Sample Paper

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TF: Textile Engineering and Fibre Science

Q.No. 1 Group I contains techniques of fibre manufacturing. Group II gives the physical phenomena associated with these techniques. Match the technique with the phenomenon.

Group I	Group II
P. Melt spinning	1.Diffusion Of only solvent
Q. Wet spinning	2. Diffusion of both and non-solvent
R.Dry spinning	3. No solvent diffusion

(A) P-1. Q-2. R-3

(B) P-3. Q-1. R-2

(C) P-3. Q-2. R-1

(D) P-1. Q-3. R-2

Answer: (C)

Q.No. 2 The punch density of a needle-punched nonwoven fabric is 50 punches/cm^2. If the stroke frequency of needle bed is doubled and the fabric delivery speed is halved, then the punch density (punches/cm^2) would be

(A) 25

(B) 50

(C) 100

(D) 200

Answer: (D)

Q.No. 3 Determine the correctness or otherwise of the following Assertion [a] and Reason [r] [a] : Kevlar fibre has high strength and high modulus. [r] : It has high orientation and low crystallinity.

(A) Both [a] and [r] are true and [r] is the correct reason for [a]

(B) Both [a] and [r] are true but [r] is not the correct reason for [a]

(C) Both [a] and [r] are false

(D) [a] is true but [r] is false

Answer: (D)

Q.No. 4 The function $f(x) = x^3 - 3x^2 - 9x + 10$ is

(A) Increasing in the intercal (l,∞)

(B) Increasing in the interval (-∞,1)

(C) Decreasing in the interval (-1, 3)

(D) Decreasing in the interval (-3 l) is

Answer: (C)

Q.No. 5 Consider two yarns, One 100% wool and the Other 100% cotton, each containing 100 fibres in the yarn cross-section. The respective limit irregularities (%) of wool and cotton yarns will approximately be

(A) 11.2 and 10.6

(B) 10.6 and 11.2

(C) 11.8 and 11.2

(D) 11.8 and 10.6

Answer: (A)

Q.No. 6 The system of linear equations $\begin{Bmatrix} \alpha x - 2y = 4 \\ 2x + 4y = \beta \end{Bmatrix}$ has

(A) No solution for α = 1,β=-8

(B) Unique solution for α = -1,β= 8

(C) Infinitely many solutions for α = -1,β= -8

(D) Infinitely many solutions forα = 1,β= 8

Answer: (C)

Q.No. 7 Acrylic fibre is made from at least 85% by weight of

(A) Acrylic acid

(B) Acrylonitrile

(C) Acrylamide

(D) Methyl methacrylate

Answer: (B)

Q.No. 8 At front centre (0°) and at back centre (180°) Of a shuttle loom,

(A) The sley velocities are the same but accelerations are different

(B) The sley velocities are different but accelerations are the same

(C) The sley velocities are the same and also accelerations are the same

(D) The sley velocities are different and also accelerations are different

Answer: (A)

Q.No. 9 For multifilament yarns, optimum add-on (%) of size is in the range

(A) 0-0.5

(B) 4-8

(C) 20-25

(D) 30-35

Answer: (B)

Q.No. 10 Viscose rayon is soluble in

(A) Acetone

(B) Formic acid 85% (v/v)

(C) Chloroform

(D) Sulfuric acid 59% (w/w)

Answer: (D)

Q.No. 11 An opening roller in blowroom with 100 cm length, 38 cm diameter and 2 teeth per cm2 is rotating at an angular velocity of 400 rpm to deliver fibre tufts at a production rate of 500 kg/h. The intensity of opening (fibre mass in mg per tooth) of the opening roller approximately is

(A) 0.44

(B) 0.87

(C) 1.74

(D) 2.74

Answer: (B)

Q.No. 12 Techniques used to determine the glass transition temperature of textile fibres are P) X-ray diffraction (XRD) Q) Differential scanning calorimetry (DSC) R) Thermogravimetric analysis (TGA) S) Dynamic mechanical analysis (DMA)

(A) P & Q only

(B) Q & R only

(C) Q & S only

(D) R & S only

Answer: (C)

Q.No. 13 If a solution curve of the differential equation $x\frac{dy}{dx} = y + 2x^3$then this curve also passes through the point (1,0) then the curve also passes through the point (l. 0).

(A) (-1.0)

(B) (0,-1)

(C) (2.10)

(D) (-2.6)

Answer: (A)

Q.No. 14 Group I gives a list of fibres and Group II contains their applications. Match the fibre with its application.

Group I	Group II
P. Polypropylene	1. Fire proof jacket
Q. Carbon	2. Bullet proof jacket
R. Ultra-high molecular weight polyethylene	3. Carpet
S. Meta-aramid	4. Windmill blade

(A) P-4, Q-2, R-3, S-1

(B) P-3, Q-4, R-2, S-1

(C) P-3, Q-4, R-1, S-2

(D) P-4, Q-1, R-2, S-3

Answer: (B)

Q.No. 15 Group I lists chemical processes. Group II lists chemicals used in these processes. Match the process with the corresponding chemical

Group I	Group II
P. Carbonising	1. Na₂C0₃
Q. Scouring	2. H₂SO₄
R. Bleaching	3. NaOH
S. Mercerising	4. H₂0₂

(A) P-2,Q-3,R-4,S-1

(B) P-2,Q-1,R-4,S-3

(C) P-3,Q-1,R-2,S-3

(D) P-2,Q-1,R-3,S-4

Answer: (B)

Q.No. 16 In air-jet weaving, the correct combination of parameters, on which drag force on weft yarn depends, is P. Weave pattern Q. Density of air R. Weft yarn diameter S. Picks per cm

(A) P and Q

(B) Q and R

(C) R and S

(D) P and S

Answer: (B)

Q.No. 17 The cross-sectional shape of a fibre affects the following properties of yarn P) Lustre Q) Torsional rigidity R) Flexural rigidity S) Packing density

(A) P & Q only

(B) P & R only

(C) P, Q & R only

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(D) P, Q, R & S

Answer: (D)

Q.No. 18 The purpose of having grooves or notches in modern flyer tops in speed frames is to

(A) Increase real twist in roving

(B) Insert false twist in roving

(C) Reduce neps in roving

(D) Increase fineness of roving

Answer: (B)

Q.No. 19 The pair of natural fibres, belonging to the category of seed fibre, is

(A) Cotton and Sisal

(B) Kenaf and Kapok

(C) Cotton and Kenaf

(D) Cotton and Kapok

Answer: (D)

Q.No. 20 Match the process steps in viscose fibre manufacture listed in Group I with the corresponding chemicals given in Group II. The correct option is Group I P. Ageing Q. Steeping R. Xanthation S. Wet spinning Group II (1) Carbon disulphide (2) Zinc sulphate (3) Sodium hydroxide (4) Manganese salt

(A) P-4, Q-3, R-2, S-1

(B) P-4, Q-3, R-1, S-2

(C) P-3, Q-4, R-1, S-2

(D) P-2, Q-3, R-1, S-4

Answer: (B)

Q.No. 21 Compared to filaments in spunbonded nonwovens, those in meltblown nonwovens have P) Lower orientation of molecular chains Q) Higher orientation of molecular chains R) Lower variability in diameter S) Higher variability in diameter

(A) P & R only

(B) P & S only

(C) Q & R only

(D) Q & S only

Answer: (B)

Q.No. 22 Match the weave in Group I with fabric attribute in Group II.

Group I	Group II
P. Plain	1. Holes in fabric
Q. 2 up 1 down twill	2. High tear resistance
R. 7 end satin	3. High shear resistance
S. Mock leno	4. Continuous diagonal line

(A) P-3, Q-4, R-2, S-1

(B) P-1, Q-4, R-2, S-3

(C) P-3, Q-4, R-1, S-2

(D) P-3, Q-1, R-2, S-4

Answer: (A)

Q.No. 23 The discharging agent used in discharge printing of cotton with reactive dyes is

(A) Citric acid

(B) Sodium dithionite

(C) Thio-urea dioxide

(D) Sodium formaldehyde sulphoxylate

Answer: (D)

Q.No. 24 Determine the correctness or otherwise of the following Assertion [a] and the Reason [r]. [a]: In a carding machine, carding type of wire point configuration is used between cylinder and doffer. [r]: Carding type of wire point configuration gives the best fibre transfer without disturbing the fibre alignment.

(A) Both [a] and [r] are true and [r] is the correct reason for [a]

(B) Both [a] and [r] are true but [r] is not the correct reason for [a]

(C) Both [a] and [r] are false

(D) [a] is true but [r] is false

Answer: (D)

P. Carded sliver
Q. First draym sliver
R. Second drawn sliver
S. Combed sliver follows the order
follows the order

Q.No. 25 The tenacity of

(A) P>Q>R>S

(B) S>R>Q>P

(C) R>S>P>Q

(D) Q>R>S >P

Answer: (A)

Q.No. 26 Shrinkage of cotton fabric during wetting is caused by

(A) Extension of fibre

(B) Crimping of fibre

(C) Swelling of fibre

(D) Compression of fibre

Answer: (C)

Q.No. 27 One of the points which lies on the solution curve of the following differential equation $2xy\,dx + x^2 + y^2\,dy = 0$ with the initial condition $y(1) = 1$ is

(A) (−1, 1)

(B) (0, 0)

(C) (0, 1)

(D) (2, 1)

Answer: (A)

Q.No. 28 Diamond bars appear in woven fabric due to

(A) Faulty loom parts

(B) Excessive warp irregularity

(C) Periodic fault in wam yarn

(D) Periodic fault in weft yam

Answer: (D)

Q.No. 29 Determine the correctness or otherwise Of the following Assertion [a] and Reason [a]: Caprolactam is polymerized in the presence Of small amount Of water to produce fibre grade nylon 6. [r]: Water acts as a catalyst and converts caprolactam to aminocaproic acid.

(A) Both [al and Irl are true and [rl is the correct reason for [a]

(B) Both [a] and [r] are true but [r] is not the correct reason for [a]

(C) Both [a] and [r] are false

(D) [a] is true but [r] is false

Answer: (A)

Q.No. 30 In a loom, seven-wheel take-up motion is

(A) Negative and intermittent

(B) Negative and continuous

(C) Positive and intermittent

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(D) Positive and continuous

Answer: (C)

Q.No. 31 The gum present in the raw mulberry silk fibre is

(A) Sericin

(B) Fibroin

(C) Keratin

(D) Casein

Answer: (A)

Q.No. 32 If A and B are two independent events such that $P(A) = 1/4$ and $P(B) = 2/3$, then $P(A \cup B)$ is equal to

(A) 11/12

(B) 1/12

(C) 3/4

(D) 5/6

Answer: (C)

Q.No. 33 In wool, the sulfur containing amino acid is

(A) Alanine

(B) Cystine

(C) Glycine

(D) Serine

Answer: (B)

Q.No. 34 The relative humidity (in %) and temperature (in °C) of standard testing atmosphere are respectively

(A) 65 and 25

(B) 65 and 20

(C) 60 and 25

(D) 60 and 20

Answer: (B)

Q.No. 35 A dye is applied on a fibre using $Na_2S_2O_4$ as an auxiliary. Washing fastness of the dye on fibre is good. The correct combination of the dye and the fibre is

(A) Cationic dye, acrylic fibre

(B) Vat dye, cotton fibre

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(C) Acid dye, wool fibre

(D) Reactive dye, cotton fibre

Answer: (B)

Q.No. 36 Which of the following fibre(s) is(are) manufactured by melt spinning process

P. Viscose
Q. Cellulose acetate
R. Nylon-6
S. Aramid

(A) P only

(B) Q and R only

(C) R only

(D) R and S only

Answer: (C)

Q.No. 37 If both the concentration (%, w/w) of size paste and target add-on are 12%, the total wet pick-up (kg) by 12 kg bone-dry warp sheet is

(A) 6

(B) 12

(C) 18

(D) 24

Answer: (B)

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Q.No. 38 Determine the correctness or otherwise Of the following Assertion [a] and Reason [r] [a]: Foam finishing significantly reduces the energy consumed in drying. [r]: The specific heat of air is significantly lower than that of water.

(A) Both [a] and [r] are true and [r] is the correct reason for [a]

(B) Both [a] and [r] are true but [r] is not the correct reason for [a]

(C) Both [a] and [r] are false

(D) [a] is true but [r] is false

Answer: (B)

Q.No. 39 Let $L = \lim_{x \to \frac{\pi}{2}} (\sin x)^{\tan x}$. The value of L is

(A) 0

(B) 1

(C) 2

(D) ∞

Answer: (B)

Q.No. 40 Match the dye-fibre in Group I with the interactions in Group II.

Group I	Group II
P. Reactive dye on cotton	1. Van der Waals forces
Q. Disperse dye on polyester	2. Covalent bonds
R. Vat dye on cotton	3. Electrostatic bonds
S. Basic dye on acrylic	4. Mechanical entrapment

(A) P-1, Q-2, R-4, S-3

(B) P-1, Q-2, R-3, S-4

(C) P-2, Q-1, R-4, S-3

(D) P-2, Q-1, R-3, S-4

Answer: (C)

Q.No. 41 A tuck stitch in knitting makes the fabric

(A) Narrower

(B) Thinner

(C) More rigid in course direction

(D) Wider and porous

Answer: (D)

Q.No. 42 Let X be a binomial random variable with mean 1 and variance 3/4. The probability that X takes the value 3 is

(A) 3/64

(B) 3/16

(C) 27/64

(D) 3/4

Answer: (A)

Q.No. 43 Pilling resistance of

(A) Ring yam is higher than open-end rotor yarn but lesser than air vortex yarn

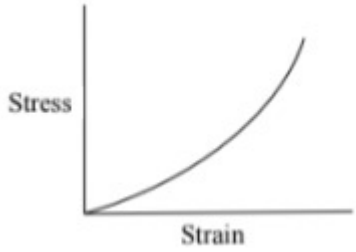
(B) Air vortex yarn is higher than ring yam but lesser than open-end rotor yarn

(C) Open-end rotor yam is higher than ring yam but lesser than air vortex yam

(D) Ring yarn is higher than air vortex yarn but lesser than open-end rotor yarn

Answer: (C)

Q.No. 44 Determine the correctness or otherwise of the following Assertion [a] and the Reason [r]. [a]: The work factor of silk fibre is greater than 0.5. [r]: The work factor is calculated by assuming the following as



the stress-strain curve of silk fibre.

(A) Both [a] and [r] are true and [r] is the correct reason for [a]

(B) Both [a] and [r] are true but [r] is not the correct reason for [a]

(C) Both [a] and [r] are false

(D) [a] is true but [r] is false

Answer: (D)

Q.No. 45 The spinning system in which one revolution of twisting element imparts several turns to the fibre strand is

(A) Ring

(B) Rotor

(C) Friction

(D) wrap

Answer: (C)

Q.No. 46 For x in $[0, \pi]$, the maximum value of $(\sin x + \cos x)$ is

(A) $1/\sqrt{2}$

(B) 1

(C) $\sqrt{2}$

(D) 2

Answer: (C)

Q.No. 47 In a three-sigma control chart. the probability that a point falls outside the control limits. when a process is under control. is

(A) 0

(B) 0.0027

(C) 0.01

(D) 0.05

Answer: (B)

Q.No. 48 Determine the correctness or otherwise of the following Assertion [a] and the Reason [r] Assertion: Jet dyeing machines yield level dyeing in short dyeing time Reason: Jet dyeing machines use pressure jets to force dye into the fibre

(A) Both [a] and [r] are true. and [r] is the correct reason for [a]

(B) Both [a] an Copyfish

(C) Both [a] an

(D) [a] is true b

Answer: (D)

Q.No. 49 Match the test in Group I with fabric property in Group II.

Group I	Group II
P. Cup test	1. Flexural rigidity
Q. Heart loop test	2. Water vapour permeability
R. Spray rating test	3. Resistance to water penetration
S. Hydrostatic head test	4. Resistance to surface wettability

(A) P-1, Q-2, R-3, S-4

(B) P-1, Q-2, R-4, S-3

(C) P-2, Q-1, R-3, S-4

(D) P-2, Q-1, R-4, S-3

Answer: (D)

Q.No. 50 In dyeing of wool with levelling acid dyes, with time, the pH of dye bath

(A) Increases

(B) Decreases

(C) Remains constant

(D) First increases and then decreases

Answer: (A)

Q.No. 51 The solution of the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = 0$ which satisfies the conditions y(0) = O, y'(0) = 3 is

(A) e^{-x}

(B) e^{x}

(C) $e^{x} + e^{-2x}$

(D) $e^{x} - e^{-2x}$

Answer: (D)

Q.No. 52 For the matrix A $A = \begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 3 \\ 0 & 0 & 1 \end{bmatrix}$, the eigenvalues of the matrix are

(A) 1,0,1

(B) 1,0,0

(C) 1,1,0

(D) 1,1,1

Answer: (D)

Q.No. 53 During crystallization of polyester

(A) Heat is evolved

(B) Heat is absorbed

(C) No exchange of heat takes place

(D) Small molecule such as water is eliminated

Answer: (A)

Q.No. 54 Laplace transform Of cosh(t) is

(A) $\frac{1}{s^2-1}$

(B) $\frac{s}{s-1}$

(C) $\frac{s}{s^2-1}$

(D) $\frac{s}{s^2+1}$

Answer: (C)

Q.No. 55 Wool gives warmth because it has .

P. A helical structure which can entrap air
Q. High heat of sorption
R. Low crystallinity
S. High extensibility

(A) P and Q only

(B) Q and R only

(C) P and S only

(D) P and R only

Answer: (A)