GENERAL APTITUDE

Q. No. 1 – 5 Carry One Mark Each

1. A generic term that includes various items of clothing such as a skirt, a pair of trousers and a shirt as

(A) fabric   (B) textile   (C) fibre   (D) apparel

Answer: (C)

- -

2. Choose the statement where underlined word is used correctly.

(A) The industrialist had a <u>personnel</u> jet.

(B) I write my experience in my <u>personnel</u> diary.

(C) All <u>personnel</u> are being given the day off.

(D) Being religious is a <u>personnel</u> aspect.

Answer: (C)

- -

3. Based on the given statements, select the most appropriate option to solve the given question.

What will be the total weight of 10 poles each of same weight?

Statements:

(I) One fourth of the weight of a pole is 5 kg

(II) The total weight of these poles is 160 kg more than the total weight of two poles.

(A) Statement II alone is not sufficient

(B) Statement II alone is not sufficient

(C) Either I or II alone is sufficient

(D) Both statements I and II together are not sufficient.

Answer: (C)

4. Consider a function $f(x) = 1 - |x|$ on $-1 \le x \le 1$. The value of x at which the function attains a maximum, and the maximum value of function are:

(A) $0, -1$ (B) $-1, 0$ (C) $0, 1$ (D) -1, 2
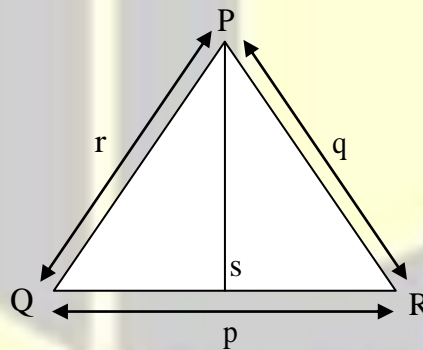
Answer: **(C)**

5. We _____ our friend's birthday and we _____ how to make it up to him.

(A) completely forgot --- don't just known

(B) forget completely --- don't just know

(C) completely forget --- just don't know

(D) forgot completely --- just don't know

Answer: **(C)**

Q. No. 6 – 10 Carry Two Marks Each

6. In a triangle PQR, PS is the angle bisector of $\angle QPR$ and $\angle QPS = 60^{\circ}$. What is the length of PS?

(A) $\dfrac{(q+r)}{qr}$ (B) $\dfrac{qr}{(q+r)}$ (C) $\sqrt{(q^2 + r^2)}$ (D) $\dfrac{(q+r)^2}{qr}$

Answer: **(B)**

7. Four branches of a company are located at M,N,O, and P. M is north of N at a distance of 4 km; P is south of O at a distance of 2 km; N is southeast of O by 1 km. What is the distance between M and P in km?

(A) 5.34   (B) 6.74   (C) 28.5   (D) 45.49

Answer: **(A)**

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8. If p, q, r, s are distinct integers such that:

f (p, q, r, s) = max (p, q, r, s)

g (p, q, r, s) = min (p, q, r, s)

h (p, q, r, s) = remainder of $(p \times q)/(r \times s)$ if $(p \times q) > (r \times s)$ or remainder of $(r \times s)/(p \times q)$ if $(r \times s) > (p \times q)$

Also a function fgh (p, q, r, s) = f(p, q, r, s) × g(p, q, r, s) × h(p, q, r, s)

Also the same operations are valid with two variable function of the form f(p, q).

What is the value of fg (h(2, 5, 7, 3), 4, 6, 8)?

Answer: **(8)**

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9. If the list of letters, P, R, S, T, U is an arithmetic sequence, which of the following are also in arithmetic sequence?

I. $2P, 2R, 2S, 2T, 2U$

II. $P - 3, R - 3, S - 3, T - 3, U - 3$

III. P^2, R^2, S^2, T^2, U^2

(A) I only   (B) I and II   (C) II and III   (D) I and III

Answer: **(B)**

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10. Out of the following four sentences, select the most suitable sentence with respect to grammer and usage:

(A) Since the report lacked needed information, it was of no use to them.

(B) The report was useless to them because there were no needed information in it.

(C) Since the report did not contain the needed information, it was not real useful to them

(D) Since the report lacked needed information, it would not had been useful to them.

Answer: **(A)**

TEXTILE ENGINEERING

Q. 1- Q.25 Carry one mark each

1. If 3 and 4 are two eigen values of $A = \begin{bmatrix} 3 & a & b \\ c & 2 & d \\ e & f & 4 \end{bmatrix}$ for some real numbers a, b, c, d, e, and f, then the

   third eigen value of A is _____.

Answer: (2)

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2. If a continuous random variable X has probability density function

   $$f(x) = \begin{cases} ax^2, & 0 \le x \le 1 \\ 0, & \text{otherwise} \end{cases}$$

   Then the value of a is _____.

Answer: (3)

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3. The value of $\lim\limits_{x \to 0} \dfrac{\sin x}{x}$ is _____.

Answer: (1)

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4. If $A = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & \dfrac{1}{12} \end{bmatrix}$, then determinant of A^{-1} is_____.

Answer: (1)

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5. The number of linearly independent eigen vectors of the matrix $\begin{bmatrix} 1 & 0 \\ 3 & 4 \end{bmatrix}$ is_____.

Answer: (2)

6.   The gum in the raw silk filament is

(A) Wax   (B) Lignin   (C) Sericin   (D) Fibroin

Answer: (C)

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7.   For production of dry-spun acrylic fibre, the suitable solvent for dope preparation is

(A) Acetone   (B) N,N' Dimethyl formamide

(C) Formic acid   (D) Aqueous sodium thiocyanate (55 wt%)

Answer: (B)

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8.   Adipic acid is a monomer for the production of

(A) Poly(ethylene terephthalate)   (B) Nylon 66

(C) Nylon 64   (D) Nylon 610

Answer: (B)

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9.   In melt spinning line, the melting of solid polymer and its homogenization takes place in

(A) Manifold   (B) Extruder

(C) Metering pump   (D) Quench duct

Answer: (B)

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10.   The blending technique that gives the most homogeneous mixing of fibres is

(A) Lap blending   (B) Tuft blending

(C) Sliver blending   (D) Roving blending

Answer: (B)

11. In a cotton comber, noil extraction increases

(A) With a decrease in detachment setting

(B) With an increase in pre-combing draft

(C) If majority of hooks are presented in leading direction

(D) With an increase in short fibres

Answer: **(D)**

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12. The bottom roller surface used for driving aprons in ringframe drafting system is

(A) Knurled   (B) Axially fluted

(C) Spirally fluted   (D) Smooth

Answer: **(A)**

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13. If the numerical value of yarn linear density expressed in Tex and that in English system is the same, this value to the nearest integer is

(A) 30   (B) 28   (C) 24   (D) 22

Answer: **(C)**

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14. Patterning is most likely to occur in

(A) Precision winding   (B) Random winding

(C) Step-precision winding   (D) Pirn winding

Answer: **(B)**

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15. In cotton yarn sizing, the starch primarily acts as

(A) Binding agent   (B) Lubricating agent

(C) Antistatic agent   (D) Antimicrobial agent

Answer: **(A)**

16. Purl is a

(A) Woven structure   (B) Nonwoven structure

(C) Braided structure   (D) Knitted structure

Answer: **(D)**

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17. The technology/ies used for producing SMS fabric is/are

(A) Spunlace   (B) Spunlace and Meltblown

(C) Needlepunch   (D) Spunbond and Meltblown

Answer: **(D)**

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18. Jigger CANNOT be used for

(A) Dyeing   (B) Printing

(C) Washing   (D) Scouring

Answer: **(B)**

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19. In the context of effluent discharge, BOD means

(A) Bio-oxidative degradation   (B) Bio oxygen distress

(C) Biological oxygen demand   (D) Bacteria observed on disc

Answer: **(C)**

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20. Milling is associated with the processing of

(A) Cotton fabric   (B) Silk fabric

(C) Jute fabric   (D) Wool fabric

Answer: **(D)**

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21. Dyed wool fabric standards are used for the evaluation of

(A) Wash fastness   (B) Perspiration fastness

(C) Sublimation fastness   (D) Light fastness

Answer: **(D)**

22. The yarn tenacity (gf/tex) measured in lea form, compared to that measured in single yarn form is

    (A) Always lower   (B) Always higher

    (C) Always equal   (D) Higher or lower depending on yarn count

Answer: **(A)**

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23. The property that Kawabata Evaluation System (KES) DOES NOT measure is

    (A) Shear rigidity   (B) Bending rigidity

    (C) Compressional resilience (D)   Tensile strength

Answer: **(D)**

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24. On absorption of moisture, the thermal insulation of cotton fabric will

    (A) Decrease   (B) Increase

    (C) Remain the same   (D) First increase and then decrease

Answer: **(A)**

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25. For meeting the criterion of number of defects in a product, the relationship between upper control limit (UCL) and upper specification limit (USL) should be

    (A) $\text{UCL} < \text{USL}$ (B) $\text{UCL} > \text{USL}$

    (C) $\text{UCL} = 2\text{USL}$ (D) $\text{UCL} = \left(\text{USL}\right)^3$

Answer: **(A)**

Q. 26- Q.55 Carry Two mark each

26. The maximum value $f\left(x\right) = \sqrt{2}\left(\sin x + \cos x\right)$ for x in $\left[0, \pi\right]$ is_____.

Answer: **(2)**

27. Out of the following, the exact differential equation is

(A) -ydx + xdy = 0   (B) ydx + xdy = 0

(C) ydx – xdy = 0   (D) dx + xdy = 0

Answer: **(B)**

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28. Let $f:[1,4] \to \Re$ be a continuous function such that $f(1)=0.32, f(2)=0.125, f(3)=0.025$ and $f(4)=0.05$. The value of the integral $\int\limits_{1}^{4} f(x)dx$, accurate up to three decimal places, obtained by trapezoidal rule with n = 3 is_____.

Answer: **(0.335)**

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29. The normal vector the surface $z = \sqrt{x^2 + y^2}$ at $(1,1,1)$ is

(A) $\hat{i} + \hat{j} + \hat{k}$ (B) $\hat{i} - \hat{j} + \hat{k}$ (C) $-\hat{i} - \hat{j} + \hat{k}$ (D) $-\hat{i} + \hat{j} + \hat{k}$

Answer: **(C)**

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30. Consider the analytical techniques in the Column I and the properties in Column II. Choose the correct alternative from amongst A, B, C, and D

Column I		Column II	
P.	FTIR	**1.**	Orientation
Q.	Differential scanning calorimetry	**2.**	Functional groups
R.	Density	**3.**	Crystallinity
S.	Birefringence	**4.**	Crystallization temperature

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

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

Answer: **(A)**

31. If T_g, T_m and T_c represent the glass transition, melting and crystallization temperature, respectively, the correct relationship is

(A) $T_g < T_c < T_m$

(B) $T_g < T_m < T_c$

(C) $T_c < T_g < T_m$

(D) $T_m < T_g < T_c$

Answer: **(A)**

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32. The correct sequence of unit operations employed in production of viscose rayon is

(A) Ageing - Steeping - Xanthation - Ripening

(B) Ageing - Steeping - Ripening - Xanthation

(C) Steeping - Ageing - Ripening - Xanthation

(D) Steeping - Ageing - Xanthation – Ripening

Answer: **(D)**

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33. Consider the following assertion [a] and reason [r] and choose the correct alternative from amongst A, B, C, and D.

[a] After polymerization of caprolactum, thorough washing of polymer with water is necessary to remove unreacted monomer and its oligomers.

[r] Otherwise, hydrolytic degradation of polymer would occur during melt spinning.

(A) [a] is right and [r] is wrong

(B) [a] is right and [r] is right

(C) [a] is wrong and [r] is wrong

(D) [a] is wrong and [r] is right

Answer: **(A)**

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34. Consider the fibres in Column I and the applications in Column II. Choose the correct alternative from amongst A, B, C, and D

Column I		Column II	
P.	Acrylic	**1.**	Chemical filtration
Q.	Jute	**2.**	Tire cord
R.	Nylon	**3.**	Precursor for carbon fibre
S.	Polypropylene	**4.**	Biodegradable sacks

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

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

Answer: (C)

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35.   Two polyester and six viscose rayon slivers of same count are blended on a drawframe. In the second passage, four slivers from first passage are further blended with two combed cotton slivers of the same count. The viscose (%) in the final sliver to the nearest integer is _____.

Answer: (50)

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36.   In ring spinning, the tension in yarn is the maximum

(A) Between the lappet guide and front roller

(B) Where the balloon radius is the maximum

(C) In winding zone

(D) Just below the lappet guide

Answer: (C)

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37.   A core spun yarn of 30 tex is to be produced with 10% core by weight. If the cotton roving count is 540 tex, the required draft on the ringframe will be _____

Answer: (20)

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38.   If the spindle speed of ringframe is 15000 rpm and the traveler speed at the maximum bobbin diameter of 50 mm is 0.8% less than that of the spindle. The yarn delivery rate (m/min), to the

nearest integer, will be _____

Answer: (19)

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39.   A rotor of 2 inch diameter is spinning a yarn of 16s Ne. If the twist multiplier is 5 and the fibre linear density is 0.1 tex, the average fibre flow through the transport channel, to the nearest integer, will be _____

Answer: (3)

40.   The groove drum in a random winder makes five revolutions for one double traverse. If the drum and package diameters are 10 cm and 5 cm, respectively, the wind per double traverse would be_____

Answer: **(10)**

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41.   A 500-end double-lift, single-cylinder jacquard has

(A) 500 hooks and 500 needles   (B) 500 hooks and 1000 needles

(C) 1000 hooks and 500 needles   (D) 1000 hooks and 1000 needles

Answer: **(C)**

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42.   A shuttle loom is running at 240 picks per minute. The angular velocity of bottom shaft in radian per second is $n\pi$. The value of n is _____

Answer: **(4)**

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43.   In an air-jet loom, if the weft yarn diameter is increased by 10%, keeping the linear density constant, the percent increase in the drag force would be _____

Answer: **(10)**

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44.   For a fully relaxed knitted fabric, the wale constant (K_w) and course constant (K_c) are 4.2 and 5.5, respectively. If the loop length is 0.5 cm, the loop density per cm^2, to the nearest integer, would be_____.

Answer: **(92)**

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45.   Consider the following assertion [a] and reason [r] and choose the correct alternative from amongst A, B, C, and D.

[a] Cross-laid needlepunched nonwoven fabrics demonstrate higher tensile strength in machine direction.

[r] In cross-laid nonwoven fabrics, the fibres are randomly oriented.

(A) [a] is right and [r] is wrong   (B) [a] is right and [r] is right

(C) [a] is wrong and [r] is wrong   (D) [a] is wrong and [r] is right

Answer: **(C)**

46. If $[C_s]$ and $[C_f]$ represent dye concentration in the bath and in the fibre, respectively, the isotherm for dyeing of polyester with disperse dyes is represented by the figure

(A)

$[C_f]$

$[C_s]$

(B)

$[C_f]$

$[C_s]$

(C)

$[C_f]$

$[C_s]$

(D)

$[C_f]$

$[C_s]$
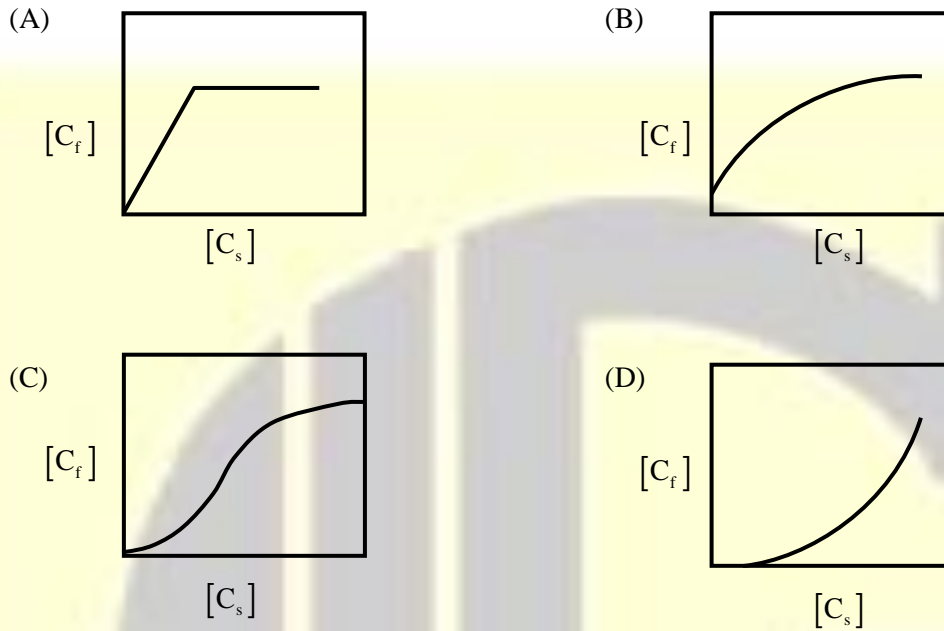
Answer: (A)

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47. A small hard particle is stuck in the doctor blade of a roller printing machine. The printing fault on the fabric, as a result of this, is represented by the figure

(A)

(B)

(C)

(D)
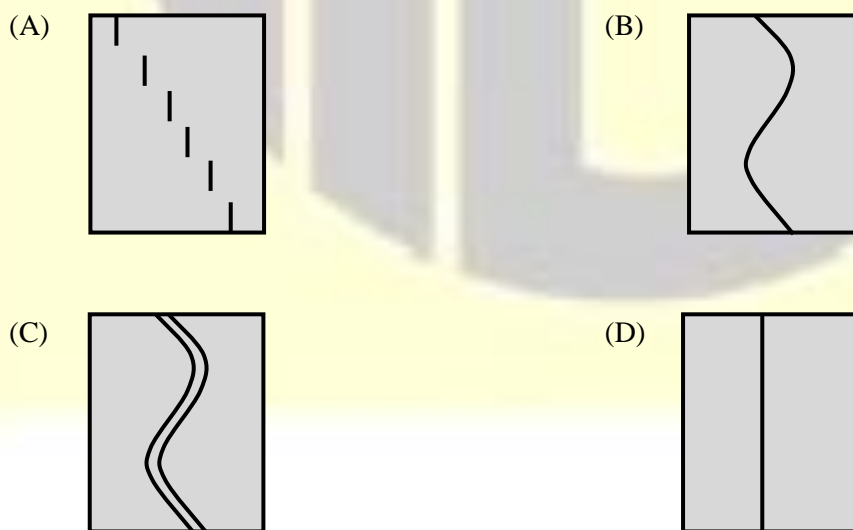
Answer: (C)

48. Consider the following assertion [a] and reason [r] and choose the correct alternative from amongst A, B, C, and D.

[a] Millions of shades can be produced through ink-jet printing with only four basic colours.

[r] The colours get mixed in appropriate proportions before jetting onto the fabric.

(A) [a] is right and [r] is wrong   (B) [a] is right and [r] is right

(C) [a] is wrong and [r] is wrong   (D) [a] is wrong and [r] is right

Answer: (A)

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49. Consider the following assertion [a] and reason [r] and choose the correct alternative from amongst A, B, C, and D.

[a] Fluorochemicals impart very high water repellency.

[r] Fluorochemicals significantly reduce the surface energy of the treated substrate.

(A) [a] is right and [r] is wrong   (B) [a] is right and [r] is right

(C) [a] is wrong and [r] is wrong   (D) [a] is wrong and [r] is right

Answer: (B)

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50. Consider the following assertion [a] and reason [r] and choose the correct alternative from amongst A, B, C, and D.

[a] In the context of foam finishing, the narrow size distribution of foam cells increases the half life of foam.

[r] The rate of coalescing and collapsing of foam cells is low in this case.

(A) [a] is right and [r] is wrong   (B) [a] is right and [r] is right

(C) [a] is wrong and [r] is wrong   (D) [a] is wrong and [r] is right

Answer: (B)

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51. For a typical yarn tensile test, force (F) in Newton and elongation (e) in cm are related as under

$$F = 2 + 4e + 3e^2$$

If the yarn fails at an elongation of 3 cm, the work of rupture in N-m, accurate up to first decimal place is_____

Answer: (0.5)

52. Choose the **INCORRECT** statement from amongst the A, B, C, and D

(A) Crease recovery is higher for thick and dense fabric

(B) Tear strength of fabric improves with greater float length

(C) Strength CV of yarn does not affect the weaveability

(D) Higher drape coefficient indicates stiffer fabric

Answer: **(C)**

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53. The unique ability of woven fabric to drape in multiple curvatures is mainly due to

(A) High tensile modulus   (B) Low shear rigidity

(C) Low compressibility   (D) High bending rigidity

Answer: **(B)**

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54. The relationship between 50% span length of fibre (L_1) and 2.5% span length of fibre (L_2) for a given cotton variety is given by

$$L_1 = \frac{L_2}{2} + 5$$

If standard deviation (SD) of L_2 is 4 mm, that of the L_1, in mm, would be_____

Answer: **(2)**

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55. The correlation coefficient (r) between two variables is 0.9. The unexplained variation (%) is _____.

Answer: **(19)**