TF: Textile Engineering and Fibre Science

GA - General Aptitude

Q1 - Q5 carry one mark each.

Q.No. 1 This book, including all its chapters,_____interesting. The students as well as the instructor_____in agreement about it.

(A) is, was
(B) are, are
(C) is, are
(D) were, was

Q.No. 2 People were prohibited _____their vehicles near the entrance of the main administrative building.

(A) to park
(B) from parking
(C) parking
(D) to have parked

Q.No. 3 Select the word that fits the analogy:

Do : Undo :: Trust : _____

(A) Entrust
(B) Intrust
(C) Distrust
(D) Untrust

Q.No. 4 Stock markets _____ at the news of the coup.

(A) poised
(B) plunged
(C) plugged
(D) probed

Q.No. 5 If P, Q, R, S are four individuals, how many teams of size exceeding one can be formed, with Q as a member?

(A) 5
(B) 6
(C) 7
(D) 8

Q6 - Q10 carry two marks each.

Q.No. 6

Non-performing Assets (NPAs) of a bank in India is defined as an asset, which remains unpaid by a borrower for a certain period of time in terms of interest, principal, or both. Reserve Bank of India (RBI) has changed the definition of NPA thrice during 1993-2004, in terms of the holding period of loans. The holding period was reduced by one quarter each time. In 1993, the holding period was four quarters (360 days).

Based on the above paragraph, the holding period of loans in 2004 after the third revision was _____ days.

(A) 45
(B) 90
(C) 135
(D) 180

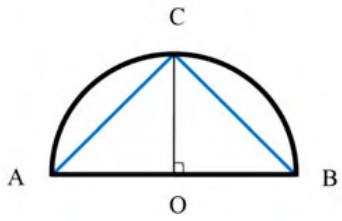
Q.No. 7 Select the next element of the series: Z, WV, RQP, ___

(A) LKJI
(B) JIHG
(C) KJIH
(D) NMLK

Q.No. 8 In four-digit integer numbers from 1001 to 9999, the digit group "37" (in the same sequence) appears _____ times.

(A) 270
(B) 279
(C) 280
(D) 299

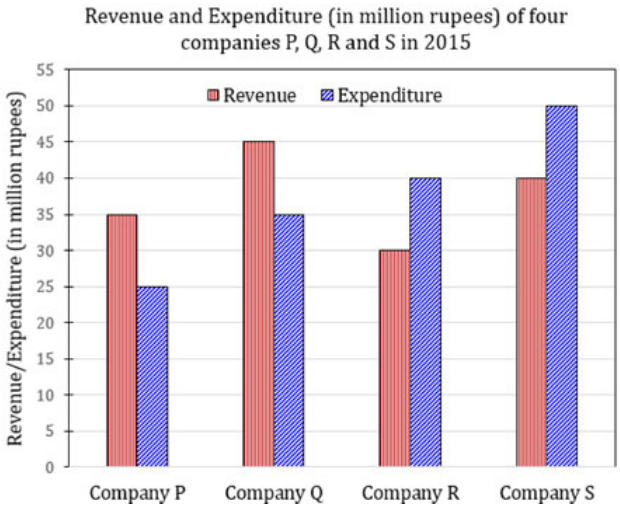
Q.No. 9 Given a semicircle with O as the centre, as shown in the figure, the ratio $\frac{\overline{AC}+\overline{CB}}{\overline{AB}}$ is _____, where $\overline{AC}$, $\overline{CB}$ and $\overline{AB}$ are chords.



(A) $\sqrt{2}$
(B) $\sqrt{3}$
(C) 2
(D) 3

Q.No. 10

The revenue and expenditure of four different companies P, Q, R and S in 2015 are shown in the figure. If the revenue of company Q in 2015 was 20% more than that in 2014, and company Q had earned a profit of 10% on expenditure in 2014, then its expenditure (in million rupees) in 2014 was _____.



(A) 32.7

(B) 33.7

(C) 34.1

(D) 35.1

TF: Textile Engineering and Fibre Science

Q1 - Q25 carry one mark each.

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

(A) 1, 0, 1

(B) 1, 0, 0

(C) 1, 1, 0

(D) 1, 1, 1

Q.No. 2 The integrating factor of the differential equation $\frac{dy}{dx} + y = e^{-x}$ is

(A) e^x

(B) e^{-x}

(C) xe^{-x}

(D) xe^x

Q.No. 3 Laplace transform of $\cosh(t)$ is

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

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

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

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

Q.No. 4 In wool, the sulfur containing amino acid is

(A) Alanine

(B) Cystine

(C) Glycine

(D) Serine

Q.No. 5 Viscose rayon is soluble in

(A) Acetone

(B) Chloroform

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

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

Q.No. 6 In carding, the highest draft is kept between

(A) Lap roller and feed roller

(B) Feed roller and licker-in

(C) Licker-in and cylinder

(D) Cylinder and doffer

Q.No. 7 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

Q.No. 8 The technology that does NOT produce a nonwoven fabric is

(A) Spunbonding

(B) Hydroentangling

(C) Meltblowing

(D) Braiding

Q.No. 9 For the same yarn and fabric sett, the weave that gives the maximum tearing strength is

(A) Plain

(B) 2×2 matt

(C) 5-end satin

(D) 2/1 twill

Q.No. 10 Two yarns have variance of strength as V_1 and V_2. If $V_1 < V_2$, the variance ratio 'F' would be

(A) $\frac{V_2}{V_1}$

(B) $\frac{V_1}{V_2}$

(C) $\frac{V_1^2}{V_2^2}$

(D) $\frac{V_2^2}{V_1^2}$

Q.No. 11 Cotton fibre length parameter that CANNOT be obtained from Baer Sorter diagram is

(A) Mean length

(B) Dispersion

(C) Uniformity ratio

(D) Modal length

Q.No. 12 The purpose of carbonization of wool fibres is to remove

(A) Waxy matter

(B) Surface scales

(C) Vegetable matter

(D) Ortho-cortex

Q.No. 13 Bio-polishing of cotton fabrics is done using

(A) Cellulase

(B) Amylase

(C) Proteinase

(D) Esterase

Q.No. 14 For the given system of linear equations, $2x - z = 1;\ 5x + y = 7;\ y + 3z = 5$, the sum of x, y and z is _____.

Q.No. 15 If $\boldsymbol{F} = x\boldsymbol{i} + y\boldsymbol{j} + z\boldsymbol{k}$, then the magnitude of $\nabla \times \boldsymbol{F}$ is _____.

Q.No. 16 A polypropylene filament is drawn in two stages with draw ratios of 1.5 and 2 respectively. The overall draw ratio is _____.

Q.No. 17 The refractive indices of a filament in axial and radial directions are 1.58 and 1.52 respectively. The birefringence of the filament (correct up to 2 decimal places) is_____.

Q.No. 18 A twin-delivery drawframe, running at a delivery speed of 800 m/min with an efficiency of 95%, is producing 5.9 ktex sliver. The rate of production of the drawframe in kg/h (rounded off to 2 decimal places) is _____.

Q.No. 19 The diameter (mm) of a yarn having twist of 700 turns per meter and surface-twist angle of 20° (rounded off to 2 decimal places) is _____.

Q.No. 20 A magazine creel has 800 package holders. The effective creel capacity (number) is _____.

Q.No. 21 A shuttle loom is running at 180 picks per minute. The angular velocity of crank shaft (degree/second) is _____.

Q.No. 22 The length (km) of 5 kg of 30 Ne yarn (rounded off to the nearest integer) is _____.

Q.No. 23 The limit irregularity and measured irregularity of a yarn are 8.4% and 9.6%, respectively. The Index of Irregularity (rounded off to 2 decimal places) is _____.

Q.No. 24 A padding mangle is processing a fabric at 1320 m/h. The bottom bowl of the mangle is rotating at 25 rpm. Assuming zero slippage at the nip, the diameter (cm) of this bowl is _____.

Q.No. 25

A Procion H (monochlorotriazine based) reactive dye used for printing of cotton has a molecular weight of 471. Taking the atomic weight of H=1, C=12, N=14, O=16, Cl=35.5, the molecular weight of the fully hydrolyzed dye (correct up to 1 decimal place) would be _____.

Q26 - Q55 carry two marks each.

Q.No. 26 Let $L = \lim_{x \to \frac{\pi}{2}} (\sin x)^{\tan x}$. The value of L is

(A) 0
(B) 1
(C) 2
(D) ∞

Q.No. 27 The solution of the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = 0$, which satisfies the conditions, $y(0) = 0,\ y'(0) = 3$ is

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

Q.No. 28 In melt spinning of poly(ethylene terephthalate), pre-drying of polymer chips is essential to avoid

(A) Hydrolytic degradation
(B) Oxidative degradation
(C) Microbial degradation
(D) Photo-induced degradation

Q.No. 29 Determine the correctness or otherwise of the following Assertion [a] and Reason [r]

[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 [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

Q.No. 30 Determine the correctness or otherwise of the following Assertion [a] and Reason [r]

[a]: Melting point of nylon 66 fibre is much higher than that of polyethylene fibre.

[r]: The molecular weight of nylon 66 fibre is significantly higher than that of polyethylene 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

Q.No. 31 Carding of polyester fibres requires that the values of wire-point density (points/inch^2) of

(P) Licker-in (Q) Cylinder (R) Flat

follow the order

(A) P < Q < R

(B) P < R < Q

(C) Q < R < P

(D) Q < P < R

Q.No. 32 For combing with forward feed, the given parameters are:

Detachment setting = 15 mm, Length of feed per combing cycle = 6 mm, Longest fiber length = 30 mm. According to Gégauff's theory, the noil (%) would be

(A) 9

(B) 16

(C) 30

(D) 49

Q.No. 33 Determine the correctness or otherwise of the following Assertion [a] and Reason [r]

[a]: Open-loop autolevelling system needs a signal storage device with time delay function.

[r]: The signal must be stored until the material reaches the adjusting point.

(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

Q.No. 34 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

Q.No. 35 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

Q.No. 36

Match the looms listed in Group I with the corresponding components given in Group II. The correct option is

Group I	Group II
P. Multiphase	1. Matched cam
Q. Projectile	2. Profile reed
R. Air-jet	3. Crank shaft
S. Shuttle	4. Weaving rotor

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

Q.No. 37 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

Q.No. 38 If the numerical value X of yarn linear density, expressed in denier is the same as that expressed in English (Ne) system, then X approximately is

(A) 24.3
(B) 48.6
(C) 72.9
(D) 97.2

Q.No. 39 Determine the correctness or otherwise of the following Assertion [a] and Reason [r]

[a]: Sodium chlorite is a bleaching agent for cotton.

[r]: Sodium chlorite is an effective reducing agent.

(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

Q.No. 40 Determine the correctness or otherwise of the following Assertion [a] and Reason [r]

[a]: Acrylic fibres are dyed with basic dyes in acidic medium.

[r]: In acidic medium the acrylic fibre acquires positive charge.

(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

Q.No. 41 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

Q.No. 42 If the probability density function of a continuous random variable X is given by $f(x) = e^{-x},\ 0 \leq x < \infty,$ the mean of random variable X is _____.

Q.No. 43 Assuming the step size $h = 1$, the numerical value of the definite integral $\int_0^2 \frac{x^2}{1+x^3} dx$ obtained using Trapezoidal rule (rounded off to 2 decimal places) is _____.

Q.No. 44 In the production of PET, diglycol terephthalate (DGT) is an intermediate. Taking the atomic weights of H=1, C=12, O=16, the molecular weight of DGT is _____.

Q.No. 45 In wet spinning of acrylic filament yarn, the volumetric flow rate of the spinning dope per spinneret hole is 0.1 cm^3 /min. If the surface speed at the first take up roller is 1.5 m/min and the diameter of spinneret hole is 0.02 cm, then the jet stretch (rounded off to 2 decimal places) is _____.

Q.No. 46 Two types of polyester staple fibers of fineness 3 and 6 denier and having the same length are mixed in a ratio of 2:3 by weight. The mean fibre fineness (denier) of the mix (rounded off to 2 decimal places) is _____.

Q.No. 47 Two rovings, each with mass CV of 10%, are fed to a ring spinning machine that adds a mass CV of 20%. The mass CV (%) of the yarn (rounded off to 2 decimal places) is _____.

Q.No. 48 In a drum-driven winder, the grooved drum having a width of 20 cm is rotating at 1000 rpm. If the drum makes 5 revolutions per double traverse, the traverse speed (m/min) is _____.

Q.No. 49 The wale constant and course constant are 4.2 and 5.04 respectively. If the loop length is 4.2 mm, then stitch density (number/cm^2) is _____.

Q.No. 50 A cotton fibre has degree of cell wall thickening (θ) of 0.9 and perimeter of 40 μm. The actual cross-sectional area of the wall (μm^2) of the fibre (rounded off to 1 decimal place) is _____.

Q.No. 51

A fabric with mass per unit area of 250 g/m^2 has flexural rigidity of 275 μN·m. The bending length (mm) of the fabric (rounded off to 2 decimal places) is _____.

Q.No. 52 The 'standard machine rate of loading' of a tensile tester, working on pendulum lever principle, is 440 N/cm. As the pendulum lever swings from 30° to 45°, the 'machine rate of loading' (N/cm), reduces by (rounded off to 2 decimal places) _____.

Q.No. 53 Under a load of 500 cN, the extension of a yarn of 300 mm length is 10%. If the elastic recovery is 90%, then the length (mm) of the yarn after removal of load is _____.

Q.No. 54 Given that one gram mole of a gas occupies 22.4 L of volume at STP, the atomic weights of H=1, and that of O=16, the concentration (g/L) of hydrogen peroxide solution of 25 volume strength (rounded off to 2 decimal places) is _____.

Q.No. 55 The work of adhesion (W_{SL}) depends on the surface tension (γ_{LV}) of the liquid and the contact angle (θ) formed on a surface and is expressed as $\gamma_{LV}(1 + \cos\theta)$. The W_{SL} for a given fabric and a liquid is reduced to 1/3rd of the original value after oil repellent treatment. If the measured contact angle of the untreated fabric is 60°, the percent change in the contact angle after the treatment is _____.

Answer Key - TF: Textile Engineering and Fibre Science

Q.No.	Session	Que.Type	Sec. Name	Key	Marks
1	5	MCQ	GA	C	1
2	5	MCQ	GA	B	1
3	5	MCQ	GA	C	1
4	5	MCQ	GA	B	1
5	5	MCQ	GA	C	1
6	5	MCQ	GA	B	2
7	5	MCQ	GA	C	2
8	5	MCQ	GA	C	2
9	5	MCQ	GA	A	2
10	5	MCQ	GA	C	2
1	5	MCQ	TF	D	1
2	5	MCQ	TF	A	1
3	5	MCQ	TF	C	1
4	5	MCQ	TF	B	1
5	5	MCQ	TF	D	1
6	5	MCQ	TF	B	1
7	5	MCQ	TF	C	1
8	5	MCQ	TF	D	1
9	5	MCQ	TF	C	1
10	5	MCQ	TF	A	1
11	5	MCQ	TF	C	1
12	5	MCQ	TF	C	1
13	5	MCQ	TF	A	1
14	5	NAT	TF	4 to 4	1
15	5	NAT	TF	0 to 0	1
16	5	NAT	TF	3 to 3	1
17	5	NAT	TF	0.06 to 0.06	1
18	5	NAT	TF	537.00 to 539.00	1
19	5	NAT	TF	0.16 to 0.18	1
20	5	NAT	TF	400 to 400	1
21	5	NAT	TF	1080 to 1080	1
22	5	NAT	TF	253 to 255	1
23	5	NAT	TF	1.10 to 1.15	1
24	5	NAT	TF	28.00 to 29.00	1
25	5	NAT	TF	452.5 to 452.5	1
26	5	MCQ	TF	B	2
27	5	MCQ	TF	D	2
28	5	MCQ	TF	A	2
29	5	MCQ	TF	A	2
30	5	MCQ	TF	D	2
31	5	MCQ	TF	B	2
32	5	MCQ	TF	B	2
33	5	MCQ	TF	A	2

34	5	MCQ	TF	B	2
35	5	MCQ	TF	A	2
36	5	MCQ	TF	C	2
37	5	MCQ	TF	A	2
38	5	MCQ	TF	C	2
39	5	MCQ	TF	D	2
40	5	MCQ	TF	D	2
41	5	MCQ	TF	B	2
42	5	NAT	TF	1 to 1	2
43	5	NAT	TF	0.70 to 0.75	2
44	5	NAT	TF	254 to 254	2
45	5	NAT	TF	0.46 to 0.48	2
46	5	NAT	TF	4.25 to 4.35	2
47	5	NAT	TF	21.00 to 22.00	2
48	5	NAT	TF	80 to 80	2
49	5	NAT	TF	120 to 120	2
50	5	NAT	TF	112.0 to 117.0	2
51	5	NAT	TF	46.00 to 50.00	2
52	5	NAT	TF	69.00 to 71.00	2
53	5	NAT	TF	303 to 303	2
54	5	NAT	TF	75.00 to 77.00	2
55	5	NAT	TF	100 to 100	2