- A. 1050
- B. 1200
- C. 1400
- D. 1600

73. Fraction of the area covered in a square plain fabric having maximum sett and circular cross-section yarns will be

- A. 0.62
- B. 0.72
- C. 0.82
- D. 0.92

**Common Data for Questions 74, 75, 76:**

A plain woven cotton fabric is made from 30s Ne warp and 35s Ne weft yarns. In the processed fabric, there are 35 ends and 20 picks per cm and 6.5% warp and 13% weft crimp. (cotton fibre density = 1.52 g/cm<sup>3</sup>)

74. Weight of the fabric in gsm will be approximately

- A. 90
- B. 100
- C. 107
- D. 112

75. Percentage cover will be about

- A. 60

- B. 69
- C. 73
- D. 80

**76.** Fabric thickness in mm will be nearly

- A. 0.22
- B. 0.33
- C. 0.44
- D. 0.55

**Common Data for Questions 77, 78, 79:**

In a plain knitted fabric, stitch density is proportional to the inverse of the square of stitch length with a proportionality constant of 21.6. A fabric with 0.39 cm stitch length has been made from 30 tex cotton yarn

**77.** Tightness factor of the fabric will be

- A. 12
- B. 13
- C. 14
- D. 15

**78.** Weight in gsm will be approximately

- A. 150
- B. 156
- C. 166
- D. 200

**79.** The relationship between dye concentration in fibre (mole/kg) and dye concentration in solution (mole/l) at equilibrium at a given temperature is used for the determination of

- A. Dye affinity
- B. Diffusion coefficient
- C. Heat of dyeing
- D. Entropy of dyeing

**80.** Which of the following enzyme is used for biopolishing of cotton

- A. Lipase
- B. Proteinase
- C. Maltase



D. Cellulase

**81.** Treatment of polyester with 3-5% caustic soda at boil is carried out to impart

A. Water repellency

B. Crease resistance

C. Antistat property

D. Stiffness

**82.** Vapour phase mechanism of protection is valid in the case of

A. Fire retardant based on borax

B. Fire retardant based on nitrogenous compounds

C. Fire retardant based on phosphorus compounds

D. Fire retardant based on halogen compounds

**83.** Bi-functional reactive dyes are characterized by

A. High affinity, high reactivity

B. Low affinity, high reactivity

C. High affinity, low reactivity

D. Low affinity, low reactivity

**84.** Dye sublimation property is associated with

A. Low molecular weight on non-ionic dyes

B. Dyes having large number of polar groups

C. Dyes having reactive groups

D. Dyes having ionic groups

**85.** The increase in viscosity on neutralization of synthetic thickener is due to

A. Conversion of coiled polymeric structure into linear structure

B. Aggregation of polymeric molecules

C. Cross linking of polymeric molecules

D. Breaking of inter molecular cross link

**86. Group 1**

P Limiting oxygen index

Q Spray test

R Molecular orientation

S Bod/Cod

**Group 2**

1 Water repellency

2 Flame retardancy

3 Pollution load

4 Heat setting

5 Abrasion resistance

## 6 Crease recovery

- A. P1-Q4-R3-S2
- B. P2-Q1-R4-S3
- C. P2-Q1-R4-S5
- D. P4-Q3-R2-S1

### 87. Group 1

- P Sodium alginate
- Q Discharge printing
- R Dye movement from high conc. to low conc. Region
- S Dye movement from wet to dry region

### Group 2

- 1 Levelling
- 2 Dye destruction
- 3 Resist printing
- 4 Reactive dye printing
- 5 migration
- 6 non ionic thickener

- A. P6-Q3-R1-S4
- B. P4-Q1-R2-S6
- C. P4-Q2-R1-S5
- D. P1-Q6-R2-S5

88. If the wet pick-up of the cotton fabric is reduced from 100% to 30%, the energy required to evaporate 1 kg water will

- A. Reduced by 30%
- B. Reduced by 70%
- C. Remain the same
- D. Increase

### Common Data for Questions 89, 90:

Consider the following data in respect of the heat exchanger of a continuous washing range in a state of dynamic equilibrium at equal mass flow rates of both the thermic fluid and water (assume that the exchange is circulating the fluid at its Maximum capacity)

Specific heat of the thermic fluid used 2500 J/kg °C

Specific heat of water being heated 4200 J/kg °C

Inlet temperature of thermic fluid 200 °C

Outlet temperature of thermic fluid 75 °C

Inlet temperature of water 30 °C

Outlet temperature of water 95 °C



89. The efficiency of the heat exchanger is

- A. 0.47
- B. 0.67
- C. 0.87
- D. 0.97

90. If the maximum fluid circulating capacity of the above heat exchanger is 104 kg/hr and the required temperature of water at the outlet is 75°C, the maximum flow rate of water (kg/hr) at the outlet will be

- A.  $0.85 \times 10^4$
- B.  $1.28 \times 10^4$
- C.  $1.44 \times 10^4$
- D.  $1.67 \times 10^4$