2013

TEXTILE TESTING

Time Allotted : 3 Hours   *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words

as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

i) Air flow method is used to measure .... of yarn.

a) maturity b) hairiness

c) fineness d) moisture content.

ii) Knowledge of air permeability is not useful in case of

a) curtain fabric b) sail cloth

c) filter cloth d) parachute fabric.

iii) With respect to tear strength which of the following

statements is correct ?

a) Tear strength of twill weave > Tear strength of

plain weave

b) Tear strength of high set fabric < Tear strength of

low set fabric

c) Tear strength does not depend upon weave and set

d) Tear strength depends upon thread strength.

iv) Largest amount of shrinkage of woven cloth is

represented by

a) swelling of threads

b) increase of threads

c) decrease in yarn length

d) none of these.

v) Rotameter is used to measure

a) rate of air flow

b) air permeability of cloth

c) air resistance of cloth

d) none of these.

vi) 'Advancing contact angle' causes

a) longitudinal wicking

b) fabric wetting

c) water surface roll over the fabric

d) transverse wicking.

vii) Elmendrof tear tester directly measures

a) energy required to tear

b) tearing force

c) tearing force $\times$ number of broken threads

d) tearing force per broken thread.

viii) Tog meter is used to measure

a) moisture permeability b) air permeability

c) drape coefficient d) thermal transmittance.

ix) Air permeability of fabrics is generally measured with a

pressure drop across fabrics equivalent to water head of

a) 1 mm b) 10 mm

c) 10 cm d) 1 m.

x) A fabric made from 100% polyester stable is more prone

to the formation of pills than 100% cotton fabric.

a) True b) False.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Explain how Kzoney's equation helps to design an instrument for measuring fineness of cotton fibre. How do you measure maturity by air flow methods ?

3. What are the imperfections in spun yarn detected by Uster Instrument ? Define these imperfections. How do they differ from classimat faults ? Which one is the long thinnest fault ? What are objectionable faults ?

4. In a woven cloth derive the relationship

$K_1 + K_2 = 1\frac{1}{6} \sqrt{[W(n_1 + n_2)]}$ where K_1, K_2 are cover factors of warp and weft, $W =$ weight of cloth per square yd in *OZ*.

n_1, $n_2 =$ ends and picks per inch.

5. State why the strip strength of single yarn is higher than single yarn strength.

6. In extremely cold environments, clothing must be able to transport the sweat caused by vigorous activity. Discuss.

7. A drawframe sliver with a *CV* value of 4% is presented to the speed frame. The resulting roving has a *CV* value of 8·4%. The yarn spun from this roving has an overall coefficient of variation value of 14·5%. It is required to determine to what extent this irregularities were provided by the speed frame and to what extent by the ring spinning frame.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

8. a) Define air permeability, air resistance, porosity, thermal resistance of a fabric. 4

b) Define Snake chart, KESF and FAST system of fabric

testing. 5

c) Briefly explain creep and stress relaxation behaviour of yarn. 6

9. Describe the principle of stelometer. Explain how the measured values of cotton fibre is expressed. How is the strength of cotton fibre measured in HVI system ? What is the difference between stelometer and precisely measuring instruments ? What is the advantage of using $\frac{1}{8}''$ gauge length fibre testing ? Why is the single fibre testing not done in industry ? $5 + 1 + 2 + 3 + 2 + 2$

10. a) Higher wind speed reduces the thermal insulation value of a fabric to a large extent. Give reasons. 4

b) Mention the points require consideration when measuring fabric thickness. 6

c) Show that the number of samples required for testing depends on variability in the material being tested. 5

11. a) Wing rip test overcomes the problem of tear transfer, in case the direction to be torn in stronger than the other direction. Justify with reasons. 4

b) Explain the effect of fabric cover factor and yarn twist factor on the air permeability of fabric. 4

c) Briefly explain between and within length *CV* of ring yarn. 4

d) The grab strength of a fabric is higher than its strip strength. Explain why. 3

12. a) Define 'degree of cell wall thickening' of cotton fibre. Discuss about maturity ratio of cotton fibre and procedure to measure it. 4

b) Discuss the difference between CRE and CRL principle of yarn testing. 4

c) Projected area of a 45 cm diameter fabric placed on 30 cm anvil is 625 cm^2. Calculate the drape coefficient of the fabric. 4

d) Discuss 'weak link' effect with proper diagram. 3

13. Define drape coefficient of a cloth. Describe the principle of measuring the drape coefficient of a cloth. What problem do you face when you use it for single-jersey knitted fibre ? Among needle punched and 2/2 gabardine cloth, which one does show better draping and why ? Explain the nature of relation between drape coefficient and bending length of woven fabric. How do the number of nodes and shape of node relate the draping qualities ? 1 + 5 + 2 + 3 + 2 + 2

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