

**KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY**

*Department of Textile Engineering*

B. Sc. Engineering 1st Year 2nd Term Examination, 2018

**Hum-1221**

(Business and Communicative English)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.  
ii) Figures in the right margin indicate full marks.  
iii) Assume reasonable data if missing any.

**SECTION-A**

- 1(a) Transform the following sentences as directed: 14
- i) Going home, he found his brother. (Compound)
  - ii) There are lots of things to do. (Passive)
  - iii) She must speak the truth. (Negative)
  - iv) None of us was absent. (Affirmative)
  - v) Truthfulness is one of the best qualities. (Positive)
  - vi) He is blind and cannot see. (Simple)
  - vii) There is nothing wrong with me. (Interrogative)
- 1(b) Make wh questions from the underlined parts of the following answers. 12
- i) The day being hot, I did not go to office.
  - ii) Our temporary capital was at Mujib Nagar.
  - iii) My suit cost seven thousands taka only.
  - iv) They are waiting for you.
  - v) She likes flowers.
  - vi) She takes only ripe mangoes.
- 1(c) Make sentences using the following phrases and idioms: 09  
Ad hoc; Null and void; In the guise of; In a body; Hard and fast; Bad blood.
- 2(a) Make sentences on the following structures: 14
- i) Sub + transitive verb + indirect object + direct object.
  - ii) There + verb + subject.
  - iii) Sub + transitive verb + object + noun complement.
  - iv) Sub + transitive verb + object + adjective complement.
  - v) Sub + linking verb + noun complement.
  - vi) Sub + be verb + adverbial.
  - vii) Sub + intransitive verb + adverbial.
- 2(b) Change the following words as asked in brackets and make sentences with the changed forms: 12  
Packet (into verb), refer (into adverb), retard (into noun), centre (into adjective), deep (into noun), speak (into noun)

- 2(c) Make sentences using the words as directed: 09  
 Once (as conjunction), better (as adverb), above (as preposition), why (as interjection),  
 such (as adjective), the (as adverb)
- 3(a) Correct the following sentences: 14
- i) He avoids to speak to me.
  - ii) Edison discovered the gramophone.
  - iii) It may result trouble.
  - iv) She did it never.
  - v) I am senior than you.
  - vi) I and he liked it.
  - vii) Any of these two girls is her sister.
- 3(b) Write a synonym and an antonym for each of the words and use the new words in sentences: 12  
 Bigotry, Camouflage, Dexterous
- 3(c) Make new words with the following prefixes and suffixes and make sentences with the new words: 09  
 Pre....., Be....., De....., Mal....., .....ship, .....dom
- 4(a) Complete the sentences with subordinate clauses as directed: 14
- i) ..... is a mystery. (noun clause)
  - ii) It is clear ..... (noun clause)
  - iii) The book ..... has been replaced. (adjective clause)
  - iv) I want a pen .....in Bangladesh. (adjective clause)
  - v) I shall go ..... (Adv. Clause of place)
  - vi) Come ..... (Adv. Clause of time)
  - vii) ....., you cannot prosper. (Adv. Clause of condition)
- 4(b) Make sentences expressing the following emotions/notions: 12  
 i) Anger, ii) Seasonal greetings, iii) Approval, iv) Offer, v) Sympathy, vi) Invitation.
- 4(c) Complete the sentences using a suitable verb: 09
- i) Why .....to bed so early last night?
  - ii) Your house is very beautiful. How long .....here?
  - iii) Where .....? Just to the post box. I want to post this letter.
  - iv) ..... Tom recently? Yes, I met him yesterday.
  - v) ..... to the USA? No, never.
  - vi) ..... television every evening? No, only if there is a good programme on.

## SECTION-B

5(a) Read the passage and answer the following questions: 20

Today's teenagers are a generation for whom the line between online and real world interaction is practically non-existent. The apotheosis of this is myspace.com, which began as a social networking site, but which now is 'a nightclub open 24 hours a day, seven day a week'. Myspace currently receives more daily visits than Google and Amazon. The site has 40 million members worldwide, each using their personal page to email and post bulletins, blogs and photos of themselves. It is precisely that creation of identity which has made it such a teen sensation.

It's like a voluntary Big Brother. For millions of teenagers, the Internet is like a drug. And the madness of the Internet and of adolescent hormones can be especially potent combination. On one occasion, 14-year-old Kara met 18-year-old David on Myspace. The relationship, which began as a friendship, intensified on the site. When her parents, who opposed the relationship, tried to cut off her online access to him, her parents were shot dead by the boy.

The internet fuels fantasy. You can be an Internet warrior, an Internet seductress. Kids are using these sites to act out fantasy. On the Internet, you are allowed the chance to be the best. Besides, lonely, unpopular or troubled teenagers get online and play the roles they want to be. It doesn't matter if anyone is actually reading their postings or not: it just feels good to let it all out, and see it archived forever.

- i) Why being a teenager and using Internet is such a potent combination?
- ii) Why were Kara's parents murdered?
- iii) What is meant by "Internet fuels fantasy"?
- iv) Do you really think Internet is addictive? Why?

5(b) Make a précis of the above passage with a suitable title. 15

6(a) Amplify the idea contained in the following statement: 20  
"Experience is the best teacher".

6(b) Write a contrast paragraph on Technical Education and General Education. 15

7(a) Suppose you are the President of Admiral Sportswear. Write a memo announcing the annual company picnic. Plan the event, venue and ask all staff to join with family members. 15

7(b) Ashworth is looking for a Textile Engineer specialized in branded golf apparel. Prepare your CV and apply for the post. 20

8(a) Write a free composition on any one of the followings: 35

- a) The role of engineers in the social reconstruction.
- b) Corruption in Bangladesh.

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**KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY**

*Department of Textile Engineering*

B. Sc. Engineering 1st Year 2nd Term Examination, 2018

**Ch-1221**  
(Chemistry-II)

Time: 3 Hours

Total Marks: 210

**N.B.:** i) Answer any THREE questions from each section in separate scripts.

ii) Figures in the right margin indicate full marks.

iii) Assume reasonable data if missing any.

**SECTION-A**

- 1(a) What is meant by plane polarized light and optical activity? Explain. 10
- 1(b) Explain the terms geometrical isomerism and enantiomerism with examples. 12
- 1(c) Tartaric acid is optically inactive. Why? 07
- 1(d) Predict the R and S configurations of FCIC\*BrI compound. 06
- 
- 2(a) Write down the probable isomeric forms (10) of fluoro-methyl-cyclohexane. 06
- 2(b) Discuss the stereochemical mechanism of SN1 and SN2 reactions. 12
- 2(c) What is free radical? Mention a free radical addition reaction with mechanism. 10
- 2(d) What is activation energy? Explain this energy for an exothermic reaction giving energy diagram. 07
- 
- 3(a) What is ring current? 05
- 3(b) Define inductive effect and mesomeric effect with examples. 08
- 3(c) Toluene gives ortho-para products on electrophilic substitution reaction whereas chlorobenzene gives meta-products. Explain. 10
- 3(d) Complete the following reactions: 12
- i)  $C_6H_6 + 3 Cl_2 \xrightarrow{UV\text{-light}}$
- ii)  $C_6H_6 + 3 H_2 \xrightarrow{Pt}$
- iii)  $C_6H_6 + CH_3COCl \xrightarrow{FeCl_3}$
- iv)  $C_6H_6 + Cl_2 \xrightarrow{FeCl_3}$
- 
- 4(a) Define different types of amines and mention their importance in nature. 08
- 4(b) Solubility of amines in water is very high. Why? 07
- 4(c) What is acetal? Mention a suitable method of preparation of thioacetal. 10
- 4(d) Synthesize chloroform and mention its uses. 10

## SECTION-B

- 5(a) What happens when glucose is treated with: 08
- i) Hydrogen, Nickel
  - ii) Conc.  $\text{HNO}_3$
  - iii)  $\text{CH}_3\text{OH}$  in presence of  $\text{HCl}$
  - iv)  $\text{Br}_2 + \text{H}_2\text{O}$
- 5(b) Discuss the evidence leading to the cyclic structure of D - (+) - glucose. 11
- 5(c) Identify each of the following glucose derivatives: 08
- i)  $\text{A} + 4 \text{HIO}_4 \longrightarrow 3 \text{HCOOH} + \text{HCHO} + \text{OHC-COOH}$
  - ii)  $\text{B} + 5 \text{HIO}_4 \longrightarrow 4 \text{HCOOH} + 2 \text{HCHO}$
  - iii)  $\text{C} + 3 \text{HIO}_4 \longrightarrow 2 \text{HCOOH} + 2 \text{OHC-COOH}$
  - iv)  $\text{D} + 4 \text{HIO}_4 \longrightarrow 4 \text{HCOOH} + \text{OHC-COOH}$
- 5(d) What are the reducing and non-reducing sugars? Give one example of each. 08
- 6(a) Deduce the structure of amylopectin by end group analysis. 12
- 6(b) Write short notes on: 15
- i) Cellulose xanthate
  - ii) Acetate rayon
  - iii) Guncotton and Pyroxylin
- 6(c) Write the structure of cellulose and sucrose. What products are formed when hydrolyzed? 02
- 7(a) Why  $\alpha$ -amino acids (except glycine) are optically active? 06
- 7(b) What is meant by peptide bond? How can you identify C-terminal and N terminal residue of proteins? 10
- 7(c) What is isoelectric point of amino acids? Why isoelectric point is different for different amino acids? 10
- 7(d) What are Cystines? Write the general structure of Cystines. 09
- 8(a) Why do molecules having more conjugated double bonds absorb lower energy of light than molecules having fewer conjugated double bonds? 10
- 8(b) Discuss the modern theory of color. 08
- 8(c) What are meant by dyes and pigments? Write the properties and applications of them. 08
- 8(d) Write short notes on: 09
- i) Vat dyes
  - ii) Azo dyes
  - iii) Mordant dyes

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KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

*Department of Textile Engineering*

B. Sc. Engineering 1st Year 2nd Term Examination, 2018

**Ph 1221**  
(Physics)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.  
ii) Figures in the right margin indicate full marks.  
iii) Assume reasonable data if missing any.

**SECTION-A**

- 1(a) State the superposition principle of light. Applying the superposition principle of light show that, the intensity distribution of light is  $I = A^2 = 4a^2 \cos^2 \frac{\delta}{2}$ ; where symbols have their usual meanings and hence find the condition for constructive and destructive interference. 10
- 1(b) Explain the formation of Newton's rings. Show how you would use them to determine the wavelength of light. 15
- 1(c) Newton's rings are observed in reflected light of  $\lambda = 5.9 \times 10^{-5}$  cm. The diameter of the 9<sup>th</sup> ring (dark) is 0.6 cm. Find the radius of curvature of the lens and the thickness of the air film. 10
- 2(a) Write short notes on i) Dispersive power of a grating, and ii) Resolving power of a grating. 10
- 2(b) Discuss the Fraunhofer diffraction at a single slit. Draw the intensity distribution for the diffraction pattern. 15
- 2(c) In a single slit diffraction pattern the distance between the first minima on either side of the central zero maximum is 4.4 mm as observed on a screen at distance of 0.5 m. The wavelength of light is 5890 Å. Calculate the slit width. 10
- 3(a) State and explain: i) Brewster's laws, and ii) Malus laws. 12
- 3(b) Explain the construction and working principle of Laurent's half shaded polarimeter. 13
- 3(c) How will you orient the polarizer and the analyzer so that a beam of natural light is reduced to i) 0.25 and ii) 0.75 of its original intensity? 10
- 4(a) What is poynting vector? Show that for a travelling electromagnetic wave that velocity of light is  $C = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$ ; where symbols have their usual meanings. 15
- 4(b) What is electromagnetic spectrum? Write short notes on i) Visible spectrum, ii) Infrared rays, and iii) X-rays. 08
- 4(c) State Grassmann's law for color. Explain briefly additive and subtractive color mixing. 12

## SECTION-B

- 5(a) What is meant by photons? Write down the failure of classical mechanics to explain the blackbody radiation. 10
- 5(b) State and explain Heisenberg's uncertainty principle. Using the uncertainty principle explain "Why can't electron exist in the nucleus?" 15
- 5(c) i) The wavelength of light falling on the surface of an alkali metal of work function is 2.3 eV is 4300 Å. With what velocity will the electron be emitted? 10  
ii) Calculate the energy of a proton having the same momentum as that of 10 MeV protons.
- 6(a) What are the assumptions of Einstein's theory of specific heat of solid? Derive the relation for lattice heat capacity using Einstein's model. 15
- 6(b) Derive an expression for Hall voltage and show that Hall co-efficient  $R_H = \frac{1}{ne}$ . 10
- 6(c) Using Bohr's formula: 10  
i) Calculate the longest wavelength in the Pfund series.  
ii) Find the limit of wavelengths in Pfund series.
- 7(a) What is meant by co-ordination number? Show that 68% of the body centered cubic structure is occupied by atoms. 10
- 7(b) Starting from the wave equation and introducing energy and momentum of the particle obtain expression for three dimensional Schrödinger equation in time dependent form. 15
- 7(c) A diffraction pattern is obtained for lead with radiations of wavelength 1.34 Å. The (210) reflection is observed at Bragg's angle  $25^\circ$ . What are the lattice parameter of lead and the radius of the atom? 10
- 8(a) What is population inversion in a LASER? Describe the principle of a LASER briefly. 10
- 8(b) What is meant by Ruby LASER? Describe the construction and working principle of Ruby LASER. 15
- 8(c) A laser beam of wavelength  $\lambda = 6000 \text{ \AA}$  on earth is focused by a lens of diameter 2 m on the crater of the moon. The distance of the moon is  $4 \times 10^8 \text{ m}$ . How big is the spot on the moon? Neglect the effect of earth's atmosphere. 10

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**KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY**

*Department of Textile Engineering*

B. Sc. Engineering 1st Year 2nd Term Examination, 2018

**TE-1221**

(Textile Fibers)

Time: 3 Hours

Total Marks: 210

**N.B.:** i) Answer any THREE questions from each section in separate scripts.

ii) Figures in the right margin indicate full marks.

iii) Assume reasonable data if missing any.

**SECTION-A**

- |      |   |    |
|------|---|----|
| 1(a) | What is textile fiber? Classify the textile fibers with examples.                                 | 09 |
| 1(b) | Discuss the morphological diagram of cotton fiber mentioning the chemical composition of it.      | 12 |
| 1(c) | State the physical and chemical properties of cotton fiber.                                       | 08 |
| 1(d) | Describe the polymeric structure of cotton fiber.   | 06 |
| 2(a) | What is meant by retting? Why is it necessary for jute fiber?                                     | 06 |
| 2(b) | Differentiate between cellulose and hemicellulose.  | 06 |
| 2(c) | Sketch a morphological structure of jute fiber mentioning the chemical composition.               | 15 |
| 2(d) | What is bast fiber? Why banana is called a bast fiber?  | 08 |
| 3(a) | Discuss the micro-structure of wool fiber with neat sketch.                                       | 15 |
| 3(b) | Though wool and hair both are protein fiber but what are the basic differences between them?      | 06 |
| 3(c) | Write down the chemical composition of wool fiber.  | 06 |
| 3(d) | Why bamboo fiber is used as hygiene materials? Write down the chemical structure of bamboo fiber. | 08 |
| 4(a) | Discuss the cultivation procedure of silk manufacturing.  | 10 |
| 4(b) | Write short notes on: i) Degumming of silk, and ii) Carbonizing.                                  | 06 |
| 4(c) | Show differences between wool and silk.   | 08 |
| 4(d) | Mention the chemical composition and physical properties of silk.                                 | 08 |
| 4(e) | Why pina fiber is so expensive?   | 03 |

## SECTION-B

- 5(a) What is regenerated protein fiber? Write down the trade name of casein fiber. 05
- 5(b) Differentiate between viscose rayon and acetate rayon. 05
- 5(c) Briefly explain the manufacturing process of viscose rayon. 15
- 5(d) Why rayon is called regenerated cellulosic fiber? State the applications of viscose rayon in the field of technical textiles. 10
- 
- 6(a) What is spandex? Show the production flowchart of spandex fiber. 15
- 6(b) What are acrylic and modacrylic? Write down the physical and chemical properties of acrylic fiber. 10
- 6(c) Write down the trade name (minimum two) with country of origin for the following fibers: 10
- i) Polyester, ii) Nylon, iii) Spandex, and iv) Viscose rayon
- 
- 7(a) Mention the types of polyamide fiber. 02
- 7(b) Differentiate between Nylon 6 and Nylon 66. 10
- 7(c) Show the chemical reactions for producing Nylon 6 and Nylon 66. 10
- 7(d) Show the physical properties of Nylon 6 fiber. 13
- 
- 8(a) Describe the manufacturing process of polyester fiber. 10
- 8(b) State the chemical properties of polyester fibers. 08
- 8(c) Describe the manufacturing process of polypropylene fiber. 08
- 8(d) Why drawing is an important procedure of manmade fiber manufacturing? 09

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**KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY**

*Department of Textile Engineering*

B. Sc. Engineering 1st Year 2nd Term Examination, 2018

**Math-1221**  
(Mathematics-II)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.  
 ii) Figures in the right margin indicate full marks.  
 iii) Assume reasonable data if missing any.

**SECTION-A**

1(a) Solve: 12  
 $(x^2 + y^2 + 1)dx - 2xydy = 0$

1(b) Solve: 12  

$$\frac{dy}{dx} = \frac{2x+y-2}{3x+y-3}$$

1(c) Find the differential equations of all circles of radius 5. 11

2(a) Solve  $(D^3 + 1)y = e^{2x} \sin x + x^2$ . 12

2(b) Apply the method of variations of parameters to solve,  $y_2 + y = \sec x$ . 12

2(c) Solve  $y'' + 4y = x^2, y(0) = 0$  and  $y'(0) = 0$ . 11

3(a) A particle moves along the curve  $x = 2t^2, y = t^2 - 4t, z = 3t - 5$  where  $t$  is the time. 12  
 Find the component of its velocity and acceleration at time  $t = 1$  in the direction  $\underline{i} - 3\underline{j} + 2\underline{k}$ .

3(b) Find the directional derivative of  $P = 4e^{2x-y+z}$  at the point  $(1,1,-1)$  in the direction towards the point  $(-3,5,6)$ . 09

3(c) Show that  $\underline{F} = (2xy + z^3)\underline{i} + x^2\underline{j} + 3xz^2\underline{k}$  is a conservative force field. Also find its scalar potential. 14

4(a) If  $\underline{v} = \underline{w} \times \underline{r}$  prove that  $\underline{w} = \frac{1}{2} \text{curl } \underline{v}$  where  $\underline{w}$  is a constant vector. 00

4(b) Evaluate 13

$$\iint_s \underline{A} \cdot \underline{n} \, ds$$

Where  $\underline{A} = y\underline{i} + 2x\underline{j} - z\underline{k}$  and  $s$  is the surface of the plane  $2x + y = 6$  in the first octant cut off by the plane  $z = 4$ .

4(c) Evaluate 13

$$\iiint_v (2x + y) \, dv$$

Where  $v$  is the closed region bounded by the cylinder  $z = 4 - x^2$  and the planes  $x = 0, y = 0, y = 2$  &  $z = 0$ .

## SECTION-B

- 5(a) Find the change in the coordinates of a point when the direction of axes is turned through an angle  $\theta$  whereas the origin of coordinates remains the same. 10
- 5(b) If the direction of axes is turned through an angle  $30^\circ$  and the origin remains unchanged then find the transformation equation of  $x^2 + 2\sqrt{3}xy - y^2 - 2a^2 = 0$ . Identify and sketch it. 12
- 5(c) What conic do the equation  $x^2 + 4xy + y^2 - 2x + 2y - 6 = 0$  represents? Reduce it to standard form and hence find the length of the axes. 15
- 6(a) Find the rectangular co-ordinates for the point whose cylindrical co-ordinate is  $(3, \frac{2\pi}{3}, 4)$ . 10
- 6(b) Find the angle between two lines whose direction cosines are given by the equations  $2l + 2m - n = 0$  and  $mn + nl + lm = 0$ . 13
- 6(c) Find the equation of the planes through  $(0, 4, -3), (6, -4, 3)$  which cut off from the axes intercepts whose sum is zero. 12
- 7(a) Find the shortest distance and its equation of the lines  $x + y = 0, z = 4$  &  $\frac{x-1}{4} = \frac{y-2}{3} = \frac{z-16}{-6}$ . 15
- 7(b) Find the equation of the plane which is perpendicular to the plane  $5x + 3y + 6z + 8 = 0$  and which contains the line of intersection of the planes  $x + 2y + 3z - 4 = 0$  and  $2x + y - z + 5 = 0$ . 10
- 7(c) Two systems of rectangular axes have the same origin. If a plane cuts the axes at  $a, b, c$  and  $a_1, b_1, c_1$  respectively from the origin. Prove that  $\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{c^2} = \frac{1}{a_1^2} + \frac{1}{b_1^2} + \frac{1}{c_1^2}$ . 10
- 8(a) Find the equation to the sphere which passes through the circle  $x^2 + y^2 + z^2 = 5$  and  $x + 2y + 3z = 3$  and touches the plane  $4x + 3y = 15$ . 11
- 8(b) Obtain the equations of the tangents planes to the sphere  $x^2 + y^2 + z^2 + 6x - 2z + 1 = 0$  which passes through the line  $\frac{16-x}{2} = \frac{z}{2} = \frac{y+15}{3}$ . 12
- 8(c) Find the equation of the right circular cone whose vertex is  $\phi(2, -3, 5)$  axis  $PQ$  which makes equal angles with the axes and semi-vertical angle is  $30^\circ$ . 12

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**KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY**

*Department of Textile Engineering*

B. Sc. Engineering 4th Year 1st Term Examination, 2019

**TE-4113**

(Textile Testing-II)

Time: 3 Hours

Total Marks: 210

**N.B.:** i) Answer any THREE questions from each section in separate scripts.

ii) Figures in the right margin indicate full marks.

iii) Assume reasonable data if missing any.

**SECTION-A**

- 1(a) What is bursting strength? For which fabrics this test is used? Describe the diaphragm bursting test with necessary figure. 13
- 1(b) Describe single rip tear test with figures and dimensions. 11
- 1(c) Explain fabric strip strength test with necessary figures. 11
- 2(a) Write short notes on: i) Air Porosity, and ii) Thermal comfort. 06
- 2(b) What is meant by breathable fabric? How to produce waterproof breathable fabric? 08
- 2(c) Explain the fabric properties those have effects on air permeability. 09
- 2(d) Describe a test method with figure for measurement of water vapor permeability. 12
- 3(a) Mention the different test methods for wet ability or water permeability of fabrics. 05
- 3(b) Differentiate between waterproof and showerproof fabric. 08
- 3(c) Write short notes on: i) Water retention, ii) Wet ability, and iii) Wetting time of a fabric. 09
- 3(d) How to carry out Bundesmann test for water penetration and absorption of fabric? Explain briefly with the assessment of the result. 13
- 4(a) Write short notes on: i) Multifiber fabric, and ii) Different light sources used in textile testing. 07
- 4(b) Explain the evaluation procedure of color fastness to light maintaining a standard. 07
- 4(c) Illustrate a format of test report of color fastness to rubbing indicating the standard. 09
- 4(d) What is color fastness? Describe a test of color fastness to wash according to an established standard. 12

## SECTION-B

- 5(a) Briefly explain the reasons and remedies of pilling. 05
- 5(b) Narrate the factors affecting abrasion resistance. 06
- 5(c) Describe an abrasion resistance test with the evaluation procedure. 10
- 5(d) What is serviceability? Write down the advantages and disadvantages of both wearer trials and laboratory test. 14
- 
- 6(a) What is Oeko-Tex? Write down the certification procedure of Oeko-Tex Standard 100. 11
- 6(b) Describe the product criteria according to GOTS. 10
- 6(c) Explain the certification levels of WRAP. 08
- 6(d) Describe ECHA's activities on Nano materials under REACH. 06
- 
- 7(a) What is meant by BAN? Describe the process of BAN for estimation of the effect of mercerization. 11
- 7(b) What is desizing and why it is important? Describe the TEGEWA method for desizing efficiency estimation. 08
- 7(c) Describe a water hardness test method in details. 10
- 7(d) A water sample from KUET-ETP contains  $MgCO_3 = 18 \text{ mg/L}$ ;  $CaCl_2 = 16 \text{ mg/L}$ ;  $MgSO_4 = 25 \text{ mg/L}$ ; and  $CaCO_3 = 22 \text{ mg/L}$ ; Calculate the temporary, permanent, and total hardness of the water. 06
- 
- 8(a) Mention the following items for 45° flame test: i) Sample preparation, ii) Interpretation of results, and iii) Purpose of the test. 15
- 8(b) Define carpet compression. Describe carpet compression test with neat sketch. 09
- 8(c) List down the chemical finishes along with their characteristics which are used to reduce the flammability of the treated fabric. 07
- 8(d) Define: i) Flame retardant fabric, and ii) Flame resistance rating. 04

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