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18TX55

Fifth Semester B.Tech. Degree Examination, July/August 2021
Textile Testing - I

Time: 3 hrs.

Max. Marks: 100

Note: *Answer any FIVE full questions.*

1   a.   State the objectives of sampling and explain the meaning of stratified , cluster and perfect numerical sampling. **(05 Marks)**
   b.   Briefly explain the core sampling technique used for sampling of fibres from bulk. **(05 Marks)**
   c.   State the meaning of correct invoice wt and give the importance of measuring the same. 20,000 km of 150 denier yarn of 8.5% Moisture content is shipped. Find the correct invoice weight if the official moisture regain is 6.0%. **(10 Marks)**

2   a.   Briefly explain random draw method and cut square method of sampling of card sliver and fibres in a yarn. **(05 Marks)**
   b.   State the meaning of MR and MC of fibres. Find the moisture regain (MR) of fibre if moisture content MC is 8% and find the moisture content of the fibre if moisture regain is 6%. **(05 Marks)**
   c.   Discuss the reasons for maintaining standard atmospheric conditions in textile testing laborator, with respect to testing of cotton textiles and explain the measurement of RH of the atmosphere using wet and dry bulb hygrometer. **(10 Marks)**

3   a.   Draw the Sorter diagram (comb sorter) for fibre length analysis and mark various length parameters and give definition of each parameter. **(05 Marks)**
   b.   The 2.5% and 50% span length of a cotton fibre is 1.22 inch and 0.41 inch respectively. Find Uniformity ratio and define the terms 2.5% and 50% span length. **(05 Marks)**
   c.   Find the fineness of fibre in decitex if density = 1.38g/cm^3 , diameter = 12 micrometer. What would be the value of fineness of above fibre in millitex , tex and denier. **(05 Marks)**
   d.   Explain how maturity ratio of cotton fibres is found using NaOH method. **(05 Marks)**

4   a.   Briefly explain the importance of fineness and maturity in assessing the strength of yarns. **(05 Marks)**
   b.   An examination of 200 cotton fibres, 130 are normal , 50 semi matured and 20 one dead fibres are observed. Find out maturity ratio and also show that theoretical maturity ratio varies from 0.2 to 1.2. **(05 Marks)**
   c.   Show that finer and longer fibres give yarn with higher tenacity (for same linear density of yarn) than shorter and coarser fibres even though breaking load of finer and longer fibres are less than coarser and shorter fibres. **(05 Marks)**
   d.   Explain the principle of Airflow method used to find the fineness of cotton fibres. **(05 Marks)**

5   a.   Briefly explain the effect of fibre length and rate of testing on tensile strength of fibres. **(05 Marks)**
   b.   In a stelometer the breaking loads of a cotton fibres bundle were found to be 2.25kg and 0.994 kg with zero and 3mm gauge lengths and the mass of tested fibre bundles were 3.0 mg and 2.1mg respectively. Determine bundle strength of cotton fibre at zero gauge length and 3mm gauge length. **(05 Marks)**
   c.   State the principle of which HVI works. Explain how span length, length uniformity strength, elongation and micronaire values are measured using HVI. **(10 Marks)**

6 a. Define the term Pressly Index. In a Pressley fibre strength tester the breaking load of a cotton fibre bundle is 5 pound and mass is 4mg. Determine Pressley Index and Bundle tenacity in g/Tex. **(05 Marks)**

b. Explain how Colour grade , Short fibre Index and Spinning consistency Index is measured using HVI data. **(05 Marks)**

c. Explain the differences between CRL , CRT and CRE principle of measuring strength of fibres. **(05 Marks)**

d. Find the tenacity of filament in g/Tex and g/denier if mean breaking load is 500gf and linear density of filament is 50Tex. **(05 Marks)**

7 a. Define the terms (with respect to linear density of yarn) : i) Tex   ii) Decitex
iii) Millitex iv) Kilotex v) Denier   vi) Ne   vii) Wollen count
viii) Worsted count   ix) Metric count. **(05 Marks)**

b. 500 meters of certain yarn weight 20 grams. Determine the linear density of the yarn in Tex, Millitex , Decitex , Denier and Kilotex. **(05 Marks)**

c. State the differences between AFIS and HVI. State various length parameters which can be obtained from AFIS and explain AFIS length , Data analysis. **(10 Marks)**

8 a. 840 yards of certain yarn weighs 0.1 ℓbs. Determine the count of yarn in Ne and Worsted system. **(05 Marks)**

b. Explain when should we use Beesley balance for measuring the count of yarn and explain the procedure to determine count of the yarn using Beesley balance. **(05 Marks)**

c. Find the resultant count of the 3 ply yarn which is produced from a 100Nm worsted yarn , a 90 denier polyester filament and a 60Tex cotton yarn . Give your answer both in Tex and Ne. **(05 Marks)**

d. State the principle of working of AFIS. Briefly explain AFIS nep data analysis. **(05 Marks)**

9 a. Explain the effect of yarn twist on Strength , Handle of fabric , Moisture regain , Aesthetics of fabric. (Draw graphs wherever necessary). **(08 Marks)**

b. Explain the principle of CRE for measuring yarn strength and also explain the measurement of various strength parameters using Instron yarn instrument. **(08 Marks)**

c. Direct twist factor of 35Nm yarn is 36 tp cm – tex$^{1/2}$. Find the approximate tpi of yarn. **(04 Marks)**

10 a. State the importance of determining twist multiplier and explain how to calculate the same in direct and indirect system. **(05 Marks)**

b. A yarn of 50cm weighing 10mg, when tested on Instron gave a breaking load of 500gf and the length of yarn at breakage was 60cm. Find the tenacity (in gPT) and elongation % at break of the yarn. **(05 Marks)**

c. Explain the working of twist tester which works on untwist and twist principle. If yarn of 10 inches is tested using this principle and if the counter shows the reading of 400.00 determine TPI of yarn. **(10 Marks)**

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