GENERAL APTITUDE

Q. 1- Q.5 Carry one mark each

1. Choose the most appropriate word from the options given below to complete the following sentence.

A person suffering from Alzheimer's disease _____ short-term memory loss

(A) experienced (B) has experienced

(C) is experiencing (D) experiences

Answer: (D)

---

2. Choose the most appropriate word from the options given below to complete the following sentence.

_____ is the key to their happiness; they are satisfied with what they have.

(A) Contentment (B) Ambition (C) Perseverance (D) Hunger

Answer: (A)

---

3. Which of the following options is the closest in meaning to the sentence below?

"As a woman, I have no country."

(A) Women have no country.

(B) Women are not citizens of any country.

(C) Women's solidarity knows no national boundaries.

(D) Women of all countries have equal legal rights.

Answer: (C)

---

4. In any given year, the probability of an earthquake greater than Magnitude 6 occurring in theGarhwal Himalayas is 0.04. The average time between successive occurrences of such earthquakesis ____ years.

Answer: (25 to 25)

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5. The population of a new city is 5 million and is growing at 20% annually. How many years wouldit take to double at this growth rate?

(A) 3-4 years (B) 4-5 years (C) 5-6 years (D) 6-7 years

Answer: (A)

Q. 6- Q. 10 carry two marks each.

6. In a group of four children, Som is younger to Riaz. Shiv is elder to Ansu. Ansu is youngest in thegroup. Which of the following statements is/are required to find the eldest child in the group?

Statements

1. Shiv is younger to Riaz.

2. Shiv is elder to Som.

(A) Statement 1by itself determines the eldest child.

(B) Statement 2 by itself determines the eldest child.

(C) Statements 1 and 2 are both required to determine the eldest child.

(D) Statements 1 and 2 are not sufficient to determine the eldest child.

Answer: (A)

---

7. Moving into a world of big data will require us to change our thinking about the merits ofexactitude. To apply the conventional mindset of measurement to the digital, connected world ofthe twenty-first century is to miss a crucial point. As mentioned earlier, the obsession withexactness is an artefact of the information-deprived analog era. When data was sparse, every datapoint was critical, and thus great care was taken to avoid letting any point bias the analysis.

From "BIG DATA" Viktor Mayer-Schonberger and Kenneth Cukier

The main point of the paragraph is:

(A) The twenty-first century is a digital world

(B) Big data is obsessed with exactness

(C) Exactitude is not critical in dealing with big data

(D) Sparse data leads to a bias in the analysis

Answer: (C)

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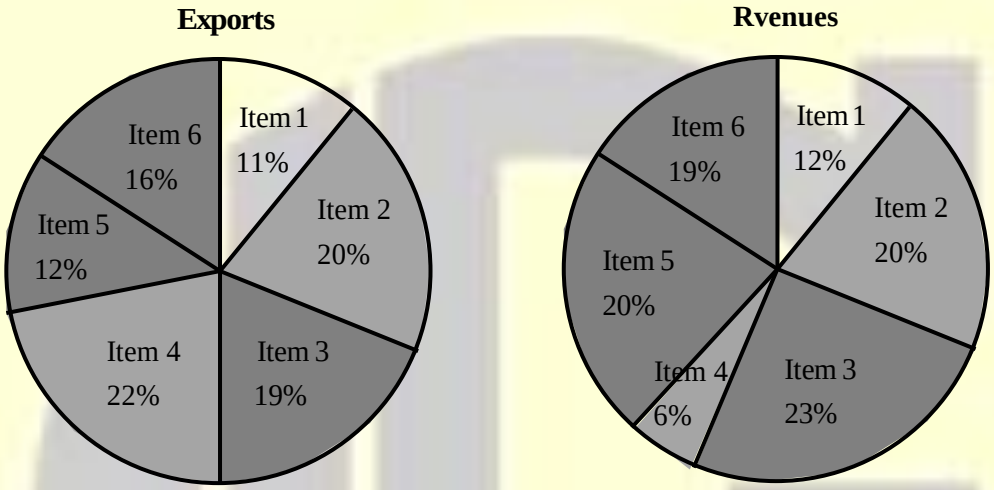
8. The total exports and revenues from the exports of a country are given in the two pie charts below.

The pie chart for exports shows the quantity of each item as a percentage of the total quantity ofexports. The pie chart for the revenues shows the percentage of the total revenue generated throughexport of each item. The total quantity of exports of all the items is 5 lakh tonnes and the totalrevenues are 250 crore rupees. What is the ratio of the revenue generated through export of Item 1per kilogram to the revenue generated through export of Item 4 per kilogram?



(A) 1:2 (B) 2:1 (C) 1:4 (D) 4:1

Answer: (D)

---

9. X is 1 km northeast of Y. Y is 1 km southeast of Z. W is 1 km west of Z. P is 1 km south of W. Q is1 km east of P. What is the distance between X and Q in km?

(A) 1 (B) $\sqrt{2}$ (C) $\sqrt{3}$ (D) 2

Answer: (C)

---

10. 10% of the population in a town is HIV^+. A new diagnostic kit for HIV detection is available; this kit correctly identifies HIV^+ individuals 95% of the time, and HIV- individuals 89% of the time. A particular patient is tested using this kit and is found to be positive. The probability that the individual is actually positive is _____.

Answer: (0.48 to 0.49)

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TEXTILE ENGINEERING

Q. 1- Q.25 Carry one mark each

1. The range of values of x satisfying the inequality $x^2 - 3x + 2 < 0$ is

(A) $x < 0$ (B) $0 < x < 1$ (C) $1 < x < 2$ (D) cannot be determined

Answer: (C)

---

2. A very large tank contains 10 liters of pure water. Salt solution (20 g/*l*) is pumped into the tank at 2 liter per minute. The salt concentration in g/*l* in the tank after a very long time will be

(A) 5 (B) 10 (C) 20 (D) 40

Answer: (C)

---

3. The inverse Laplace transform of $\frac{2}{s^2 + 2s} + \frac{s}{s^2 + 4s + 4}$ is

(A) $1 - 2te^{-2t}$ (B) $1 - e^{-2t} + 2te^{-2t}$

(C) $1 - 2e^{-2t} + 2te^{2t}$ (D) $e^{-2t} + 2te^{-2t}$

Answer: (A)

---

4. The probability of obtaining a total of 5 in two throws of a dice is

(A) 1/6 (B) 1/9 (C) 1/12 (D) 1/8

Answer: (B)

---

5. Medulla is associated with

(A) Cotton (B) Silk (C) Wool (D) Nylon

Answer: (C)

---

6. A good fibre forming polymer should NOT have

(A) Linear polymeric chain (B) Branched polymeric chain

(C) High DP (D) High inter-molecular interaction

Answer: (B)

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7. The DP of viscose fibre is approximately

(A) 25000 (B) 2500 (C) 250 (D) 25

Answer: (C)

---

8. A synthetic yarn is stretched by 5% and kept in the extended condition. With time, the registered stress will

(A) Increase linearly (B) Decrease linearly

(C) Increase exponentially (D) Decrease exponentially

Answer: (D)

---

9. In a cotton card, the wire point density on

(A) Cylinder is lesser than that on flat (B) Doffer is greater than that on cylinder

(C) Cylinder is greater than that on flat (D) Flat is greater than that on doffer

Answer: (C)

---

10. In a drawframe with 3 over 3 drafting system, the roller most prone to slip is

(A) Middle top roller (B) Front top roller

(C) Back top roller (D) Front bottom roller

Answer: (A)

---

11. Fibre parallelization in drawn sliver improves with

(A) Increase in draft (B) Increase in doubling

(C) Decrease in roller setting (D) Increase in roller pressure

Answer: (A)

---

12. The combing force increases with

(A) Decrease in mass/unit length of lap (B) Decrease in pre-combing draft

(C) Decrease in needles/cm on half lap (D) Decrease in nips per minute

Answer: (B)

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13. Pirn winding is an essential preparatory process for weaving on

(A) Air-jet loom (B) Water-jet loom

(C) Rapier loom (D) Drop-box loom

Answer: (D)

---

14. Double acting dobby is driven from

(A) Bottom shaft (B) Crank shaft

(C) Tappet shaft (D) Rocking shaft

Answer: (A)

---

15. In air-jet loom

(A) All the relay nozzles start jetting at the same time

(B) Each relay nozzle has separate jetting time

(C) Relay nozzles of a group start jetting at the same time

(D) Main and relay nozzles have same jetting time

Answer: (C)

---

16. If the diameter of a torsion rod used in projectile loom is doubled then the torque required to twist itwould increase by

(A) 2 times (B) 4 times (C) 8 times (D) 16 times

Answer: (D)

---

17. In a sizing process, if add-on is 12.8% and paste concentration is 16%, the value of wet pick-up (%)would be

(A) 16 (B) 50 (C) 80 (D) 200

Answer: (C)

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18. The fibre parameter that CANNOT be obtained from Baer sorter diagram is

(A) Mean length (B) Effective length

(C) Span length (D) Modal length

Answer: (C)

---

19. A 25 tex cotton yarn has a twist factor of 30. The yarn twist, in turns per cm, is

(A) 4 (B) 5 (C) 6 (D) 7

Answer: (C)

---

20. With an increase in gauge length, the tenacity of a spun yarn would

(A) Increase (B) Decrease

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

Answer: (B)

---

21. Sodium chlorite bleaching of cotton is carried out in the temperature range of

(A) 95-110°C (B) 80-85°C

(C) 50-60°C (D) 30-40°C

Answer: (B)

---

22. K/S ratio is related to reflectance (R) as

(A) $K/S = (1-R^2)/2R$ (B) $K/S = (1+R^2)/2R$

(C) $K/S = (1-R)/2R$ (D) $K/S = (1-R)^2/2R$

Answer: (D)

---

23. A print paste CANNOT be prepared without

(A) Colourant (B) Thickener

(C) Dispersing agent (D) Carrier

Answer: (B)

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24. In the Limiting Oxygen Index (LOI) test, the sample is kept in

(A) Horizontal position and burnt from the left side

(B) Inclined position and burnt from the bottom

(C) Vertical position and burnt from the top

(D) Vertical position and burnt from the bottom

Answer: (C)

---

25. A fabric was dyed in acidic medium. If the dye could be stripped out in strong aqueous alkaline solution at room temperature, the dye-fibre combination is

(A) Direct dye – Cotton

(B) Acid dye - Wool

(C) Vat dye – Cotton

(D) Disperse dye – Polyester

Answer: (B)

Q. 26- Q.55 Carry Two mark each

26. Of the two eigen values of the matrix $\begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$

(A) One is positive, one is negative

(B) Both are positive

(C) Both are negative

(D) Both form a complex conjugate

Answer: (A)

---

27. The 51^{st}common term of the two arithmetic sequences 15, 19, 23 ..... and 14, 19, 24 ...., is _____

Answer: (1019 to 1019)

---

28. The integrating factor for solving the differential equation $\frac{dy}{dx}\cos(x) + y\sin(x) = 2\cos^3(x)$ is

(A) sin(x) (B) cos(x) (C) tan(x) (D) sec(x)

Answer: (D)

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29. X is a continuous random variable whose probability density function is given by

$$f(x)=\begin{cases} K\left(4x-2x^2\right) & \text{for } 0<x<2 \\ 0 & \text{otherwise} \end{cases}$$

The value of the constant K, accurate to three decimal places, is_____.

Answer: (0.374 to 0.376)

---

30. $\int_0^2 e^x dx$ is evaluated both by Trapezoidal rule and Simpson's 1/3 rule by taking two subintervals.

The difference between the results, accurate to the second decimal place, is _____

Answer: (0.47 to 0.51)

---

31. Consider the following assertion [a] and reason [r] and choose the most appropriate answer.

[a] The apparent blend ratio of polyester / viscose fabric would increase as a result of drying

[r] The moisture content of viscose is significantly higher than that of polyester

(A) [a] is right [r] is wrong
(B) [a] is right [r] is right
(C) [a] is wrong [r] is wrong
(D) [a] is wrong [r] is right

Answer: (B)

---

32. Consider the following assertion [a] and reason [r] and choose the most appropriate answer.

[a] In the case of condensation polymerization of PET, diethylene glycol terephthalate (DGT) is prepared first

[r] In condensation polymerization, it is important to have a correct stoichiometric balance of comonomers

(A) [a] is right [r] is wrong
(B) [a] is right [r] is right
(C) [a] is wrong [r] is wrong
(D) [a] is wrong [r] is right

Answer: (B)

---

33. A polypropylene yarn, melt spun at a throughput rate of W (g/s) and winding speed of S (m/min),was drawn to a draw ratio of D. The denier of this yarn is a function of W, S, D and a constant K.

The value of K, accurate to the nearest integer, is_____

Answer: (540000 to 540000)

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34. Consider the following assertion [a] and reason [r] and choose the most appropriate answer.

[a] Cut and crush method for tow to top conversion uses cutting roller with embedded helical blade

[r] This helps to impart crimp in the cut fibres

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

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

Answer: (A)

---

35. Consider the following assertion [a] and reason [r] and choose the most appropriate answer.

[a] Before SEM analysis of carbon fibre, it is sputter coated with gold or silver

[r] This is done because the carbon fibre is electrically insulating

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

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

Answer: (C)

---

36. A cleaning unit in a blowroom is processing cotton at 600 kg/h. The waste generated is 2%. The lintto trash ratio is 60:40. The lint (in kg) accumulated in 8 hours, accurate to one decimal place, willbe_____.

Answer: (57.5 to 57.7)

---

37. The twist contraction factor of a filament yarn is 1.06. For producing 5 ton twisted yarn of 50 tex,the untwisted yarn length required, in km, accurate to the nearest integer, is .....

Answer: (106000 to 106000)

---

38. For producing a coarse count yarn from short staple trashy cotton sliver, the most suitable rotor is

(A) Large diameter rotor with narrow groove

(B) Large diameter rotor with wide groove

(C) Small diameter rotor with narrow groove

(D) Small diameter rotor with wide groove

Answer: (B)

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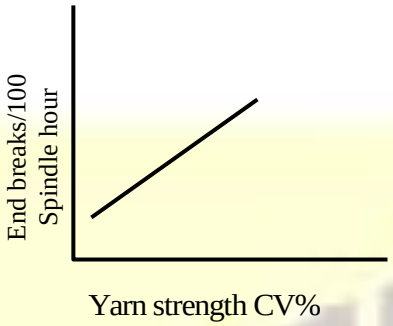
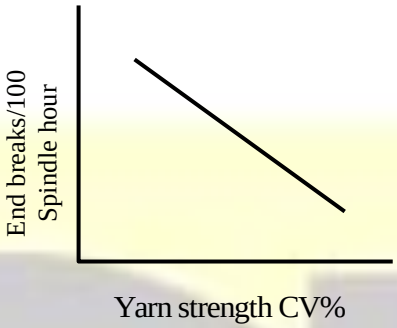
39. Consider the following figures. Choose the alternative that represents the correct relation

(A)

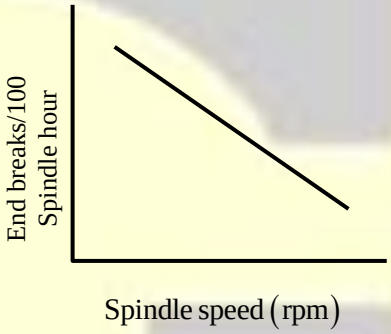


(B)



(C)

(D)



Answer: (A)

---

40. The surface helix angle of a fibre in a yarn of 0.3 mm diameter is 30°. Assuming ideal helix geometry, the helix angle (in degrees), of a fibre situated at 0.1 mm from the yarn axis, accurate to one decimal place, will be_____.

Answer: (10.7 to 11.1)

---

41. Higher value of stitch cam setting in a weft knitting machine would

(A) Increase the loop length and decrease the fabric areal density

(B) Increase the loop length and increase the fabric areal density

(C) Decrease the loop length and decrease the fabric areal density

(D) Decrease the loop length and increase the fabric areal density

Answer: (A)

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42. A shuttle loom producing 3 up 1 down twill fabric is running at 180 picks per minute. The angular velocity of the tappet (cam) shaft in radian per second, accurate to two decimal places, would be _____.

Answer: (4.67 to 4.74)

---

43. A yarn is passing over a multiplicative tensioner with an angle of wrap of 90°. If the input yarn tension is 100 cN and coefficient of friction between yarn and tensioner is 0.2, then the output yarn tension in N, accurate to two decimal place, would be _____.

Answer: (1.35 to 1.39)

---

44. During beat-up, possibility of bumping increases if

(A) Warp tension is low and cloth fell displacement is low

(B) Warp tension is low and cloth fell displacement is high

(C) Warp tension is high and cloth fell displacement is low

(D) Warp tension is high and cloth fell displacement is high

Answer: (B)

---

45. A needle-punched nonwoven fabric has 2 mm thickness and $400\text{g}/\text{m}^2$ areal density. If the fibre density is $0.9\text{g}/\text{cm}^3$, the volume porosity (%) of the fabric, accurate to the nearest integer, will be _____.

Answer: (78)

---

46. For a square plain fabric, crimp in one set of yarns would be completely removed without jamming, if the ratio of modular length (l) to the sum of the yarn diameters (D) is

(A) Between $\pi/8$ and $\pi/6$

(B) Between $\pi/6$ and $\pi/4$

(C) Between $\pi/4$ and $\pi/2$

(D) Greater than $\pi/2$

Answer: (D)

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47. The breaking load of a 300 mtexfibre is 110 mN. If the density of the fibre is $1.24 g/cm^3$, breaking stress in kN/cm^2, accurate to one decimal place, will be_____.

Answer: (45 to 46)

---

48. A 60.5 tex yarn with an unevenness CV of 10% is produced form 0.5 tex polyester fibre. The index of irregularity of the yarn, accurate to one decimal place, will be_____.

Answer: (1.1)

---

49. The vibroscope method for determination of fibre fineness does NOT take into account

(A) Length of specimen
(B) Natural frequency of specimen
(C) Tension in specimen
(D) Tensile strength of specimen

Answer: (D)

---

50. In the context of Kawabata Evaluation System, match the fabric properties from Group I with the units from Group II.

Group I	Group II
P. Tensile energy	**1.** $gf.cm^2 / cm$
Q. Linearity of load-elongation curve	**2.** percentage
R. Bending rigidity	**3.** $gf.cm / cm^2$
S. Compressional resilience	**4.** dimensionless

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

Answer: (A)

---

51. The Barium Activity Number (BAN) was determined using the standard procedure. For this, 30 mlof 0.25N $Ba(OH)_2$ solution was used, in each of the three titrations, i.e. (a) blank titration, (b) backtitration where mercerized fabric sample was immersed and (c) back titration where unmercerizedfabric sample was immersed in $Ba(OH)_2$ solution. If the volume (ml) of 0.1N HCl consumed was 10,1 and 4.5 respectively, the BAN of the mercerized sample, accurate to one decimal place, is_____.

Answer: (163 to 164)

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52. Scoured and bleached cotton fabric was dyed with reactive dye under the following conditions:

Temperature of dyeing:	40°C
Shade:	3%
Fixation efficiency:	65%

If the rate of hydrolysis of dye is known to be 5% more for every 10°C rise in dyeing temperature, the amount of dye fixed on cotton (g of dye / kg of fibre), if dyed at 50°C, accurate to one decimal place, would be _____.

Answer: (18.4 to 18.6)

---

53. Consider the following assertion [a] and reason [r] and choose the most appropriate answer.

[a] In a roller printing machine, the doctor blade is closely set over the printing roller

[r] This is to remove the lint collected on the roller

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

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

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

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

Answer: (A)

---

54. A cotton fabric is finished with DMDHEU. As a result, its

(A) Tensile strength decreases, abrasion resistance increases, stiffness decreases

(B) Tensile strength decreases, abrasion resistance decreases, stiffness decreases

(C) Tensile strength decreases, abrasion resistance decreases, stiffness increases

(D) Tensile strength increases, abrasion resistance increases, stiffness decreases

Answer: (C)

---

55. During burning, a flame retardant does NOT

(A) Increase heat absorption

(B) Reduce supply of oxygen

(C) Increase char content

(D) Lower glass transition temperature (Tg)

Answer: (D)

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