

BANGLADESH UNIVERSITY OF TEXTILES

B. Sc. in Textile Engineering (For Affiliated Colleges)

Level-1 Term-II, Final Examination-2018



Subject: Introduction to Apparel Engineering (Code: AE 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) Mention the positive and negative impact of apparel industry in Bangladesh.
(b) Briefly describe the current scenario of the apparel industry in Bangladesh with future scope and present challenges.
(c) Why is sample apparel making important?
[4+5+3=12]
2. (a) Show the flow process of Apparel Manufacturing Industry?
(b) Discuss about the primary stage development process which is essential to make apparel in large scale.
[6+6=12]
3. (a) Show the organogram of apparel industry.
(b) Why is apparel sector important in Bangladesh? Discuss briefly.
(c) List down the major challenges of garments industry in Bangladesh with remedies.
[4+4+4=12]
4. (a) List the section in apparel industry and write the function of each section separately.
(b) Write the role of a Textile Engineering in a Textile and Apparel Industry.
[6+6=12]

Part: B

(Answer any three questions)

5. (a) Define the following term:
L/C, Counter Sample, Pattern, Knitwear, Woven Apparel, Pressing.
(b) Define Accessories. Make a list of trims and accessories for making basic woven shirt in industry.
[6+6=12]
6. (a) Define the term "Quota" and "Category" with examples.
(b) Sketch a woven shirt and show its main components.
(c) Prepare a list of fabric used in apparel industry.
[3+6+3=12]
7. (a) What is meant by CAD and CAM in apparel manufacturing?
(b) Why is pattern grading done during apparel manufacturing process?
(c) Write down the steps to control the quality in apparel industry.
[3+3+6=12]
8. (a) How many components are needed to make a trouser? Point out their names.
(b) Why is fabric quality important to maintain the quality of garments?
(c) Make a tablet of standard body measurement chart for ladies.
[4+4+4=12]

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BANGLADESH UNIVERSITY OF TEXTILES

B. Sc. in Textile Engineering (For Affiliated College)

Level-1 Term-II, Final Examination-2018

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 are familiar with. [5+7=12]
2. (a) What are the important elements of Communication? Discuss in details.
(b) Mention some characteristics of spoken language. [7+5=12]
3. (a) Define feedback. Write the importance of feedback.
(b) What is communication model? Describe Aristotle's communication model. [(2+4)+(2+4)=12]
4. (a) What is meeting? What are the general objectives of arranging meeting?
(b) State the pre-requisites of a valid meeting. [(2+5)+5=12]

Part: B

(Answer any three questions)

5. (a) Discuss 'Diamond Sequence Letter formula' with diagram.
(b) Elaborately discuss the important parts of a Business Letter. [5+7=12]
6. (a) Elaborately discuss different types of Business Reports.
(b) What do you mean by 'Minutes'? What are the different parts of 'Minutes'? [8+4=12]
7. (a) What is CV? Write a CV for the post of an 'Lecturer (Textile)' with cover letter. [2+10=12]
8. (a) Write an essay on "Bangladesh Textile Industry and Challenges". [12]

BANGLADESH UNIVERSITY OF TEXTILES

B. Sc. in Textile Engineering (For Affiliated Colleges)

Level-1 Term-II, Final Examination-2018

Subject: Physics-II (Code: PHY 103)

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)

- (a) What is electric dipole moment?

(b) Calculate electric field intensity due to an electric dipole at a point lying on the perpendicular bisector of a dipole.

(c) Four point charges of magnitude $3\mu\text{C}$ are placed at the four corners of a square that is 40cm on a side. Find the force on any one of the charge.

[2+6+4=12]
- (a) State and explain Gauss' law.

(b) Show that, in a uniform magnetic field fast particle move in large circles and slower ones in small circles, but require the same time T (the period) to complete one.

(c) The distance r between the electron and proton in the hydrogen atom is about 5.3×10^{-11} meter. What is the magnitude of electrical force between these two particles?

[3+6+3=12]
- (a) What is capacitive time constant?

(b) For a RC circuit derive the expression of charge and potential across the capacitor at any instant of time.

(c) A capacitor of capacitance $3 \mu\text{F}$ is discharging through a resistor of resistance 2Ω . When will the charge on the capacitor be half its initial value?

[2+7+3=12]
- (a) What is drift velocity of electron?

(b) Define magnetic force.

(c) A semicircular wire of radius R carries a current i and is placed in a uniform magnetic field B acting perpendicular to the plane of the semi-circle. Calculate the force acting on the wire.

(d) A proton moves with a speed of 5.0×10^6 m/s in a plane perpendicular to a magnetic field of 2.5 T. (i) Calculate the radius of its circular path.
(ii) What is the energy of the proton in eV?

[2+2+4+4=12]

Part: B

(Answer any three questions)

- (a) What is photo-electric effect? Write down the characteristics of photo-electric effect.

(b) Briefly explain Compton effect.

(c) What is the threshold wavelength for a tungsten surface whose work function is 4.5 eV?

[(2+4)+3+3=12]
- (a) Distinguish between isothermal and adiabatic processes.

(b) Derive an expression for the efficiency of a Carnot reversible engine.

(c) Assuming that a refrigerator can be regarded as a reversible engine working between the temperature of melting ice and the room temperature 27°C . Calculate the work that must be done to freeze 1 kg of water already at room temperature. ($J=4.2$ j/cal; latent heat of fusion of ice = 80 cal/gm).

[3+6+3=12]
- (a) What is critical coefficient of a gas?

(b) Show that the value of critical coefficient is equal for all gases and it is 2.67.

(c) Apply first law of thermodynamics in (i) isothermal, (ii) adiabatic, (iii) constant-volume and (iv) closed cycle processes.

[1+7+4=12]
- (a) State and explain the first law of thermodynamics.

(b) Write down the postulates of the kinetic theory of gases, any five.

(c) X-rays with wavelength 100 pm are scattered from a carbon target. The scattered radiation is

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B. Sc. in Textile Engineering (For Affiliated Colleges)

Level-1 Term-II, Final Examination-2018

Subject: Chemistry-II (Code: CHEM 103)

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)

- What are carbonium ions and carbanions?
 - Discuss the mechanism of SN^1 reactions of alkyl halides.
 - Distinguish between electromeric effect and inductive effect.
 - Write short note on TEL.

[3+4+3+2=12]
- How can synthesis the following compounds from the indicated starting materials:
(i) Isopropyl alcohol from acetone (ii) Phenol from aniline.
 - Discuss the acidic and basic nature of phenol.
 - State the following reaction with reference to phenol: (i) Kolbe's reaction (ii) Reimer-Tiemann reaction.

[4+3+5=12]
- Describe in brief any two general methods for the preparation of ketones.
 - Write the mechanism of Cannizzaro reaction.
 - Compare between acetaldehyde and acetone.
 - Write short note on clemmenson reduction.

[3+3+3+3=12]
- Give the reactions for preparation of Grignard Reagent. What are the limitations of using Grignard Reagent?
 - Discuss any two preparation methods of amine.
 - How would you prepare: (i) Ethylzine iodine using Zn-Cu-couple (ii) Tetraethyl Lead (TEL) by reaction of chloroethane with Sodium- Lead alloy.

[4+3+5=12]

Part: B

(Answer any three questions)

- What are amino acids? Describe zwitterionic nature of amino acids.
 - How will you prepare an amino acid from aldehyde?
 - Give the reactions for synthesis of following compounds from alanine: (i) Ethyl amine (ii) 2-amino propanol (iii) α -hydroxy propanoic acid (Lactic acid).

[4+2+6=12]
- What are carbohydrates? How are they classified?
 - Discuss the evidence favour of cyclic structure of glucose.
 - Why glucose is a reducing sugar?
 - Write short note on invert sugar.

[3+4+3+2=12]
- Define essential and non-essential amino acids.
 - Explain the following terms: (i) Peptide linkage (ii) Zwitter ion (iii) Isoelectric point.
 - Discuss N-terminal and C-terminal residue of peptide.

[3+6+3=12]
- What is meant by chromophore and auxochrome?
 - Discuss the properties and uses of following dyes: (i) Disperse dye (ii) Reactive dye.
 - State the differences between dyes and pigments.

[4+4+4=12]

BANGLADESH UNIVERSITY OF TEXTILES

B. Sc. in Textile Engineering (For Affiliated Colleges)

Level-1 Term-II, Final Examination-2018

Subject: Natural Textile Fibres (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) What is meant by micro and nano fibre? Write the classification of textile fibres with example.
(b) Write the physical properties of textile fibre.
(c) What is crystallinity? Mention the properties of more crystalline fibre. [6+3+3=12]

2. (a) What is ginning? Briefly discuss about saw ginning process.
(b) State the chemical structure of cotton fibre.
(c) How will you identify cotton fibre? [6+3+3=12]

3. (a) What are the effects of lignin on jute fibre?
(b) Describe the cultivation process of cotton fibre.
(c) Discuss the defect of jute fibre briefly. [3+5+4=12]

4. (a) Elucidate the production and processing of jute fibre.
(b) Sketch the micro-structure of jute fibre with proper identification.
(c) List down the traditional and diversified products of jute fibre. [6+3+3=12]

Part: B

(Answer any three questions)

5. (a) Describe in short the shearing and grading of wool fibre.
(b) Write the chemical composition of wool fibre.
(c) What is meant by ortho-cortex and para-cortex? Why ortho-cortex absorbs more dye than para-cortex?
(d) How can wool fibre be identified? [3+2+4+3=12]

6. (a) Define sericin and fibroin.
(b) What is meant by seri culture? Describe the sericulture process briefly.
(c) Why does silk loss its strength in wet condition?
(d) Explain: "Silk is called the queen of the fibre". [3+5+3+1=12]

7. (a) Write down the common uses of flax fibre.
(b) What is "Cottonization" of flax? Why flax fibre is cottonized?
(c) Elucidate the production and processing of flax fibre. [3+3+6=12]

8. (a) Show the chemical composition of asbestos and write its uses.
(b) Write short notes on any 03 (three) of the following fibres: (i) Pine apple (ii) Kapok
(iii) Sisal (iv) Hemp (v) Bannan. [3+(3×3)=12]

BANGLADESH UNIVERSITY OF TEXTILES

B. Sc. in Textile Engineering (For Affiliated Colleges)

Level-1 Term-II, Final Examination-2018

Subject: Polymer Science and Engineering (Code: WPE 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)

- Define monodispersity, polydispersity and index of polydispersity of a Polymer.
 - Why the molecular weight of a Polymer is to be controlled?
 - Calculate \bar{M}_n and \bar{M}_w , When there is four entities having molecular weight of 10, 20, 100, and 250 respectively. Also consider the number of each entities are 2, 4, 6, and 3 respectively.

[3+3+6=12]
- Distinguish between LDPE and HDPE.
 - Describe the principle of Infrared spectroscopy.
 - What is polymer size? Show the astronomical variations of polymer size.

[4+5+3=12]
- What are the criteria for fibre forming Polymer?
 - Write the differences between Polymer and Oligomer.
 - Explain the classification of co-polymer with examples.

[4+3+5=12]
- What is the practical significance of polymer molecular weight? How it is expressed?
 - Draw molecular weight distribution curve of polymer and point out different molecular weight.
 - What would be the molecular weight and PDI, if 9 moles, molecular weight (M_w) = 40,000 and 5 moles molecular weight (M_w) = 60,000.
 - Compare the properties of chain-growth and step-growth polymerization.

[3+3+4+2=12]

Part: B

(Answer any three questions)

- What are the methods used for measuring the crystallinity of polymer?
 - Write the merits and demerits of solution and suspension polymerization.
 - Discuss the effects of crystallinity on the properties of polymer.
 - Describe the polymer lattice models.

[3+3+3+3=12]
- What are the environmental benefits of Bio-polymer?
 - Write the differences between amorphous and crystalline polymer.
 - What is degree of crystallinity? How will you calculate the volume fraction and Mass fraction crystallinity?

[3+4+(1+4)=12]
- Discuss the factors affecting thermal conductivity.
 - Show the differences between T_g and T_m .
 - Discuss briefly about thermal de-polymerization.

[4.5+3+4.5=12]
- Mention the features of Graphene.
 - What are the applications of hydrogels?
 - Classify liquid crystals with an example.
 - Explain the manufacturing process of "Spandex" fibre.

[4+2+3+3=12]

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) What is engineering materials? Write down the properties of engineering materials.
(b) What is meant by plasticity and hardness?
(c) A load of 5 KN is to be raised with the help of a steel wire, Find the minimum diameter of the steel wire, if the stress is not to exceed 100 Mpa.
[5+3+4=12]
2. (a) What is meant by Plain Carbon Steel? Explain the general properties of Plain Carbon Steel with its limitations.
(b) State the heat treatment of metal. Describe the characteristics features of Annealing and Spheroidizing heat treatment process.
(c) Define Ferrous, Non Ferrous, and Pure Metal. Give the examples of each.
[4+4+4=12]
3. (a) What is ceramics? Write down the classification of ceramics.
(b) Differentiate between drying and firing.
[6+6=12]
4. (a) Describe 7 (seven) basic crystal system.
(b) Define steel and classify steel based on carbon percentage. What is ductile to brittle transition temperature?
(c) What is Cast Iron? Demonstrate the consecutive steps of Cast Iron production process with necessary sketches.
[4+4+4=12]

Part: B**(Answer any three questions)**

5. (a) What is Textile Composites?
(b) Classify composites and describe any two types of composites briefly.
(c) Write down the application areas of jute reinforced polymer composites with technical advantages.
[1+5+6=12]
6. (a) What is brass? Write down the different types of brass.
(b) Explain the outstanding characteristics and applications of aluminium.
(c) Write down the uses of Duralumin.
[5+5+2=12]
7. (a) Define polymer.
(b) What is copolymer? Write down the different types of copolymer.
(c) State the advantages and disadvantages of polymer.
[1+5+6=12]
8. (a) Describe the analysis of effect of high temperature on materials.
(b) What are the components of a Lubricants? Discuss the properties of a good Lubricant.
(c) For a particle reinforced composite volume fraction of matrix is 70%. Elastic Modulus of matrix and dispersed phase of the composite is 60 MPa and 25 MPa respectively. Calculate the upper limit and lower limit of Elastic Modulus of the composite.
[4+4+4=12]

**B. Sc. in Textile Engineering (For Affiliated Colleges)
Level-1 Term-II, Final Examination-2018**

Subject: Computer Programming (Code: MDM 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 computer program. Draw a flowchart for calculating sum of all even numbers from 1 to N.
 (b) What are the advantages of programming with third generation programming languages?
 (c) Briefly explain all the possible sections that might be available in a C program.
 (d) What is meant by source code and object code? [4+3+3+2=12]

2. (a) Write down the limitations of switch statement with appropriate examples.
 (b) Write down the output of following program with proper justification:

```
main() {
    int i = '0', a;
    if (a = i) { //NOT double equal operator
        print("%d", a);
    }
}
```

- (c) Write a c program that takes mark of a subject as input and prints obtained grade using the following table:

90% and above	80% to below 90%	70% to below 80%	60% to below 70%	50% to below 60%	Below 50%
4.0	3.5	3.0	2.5	2.0	0
Sample Input			Sample Output		
82			3.5		
45			0		

[4+4+4=12]

3. (a) How do **continue** and **break** statements work in a loop? Describe with appropriate examples.
 (b) Write down the output of following program:

```
main() {
    int i, j, m = 5, n = 5;
    for (i=1; i<=m; i++) {
        for (j=1; j<=n; j++) {
            if (i== 1 || j == (n/2+1)){
                printf("*");
            } else {
                print(" ");
            }
        }
        printf("\n");
    }
}
```

- (c) Write a c program to take number of rows and number of columns as input and print the following pattern:

Sample Input

4 5

Sample Output

+++++
+ - - - +
+ - - - +
+++++

4. (a) What is structure? Write down the syntax of defining structure.
 (b) How to create a structure type called *s_point* to represent points of Cartesian coordinate with following three elements?
- Name of point (maximum length of 20 characters)
 - X-coordinate of the point (floating point)
 - Y-coordinate of the point (floating point)
- Also declare one variable called *center_point* of type *s_point* using this structure and assign value to any one member of *center_point*.
- (c) What is union? Differentiate between structure and union with example. [3+5+4=12]

Part: B

(Answer any three questions)

5. (a) What is array? How can you declare an array and access its elements?
 (b) When can you use array, explain with example? What are the advantages of using array?
 (c) What is pointer? Read the following program:
- ```
int *a, b;
b = 1;
a = &b;
printf ("value stored at %d address location = %d" , a, *a) ;
```
- In the program above, if the variable *b* is stored at address location 127 in memory then, what will be the output of the program?
- (d) What is string? What are the differences between 'a' and "a" in C programming language? [3+4+2+3=12]
6. (a) Discuss the advantages and disadvantages of functions.  
 (b) Write down the output of following program with proper justification:
- ```
int module() {
    static int i = 45;
    return i++;
}

main() {
    int a = module(), b = module();
    printf("%d %d", a, b);
}
```
- (c) Write a c program with function to solve the following combination formula. Your function should take a number as a parameter from your main function and return its factorial to your main function.

$${}^n C_r = \frac{n!}{r!(n-r)!}$$

Sample Input

10 6
6 2

Sample Output

210
15

[4+4+4=12]

7. (a) Differentiate **call by reference** from **call by value** with appropriate examples.
 (b) Write down the output of following program with proper justification:

```
int rec(int n) {
    if (n < 0) {
        return 1;
    } else {
        return n * rec(n-2);
    }
}
```

```
main() {
    printf("%d", rec(4));
}
```

- (c) Write a c program with function to convert a month number to month name as string. Your function should take month number and a string as parameters from your main function. It will assign the 1st three letters of corresponding month name to the string that has been sent from main function.

Sample Input

9

Sample Output

Sep

[4+4+4=12]

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) Find the General solution of $(D^2+2D+1)y = x^2e^{3x}$.
- (b) Solve the equation $(D^2-2D-3)y = 2e^x-10 \sin x$ by the method of undetermined coefficients.
- (c) Solve the equation $(D^2-6D+9)y = \frac{e^{3x}}{x^2}$ by using the method of variation of parameter.

[4+4+4=12]

2. (a) State stoke's theorem.
- (b) Show that $[\vec{a} + \vec{b} \quad \vec{b} + \vec{c} \quad \vec{c} + \vec{a}] = 2[\vec{a} \quad \vec{b} \quad \vec{c}]$.
- (c) Verify $\oint_c (3x^2 - 8y^2)dx + (4y - 6xy)dy$ by Green's theorem, where c is the bonding of the curve by $y^2 = x, y = x^2$.

[2+4+6=12]

3. Solve the following differential equations:

(a) $\frac{dy}{dx} + \frac{x}{1-x^2}y = x\sqrt{y}$.

(b) $x \ln x \frac{dy}{dx} + y = 2 \ln x$.

(c) $(x-y)^2 \frac{dy}{dx} = \alpha^2$

[4+4+4=12]

4. Solve the following differential equations:

(a) $(D^2 - 2D + 1)y = e^x \sin x$

(b) $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + y = \ln x^2$

(c) $y'' + 36y = \operatorname{cosec} 3x$.

[4+4+4=12]

Part: B

(Answer any three questions)

5. (a) Define complex number. For any complex number z_1, z_2, \dots, z_n . Then prove that $|z_1 + z_2| \leq |z_1| + |z_2|$.
- (b) State and prove sufficient condition for $f(z)$ to be analytic.
- (c) If $f(z)$ is an analytic function of z , then show that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) |f(z)|^2 = 4|f'(z)|^2$.

[4+4+4=12]

6. (a) Define Harmonic conjugate.
- (b) Show that $\oint_c \frac{e^{tz}}{z^2+1} dz = 2\pi i \sin t$, where c is the circle $|z| = 3$ and $t > 0$.
- (c) Evaluate the integral $\oint_c \frac{e^{-iz}}{(z+3)(z-i)^2} dz$, $C = \{z : z = 1 + 2e^{i\theta}\}, 0 \leq \theta \leq 2\pi$ using Cauchy's residue theorem.

[1+5+6=12]

7. (a) Find $L\{e^{-2t}(\cos 2t + 4\sin 3t)\}$.
- (b) Using the convolution theorem, find $L^{-1}\left\{\frac{1}{s^2(s-1)}\right\}$.
- (c) Solve $Y'' + 4Y = 9t, Y(0) = 0, Y'(0) = 7$, using Laplace transform.

[3+4+5=12]

8. (a) State Cauchy's Integral formula.
- (b) Evaluate $\oint_c \frac{\sin^6 z}{(z-\pi/3)^3} dz$, where C is the circle $|z| = 1$.