

BANGLADESH UNIVERSITY OF TEXTILE

B. Sc. in Textile Engineering (For Affiliated College)
Level-I Term-I, Final Examination-2017

Subject: Business and Communicative English (Code: HSS 101)

Time: 3.0 hrs

Full Marks: 72

(Use separate answer script for Part: A and Part: B)

(All parts of a question must be answered consecutively)

Part: A

(Answer any three questions)

1. (a) Define language function with example.
(b) Discuss different types of communication that you have read. [4+8=12]
2. (a) What is effective communication? Describe the factors of effective communication.
(b) State the elements of business communication. [(2+5)+5=12]
3. (a) Define feedback. State the importance of feedback.
(b) State the elements of communication process showing a diagram. [(2+5)+5=12]
4. (a) Write a composition on "Importance of communication for textile engineer".
(b) Why do you think group meeting is important for office management? [8+4=12]

Part: B

(Answer any three questions)

5. (a) State the differences between report and proposal.
(b) What are the important parts of a notice? Write a notice on the annual sports week of your College mentioning the event details. [4+8=12]
6. (a) How can we develop four skills (listening, speaking, reading and writing)?
(b) Describe the functions of language. [7+5=12]
7. (a) What is letter?
(b) Write an application for sinking a tube-well following "Indented Style"? [2+10=12]
8. (a) What do you mean by business proposal?
(b) Write a letter to your principal of your College inviting him in a cultural program on the occasion of celebrating the Independence Day-2018 on behalf of the college cultural club. [4+8=12]



BANGLADESH UNIVERSITY OF TEXTILE
B. Sc. in Textile Engineering (For Affiliated College)
Level-1 Term-1, Final Examination-2017
Subject: Natural Textile Fibers (Code: YE 101)

Time: 3.0 hrs

Full Marks: 72

(Use separate answer script for Part: A and Part: B)
 (All parts of a question must be answered consecutively)

Part: A

(Answer any three questions)

1. (a) Define textile fibre.
 (b) State the classification of textile fibre.
 (c) Discuss the historical background of textile fibres.
 (d) What are the properties of textile fibre. [2+4+4+2=12]

2. (a) What is ginning? Compare between saw ginning and roller ginning.
 (b) Mention the American cotton grading system.
 (c) What is natural convolution in cotton? Describe the effect of convolution. [5+2+5=12]

3. (a) Mention the difference between primary and secondary wall of cotton fibre.
 (b) Draw the microscopic view of longitudinal and cross-sectional of cotton fibre.
 (c) Why strength of cotton fibre is increased in case of wetting?
 (d) How cotton fibre can be identified? [3+3+3+3=12]

4. (a) State the geographical distribution of Jute fibre.
 (b) Draw the microscopic view of Jute fibre.
 (c) Write down the chemical properties of Jute fibre.
 (d) Discuss the defects of Jute fibre. [2+2+3+5=12]

Part: B

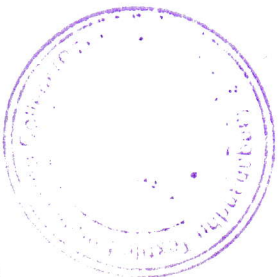
(Answer any three questions)

5. (a) What is cottonisation of flax?
 (b) Write the difference between ortho and paracortex of wool fibre.
 (c) Show the different bonds of wool fibre.
 (d) Describe the processing of wool fibre in briefly. [2+3+2+5=12]

6. (a) What do you mean by silk?
 (b) What are the largest silk producing countries?
 (c) Discuss the sericulture process of silk production.
 (d) Draw the micro structure of silk. [2+2+6+2=12]

7. (a) Differentiate between wool and silk.
 (b) What do you mean by mineral fibre and asbestos?
 (c) Write the chemical composition of asbestos.
 (d) Give the end uses of asbestos fibre. [4+3+2+3=12]

8. Briefly discuss about any three fibres from the following:
 i) Banana, ii) pineapple, iii) coir and iv) ramie. [3×4=12]



BANGLADESH UNIVERSITY OF TEXTILES

B. Sc. in Textile Engineering (For Affiliated College)
Level-1 Term-I, Final Examination-2017

Subject: Mathematics-I (Code: MS 101)

Time: 3.0 Hrs.

Full Marks: 72

(Use separate answer script for Part: A and Part: B)

(All parts of a question must be answered consecutively)

Part : A

(Answer any three questions)

1. (a) Define continuity.

(b) Differentiate the followings: (i) $\sqrt{\frac{\sec x + \tan x}{\sec x - \tan x}}$ (ii) $\sin^{-1} \left\{ \frac{a+b \cos x}{b+a \cos x} \right\}$

(c) If $x \cos x + y \sin x = P$ touch the curve $\frac{x^m}{y^m} + \frac{a^m}{b^m} = 1$

Show that $(a \cos x)^{\frac{m}{m-1}} + (b \sin x)^{\frac{m}{m-1}} = p^{\frac{m}{m-1}}$

2. (a) State and prove Euler's theorem on homogeneous function.

(b) Evaluate $\lim_{x \rightarrow 0} (2 \tan x)^{2 \tan x}$

(c) Discuss the convergence of the following series $1 + \frac{2}{x} + \frac{2.4}{1.3} x^2 + \frac{2.4.6}{1.3.5} x^3 + \dots$ ($x > 0$)

[4+3+5=12]

3. (a) Define Gamma and Beta function. Express the integral $\int_1^{\infty} \frac{\sqrt{1-x^2}}{dx}$ in terms of Beta function.

(b) Evaluate the following: (i) $\int_0^{\pi/2} \frac{\sin^2 x}{\sin x + \cos x} dx$ (ii) $\int_1^{\infty} \frac{\sqrt{1-x^2}}{\log x} dx$

(c) Establish a reduction formula for $\int_1^{\infty} x^n \tan^{-1} x dx$

[4+4+4=12]

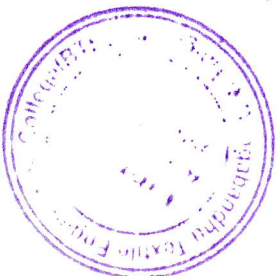
4. (a) Write general properties of the definite integral.

(b) Find the area included between the curve $xy^2 = 4a^2(2a - x)$ and its asymptote.

(c) Find the volume of the solid produced by the revolution of the upper half of the

curve $y^2 = x^2(2 - x)$ about the x - axis.

[3+4+5=12]



Part : B
(Answer any three questions)

5. (a) Define matrix.

(b) Find the inverse of the following matrix by using row canonical form:

$$\text{Where } A = \begin{bmatrix} 3 & 4 & -1 \\ 1 & 0 & 3 \\ 2 & 5 & -4 \end{bmatrix}$$

(c) Solve the following linear equations with the help of matrices:

$$3x + 5y - 7z = 13$$

$$4x + y - 12z = 6$$

$$2x + 9y - 3z = 20$$

6. (a) Find the inverse of the following matrix by using row-echelon form

[2+5+5=12]

$$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 3 \\ 1 & 0 & 8 \end{bmatrix}$$

(b) Find a system of linear equation corresponding to the augmented matrix

$$\begin{bmatrix} 3 & 0 & -2 & 5 \\ 7 & 1 & 4 & -3 \\ 0 & -2 & 1 & 7 \end{bmatrix}$$

(c) Solve the following system of linear equations by Cramer rule

$$x + y + z = 0$$

$$2x + 5y + 3z = 1$$

$$-x + 2y + z = 2$$

7. (a) Prove that the equation $2x^2 - 6y^2 - 12z^2 + 18yz + 2zx + xy = 0$ represents a pair of straight lines and find the angle between them.

[6+2+4=12]

(b) Find the direction cosines of two lines which are connected by the relation $l - 5m + 3n = 0$ and $7l^2 + 5m^2 - 3n^2 = 0$.

(c) Find the equation of the plane which contains the line $x = \frac{y-3}{2} = \frac{z-5}{3}$ and which is perpendicular to the plane $2x + 7y - 3z = 1$.

8. (a) Prove that the straight lines whose direction cosines are given by the relations

[4+4+4=12]

$$al + bm + cn = 0 \text{ and } fmn + gnl + hlm = 0 \text{ are perpendicular if } \frac{f}{a} + \frac{g}{b} + \frac{h}{c} = 0$$

(b) Find the equation of the plane which is perpendicular to the plane $5x + 3y + 6z + 8 = 0$ and contains the line of intersection of the planes $x + 2y + 3z - 4 = 0$ and $2x + y - z + 5 = 0$

(c) Find the shortest distance between the following two straight lines:

$$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-4}{4} \text{ and } \frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$$

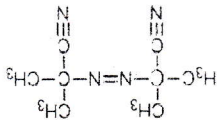
[4+4+4=12]

(Use separate answer script for Part: A and Part: B)
 (All parts of a question must be answered consecutively)

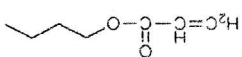
Part : A

(Answer any three questions)

1. (a) What is polymer? What makes polymer unique?
 (b) Classify polymer according to their end uses.
 (c) Distinguish between thermoplastic and thermosetting polymer.
 (d) Explain the functionality of monomer.
2. (a) How can you control the molecular weight of the product in step polymerisation?
 (b) Compare between bulk and solution polymerisation technique.
 (c) Discuss about emulsion and solution polymerisation technique with its practical application.
3. (a) Describe mechanism of cationic polymerisation.
 (b) What is initiator? Give five (05) example of initiator with chemical structure of free radical polymerization.
 (c) Point out the salient features of step polymerization process.
 (d) State the mechanism free radical polymerization of the following monomers and initiators.



2,2-azobisisobutyronitrile (Initiator)



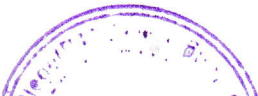
Butyl Acrylate (Monomer)

4. (a) What is the practical significance of polymer molecular weight? How it is expressed?
 (b) Derive the equation, $PDI = 1 + p$, where p is the extent of reaction.
 (c) What would be the molecular weight, if 9 moles, molecular weight (M_w) = 30,000 & 5 moles, molecular weight (M_w) = 50,000?
 (d) Distinguish between monodispersity and polydispersity.

Part : B

(Answer any three questions)

5. (a) How can we measure the glass transition temp (T_g), melting temp (T_m) and crystallization temp (T_c) of polymer?
 (b) Explain the significance of glass transition temperature in case of textile polymer.
 (c) Mention the T_g & T_m of PET, Nylon 6 and Nylon 66.
6. (a) Write about oxidative degradation and mention the ways of its prevention.
 (b) Discuss the unzipping mechanism of polymer degradation.
 (c) Mention the factors considered for polymer degradation.
 (d) What are conductive polymers? Describe the features of conductive polymers.
7. (a) Illustrate the structure of Bakelite and PVA.
 (b) Explain the criteria of fibre forming polymer.
 (c) Why melamine formaldehyde (MF) is best choice over urea formaldehyde (UF) resins?
 (d) Write short notes on LDPE and HDPE.
8. (a) Write various practical applications of Liquid crystal polymer.
 (b) Show the comparison between Nematic and Smectic liquid crystalline structure.
 (c) Mention the steps involved in the production of polyester fibre from recycled PET bottles.



(Use separate answer script for Part: A and Part: B)
(All parts of a question must be answered consecutively)

Part: A

(Answer any three questions)

1. (a) What is programming language? Describe the importance of programming language?
(b) What is variable? Write the rules of declaring valid variable.
(c) What is a statement and an operator? What are the arithmetic operators used in C programming language?
(d) What is loop? Write down the difference between the while and do-while loop.

[3+3+3+3=12]

2. (a) What are key words & Tokens? Define with proper example.
(b) Write a C program to convert the temperature Fahrenheit to Celsius using conversion formula.
(c) Write down the general form of `else if` Ladder.

[4+4+4=12]

3. (a)

```
union std { int a; float b; } ul;  
struct sid { int a; float b; } sl;  
main () { printf("%d", sizeof (sl));  
          printf("%d", sizeof (ul), sizeof (sl));  
          What will be the output and why?  
(b) What are functionality of fscanf(), fprintf(), fopen() and fclose()?  
(c) What is pointer? Give the output of the following program.  


```
int *a,b;
b=2;
a=&b;
printf("%d", *a);
```


```

[4+4+4=12]

4. (a) What is Array? What are basic difference between Array & structure.
(b) What is operator? Describe the difference types of operator in 'C' language.
(c) What is recursion? Write a simple C to use recursive function.

[(1+3)+(1+3)+(1+3)=12]

Part: B

(Answer any three questions)

5. (a) How many storage class are there? Describe register and extern classes.
(b) What is flow chart? Draw a flow chart to judge a number whether it is negative or positive.
(c) If `a=10` and `b=6`, in 4 bit representation system what will the answers?

- i. `c = ~ a`
- ii. `c = b << 1`
- iii. `c = ~ (a | 15)`
- iv. `c = a & b`

[4+4+4=12]

6. (a) How many data types are there in C programming language? Describe all the data types.
(b) Write down a program that prints the odd number from 1 to 100.
(c) What is the difference between union and structure? Describe with example.

[4+4+4=12]

7. (a) What is file? Describe the basic file operation.
(b) Write down the difference between following -
(i) `m++` and `++m`
(ii) While loop and do while loop
(c) Write a C Program to determine whether an input Number is Even or odd.

[(1+3)+4+4=12]

8. (a) Write down the advantage of oop.
(b) What is the primary pillar of oop?
(c) What is inheritance? Write the difference between oop & pop
(d) Explain the method overloading with suitable example.

(Use separate answer script for Part: A and Part: B)
(All parts of a question must be answered consecutively)

Part: A

(Answer any three questions)

1. (a) Explain venturimeter with its working principle.
(b) State Bernoulli's principle for fluid motion and derive Bernoulli's equation for a fluid in streamline motion.
(c) A venturimeter is connected to a horizontal main of radius 20 cm. If the radius of the throat of the venturimeter is 15 cm and the difference of the water level in the manometer tubes is 10 cm, calculate the rate of flow of water per hour through the main. [3+6+3=12]
2. (a) Give the dimension and units of co-efficient of viscosity.
(b) Show that the co-efficient of viscosity is equal to the force at unit area and unit velocity gradient.
(c) Derive poiseuille's equation for the rate of flow of a viscous liquid through a capillary tube. [2+3+7=12]
3. (a) Discuss the general behavior of a material under stress with reference to a stress-strain curve.
(b) Show that $\gamma = 3K(1-2\nu)$, where the symbols have their usual meanings.
(c) Find the greatest length of a steel wire that can hang vertically without breaking, (Breaking stress for steel = $7.9 \times 10^8 \text{ N/m}^2$, Density of steel $7.9 \times 10^3 \text{ kg/m}^3$). [3+6+3=12]
4. (a) Write the relation between surface tension and surface energy.
(b) Derive an expression for the excess pressure inside a spherical liquid drop or air bubble in a liquid.
(c) Calculate the excess pressure inside a soap bubble of radius $3 \times 10^{-3} \text{ m}$, surface tension of a soap solution is $20 \times 10^{-3} \text{ N/m}$ and also calculate the surface energy of the soap bubble. [3+6+3=12]

Part: B

(Answer any three questions)

5. (a) State and prove the theorem of parallel axes in moment of inertia.
(b) Show that the moment of inertia of a uniform circular disc about an axis passing through its centre and perpendicular to its plane is $0.5 MR^2$.
(c) A circular disc of mass 100 grams and radius 10 cm is making 120 rpm about an axis passing through its centre perpendicular to its plane. Calculate its kinetic energy. [4+5+3=12]
6. (a) Distinguish between Fresnel and the Fraunhofer class diffraction.
(b) What is zone plate? Show that the area of half period zone is $\pi b\lambda$, where the symbols have their usual meaning.
(c) Calculate the least width of a plane diffraction grating having 500 lines/cm which will just resolved in the 2nd order the sodium light of wave length 5890 \AA and 5896 \AA . [3+6+3=12]
7. (a) Compare the zone plate with convex lens. Show that a zone plate has multiple foci.
(b) Determine the wavelength of spectral line by using plane transmission grating. [7+5=12]
8. (a) Define-polarized and unpolarized light.
(b) Explain the Brewster's law? Prove that the reflected and the refracted rays at right angle to each other.
(c) Describe the polarization by reflection. [2+6+4=12]

(Use separate answer script for Part: A and Part: B)
(All parts of a question must be answered consecutively)

Part : A

(Answer any three questions)

- What is ionization potential? Explain why the first ionization potential of B is less than that of Be.
 - Explain the physical significance of the four quantum numbers.
 - State Aufbau principle about electronic configuration of atom with example.
 - Write the electronic configuration of the following atoms or ions Fe^{2+} (26), Cr(24), Nb(41), I(53).

[3+4+3+2=12]

- Why leading zeros are not significant figures?
 - Compare the bond order between O_2 and N_2 .
 - Apply the best two methods to minimize errors.

[3.5+5+3.5=12]

- What are the postulates of Werner's theory of co-ordination compound?
 - Explain the bonding in $CoCl_3 \cdot 5NH_3$.
 - Discuss the following types of isomerism of co-ordination compounds with suitable examples. (i) Geometrical isomerism (ii) Optical isomerism.
 - Explain inner and outer orbital complexes.
 - Calculate the EAN of $K_4[Fe(CN)_6]$.

[4+4+2+2=12]

- Illustrate Lewis acid and Lewis base from the reaction $CO_2 + O^{2-} \rightleftharpoons CO_3^{2-}$.
 - Determined the direction of the following reaction according to relative strength of acid-base $CH_3COOH + HS^- \rightleftharpoons CH_3COO^- + H_2S$.
 - Rearrange the compounds AgF , AgI , $AgCl$ and $AgBr$ in decreasing order of their solubility in terms of Pearson concept with causes.

[4+4+4=12]

Part : B

(Answer any three questions)

- What are colligative properties? Derive Raoult's law by using lowering of vapor pressure.
 - Write short notes on "Elevation of boiling point".
 - Write down Van't Hoff's laws of Osmotic pressure.
 - A solution of glycol containing 1.821g per liter has an osmotic pressure of 51.8 cm of mercury at $10^\circ C$. What is the molecular mass of glycol?

[4+3+3+2=12]

- Draw the energy profile for exothermic and endothermic reaction.
 - The reaction rate will increase if the initial temperature T_1 increases to T_2 .--Justify.
 - At temperature $300^\circ C$ the rate constant for 1st order reaction $SO_2Cl_2 \xrightarrow{K} SO_2 + Cl_2$ is $2.0 \times 10^{-5} \text{ sec}^{-1}$. How many portions will dissociate after 60 minutes at same temperature?

[4+5+3=12]

- Define zeta potential.
 - If ∞ is the amount of degree of dissociation then express the K_p and K_c of the following reaction: $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$.
 - What is the comparison between lyophilic and lyophobic solutions?
 - Describe two chemical methods of preparing colloids.

[2+4+3+3=12]

- State Stark-Einstein's law and mention its limitations.
 - Discuss the influences of temperature and catalyst on activation energy.
 - A radiation of 290 nm wavelength dissociate 1.05×10^{-2} mole HI with 4050 J energy. Calculate quantum yield (Here, $h = 6.62 \times 10^{-34} \text{ Js}$, $c = 3 \times 10^8 \text{ ms}^{-1}$).

[3.5+5+3.5=12]