

Mainul  
23.9.13

L-1/T-2/ME

Date : 23/09/2013

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations 2011-2012

Sub : **CHEM 141** (Chemistry of Engineering Materials)

Full Marks : 210

Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

**SECTION – A**

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) Why glasses have no definite melting point? Show the different types of reactions involved in the conversion of raw materials into glasses. Explain, why the glasses are not stable in presence of hydrofluoric acid? (3+4+4=11)  
(b) Describe the industrial manufacturing process of glasses. (11)  
(c) Why non-uniformity arises during cooling of the glasses and how it can be removed? Discuss the functions of the stabilizers, refining agents and opalizing agents used in the glass manufacturing process. (4+9=13)
2. (a) Define refractories. Explain the inter conversion of the allotropic forms of silica at different temperatures. Discuss the preparation, properties and uses of fire clay bricks. (2+4+6=12)  
(b) Describe the industrial manufacturing process of refractory materials. (11)  
(c) Explain the following statements: (12)
  - (i) The properties of the refractory materials are directly related to the porosity.
  - (ii) Thermal agitation, mechanical and structural factors are the cause of spalling.
  - (iii) A refractory material should possess very high softening temperature.
3. (a) What are the basic raw materials of ceramic wares? Mention the name and functions of the additives which are used in the glass manufacturing process, classify the ceramic wares based on the field of use. (3+6+6=15)  
(b) Write the chemical compositions of the different types of clay and feldspar. Show the flow diagram of the manufacturing white wares. (3+6=9)  
(c) What is activated carbon and how it can be reactivated? Draw the flow chart for the manufacturing of artificial graphite electrode. (5+6=11)
4. (a) Give the synthesis of monomer of nylon 6 6 and describe the manufacturing process of nylon 6 6 with flow sheet and reactions. (5+10=15)  
(b) Discuss the important properties of natural and synthetic fibers. (5)  
(c) Write short notes on the following (any three): (5×3=15)
  - (i) Mod acrylic fibers
  - (ii) Methods of spinning
  - (iii) Polyurethane
  - (iv) Curprammonim rayon.

Contd ..... P/2

**CHEM 141 (ME)**

**SECTION – B**

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) Discuss the economic aspects of corrosion. (7)  
(b) Describe with suitable example the electrochemical mechanism of corrosion. (8)  
(c) What is microbiological corrosion? Write the chemical reactions involved in microbiological corrosion. How can be the microbiological corrosion prevented? (8)  
(d) Write notes on the following: (4×3=12)  
(i) Pitting corrosion  
(ii) Weld decay  
(iii) Corrosion fatigue
6. (a) What are the major sources of natural water? Water from which sources would you like to prefer for its use in different industry. Give suitable explanation. (8)  
(b) Describe with suitable reactions the experimental determination of (i) hardness of water and (ii) concentration of dissolved oxygen in water. (16)  
(c) Classify hardness of water giving example of each class. (4)  
(d) Discuss the zeolite process of removal of hardness of water. (7)
7. (a) Give classification of plastics formed by condensation polymerization. (6)  
(b) What are biodegradable plastics? (5)  
(c) Describe the preparation of the following plastics with reactions (any three). mention their uses. (5×3=15)  
(i) Celluloid (ii) Polyester (iii) Polyvinyl acetal (iv) Metamine-formaldehyde resin  
(d) Describe the thermal and electrical properties of plastics. (9)
8. (a) Describe different steps involved in preparation of metal surface for the application of protective coating. (8)  
(b) What is porcelain vitreous enamel? How can it be prepared and applied on the metal surface. (9)  
(c) Discuss the properties and importance of rubber. (8)  
(d) Describe the vulcanization of rubber. How do you make the vulcanization process economic as well as modify the properties of vulcanized rubber? (10)
-

L-1/T-2/ME

Date : 06/10/2013

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations 2011-2012

Sub : **HUM 101** (English)

Full Marks : 210

Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

**SECTION – A**

There are **FOUR** questions in this Section. Answer any **THREE**, including Q. No. 1 as compulsory.

1. (a) Explain with reference to the context any two of the following: (15)
- (i) "I thought I had the blood of a man on my hands all these years."  
(ii) "I was very willing to accept him as the guide I sought. He had worldly wisdom and common sense. He was tolerant of human weakness."  
(iii) A Sahib has got to act like a Sahib; he has got to appear resolute, to know his own mind and do definite things."
- (b) Answer any one of the following: (15)
- (i) Comment on the symbolic aspects of the story "Fire on the Mountain".  
(ii) Why was the author compelled to shoot the elephant in the "Shooting an Elephant"?
- (c) Answer any three of the following: (15)
- (i) "There aren't any grown-ups. We shall have to look after ourselves" - Who said this, to whom and why?  
(ii) Sketch the character of the Astrologer.  
(iii) Why did Somerset Maugham give up his plan of writing a book on philosophy?  
(iv) Why did the writer say the young Buddhist Priests were the worst of all?  
(v) Describe the story of the young king of the East in "The Use of Philosophy".
2. (a) Recast and Correct any ten of the following sentences: (15)
- (i) The widow woman entered the court room slowly.  
(ii) They can't hardly speak English.  
(iii) He suffers from the allusion that he is a great writer.  
(iv) The militia is discussing the battle among itself.  
(v) My father's happiness is essential to me.  
(vi) The newly arrived burger of KFC tasted extra good.  
(vii) A box of eggs are on the table.  
(viii) The Japanese they eat a great deal of rice.  
(ix) It is I who is to make the call.  
(x) Jamal ate, dressed, and washed before seven O'clock.  
(xi) This new car is our's!  
(xii) We accept Rima from the responsibility.

## HUM 101

### Contd ... Q. No. 2

(b) Give the meaning of and make sentences with any ten of the following words: (15)

Tumult, Demolish, Reckless, Twofold, Obsolete, Flimsy, Enhance, Segment, Avarice, Deride, Chasm, Applaud,

3. Amplify the idea contained in any one of the following: (30)

(i) The things you take for granted, someone else is praying for.

(ii) If winter comes, can spring be far behind?

4. Write a précis of the following passage with a suitable title: (30)

Trees give shade for the benefit of others and while they themselves stand in sun and endure scorching heat, they produce the fruit by which others profit. The character of good men is like that of trees. What is the use of this perishable body, if no use of it is made for the benefit of mankind? Sandalwood - the more it is rubbed, the more scent does it yield. Sugarcane - the more it is peeled and cut into pieces, the more juice it does produce. Gold - the more it is burnt, the more brightly it does shine. The men who are noble at heart do not lose these even in losing their lives. What does it matter whether men praise them or not? What does it signify whether they die at this moment or whether their lives are prolonged? Happen what may, those who tread in the right path will not set foot in any other. Life itself is unprofitable to a man who does not live for others. To live for the mere sake of living one's life is to live the life of dogs and cows - Those who lay down their lives for the sake of friends, or even for the sake of a stranger, will assuredly dwell in a world of bliss.

### SECTION - B

There are **FOUR** questions in this Section. Answer any **THREE** including Q. No. 5 as compulsory.

5. Read the passage carefully and answer the questions that follow: (45)

Change is the law of nature. We have six seasons. Winter gives place to spring which is followed by summer. This is an eternal cycle laid down by mother nature. Winter is the season of extreme cold, chill and snow. The leaves fall off from the trees and the nature looks bare. This season is not at all comfortable to the poor people. But it must appear whether we like it or not. With the onset of spring, trees put forth new leaves and beautiful flowers bloom all around. Cold wind gives place to gentle breeze. <sup>There</sup> ~~The~~ is a cycle in the life of man also. It is but natural that he should feel gloomy when adversity overtakes him. He may lose all hope and become a pessimist. It is at his crucial junction that he should draw courage from mother-nature. He should realise that like dark clouds, chilly winds and wintry weather may cast shadow on one's life. But they are all temporary. They will have to disappear, it is the law of nature.

## HUM 101

### Contd ... Q. No. 5

Misfortune and difficulties may overcome us, but we must not forget that they are all temporary. Fortune and happiness are bound to follow them. Let us all face our difficulties courageously for the brighter period ahead.

Questions:

- (a) What is an 'eternal cycle of season?
  - (b) What is the law of nature?
  - (c) Why should one not be pessimistic?
  - (d) What is the moral lesson of the passage?
  - (e) Write down the meaning of the following words as used in the passage:  
Eternal, chill, breeze, gloomy, adversity, overtake, pessimist, overcome, disappear.
6. (a) Briefly discuss the elements that constitute the structure of a business letter. (10)
- (b) Write a letter to the Dhanmondi Branch manager of DHL complaining about a damaged parcel that you have recently received. (10)
- (c) Write phonetic transcription of the following words (any five): (10)  
Short, school, child, dark, beautiful, book.
7. (a) Briefly discuss the elements of 'Back Matter' of a formal Report. (5)
- (b) Write a short essay on any one of the following topics: (15)
- (i) Social Service as part of Education;
  - (ii) Adulteration in food.
  - (iii) Dreams.
- (c) Write a dialogue between two students of your department about the prospect of your discipline in professional arena in our country. (10)
8. (a) Transform the following sentences as directed (any five): (10)
- (i) I offended him by doing this. (compound)
  - (ii) Do not get into a bus while it is moving. (simple)
  - (iii) What he has said is true. (simple)
  - (iv) You have succeeded and I am glad of it. (complex)
  - (v) Only the hard working will succeed. (complex)
  - (vi) The evil that ~~man~~<sup>men</sup> do live after them. (compound)
- (b) How would you differentiate interpretive report from informational report? (5)
- (c) Write short notes on any three of the following: (15)
- (i) Forwarding letter;
  - (ii) Paragraph developers;
  - (iii) Feedback;
  - (iv) Adjustment letter;

L-1/T-2/ME

Date : 06/10/2013

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations 2011-2012

Sub : **HUM 103** (Economics)

Full Marks: 210

Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

**SECTION – A**

There are **FOUR** questions in this section. Answer any **THREE**.

1. (a) What do you mean by inflation? Mention the causes of 'demand pull' and 'cost push' inflation. (15)  
 (b) Compare graphically the effects of demand pull and cost inflation on the price level and output. (20)
  
2. (a) Define Gross Domestic Product (GDP) and Gross National Product (GNP). (7)  
 (b) Explain different methods of GDP measurement. (20)  
 (c) What items are not considered in GDP calculation? (8)
  
3. (a) Suppose the production equation of Google is  $TP = -3L^3 + 270L^2$ . (15)  
 Sketch a graph showing the relationship between the total product, average product and marginal product curves of Google.  
 (b) What do you mean by 'returns to scale'? Explain different types of 'returns to scale'. (2+3=5)  
 (c) What is 'opportunity cost'? Given an example of 'opportunity cost' with the help of Production Possibility Frontier (PPF). What will be the impact of the changes in technology and resources on the PPF? (5+5+5=15)
  
4. (a) What is market? Mention the properties of different types of markets with examples. (10)  
 (b) What are the equilibrium conditions for a firm in a perfectly competitive market? Show graphically the 'super normal profit', 'abnormal loss' and 'normal profit' for a firm in perfect competition. (3+7=10)  
 (c) Consider an arbitrary cost function of a firm: (15)  

$$TC = 2Q^3 - 36Q^2 + 1500Q$$
, where TC = Total Cost  
 With the help of the above cost equation, derive the marginal cost and average cost curves from the total cost curve and then show the relationship between total cost, marginal cost and average cost curves. (15)

**HUM 103**

**SECTION – B**

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) Define demand function. (5)  
(b) What are the factors that influence the shifting of a demand curve? (10)  
(c) What are the exceptions to the law of demand? Explain them. (10)  
(d) How would you derive the market demand curve of a commodity? Explain graphically. (10)

6. (a) Define income and cross elasticity of demand. (10)  
(b) Show that price elasticity of demand varies from zero to infinity along any straight line demand curve. (15)  
(c) From the following table calculate elasticity of demand if you move from point B to C and explain what you understand from the result. (10)

Point	$P_x$	$Q_y$
A	500	850
B	600	800
C	700	750

7. (a) How is price determined in an economy under competition? Explain graphically. (10)  
(b) What will happen to the equilibrium price and quantity due to change in demand? (10)  
(c) From the following demand and supply functions, calculate equilibrium price and quantity and show the result in a graph. (15)

$$P = 0.1 Q + 10$$

$$P = -0.5 Q + 50$$

if the demand function changes to

$$P = -0.6 Q + 36$$

then what will be the new equilibrium price and quantity? Plot the coordinates on the graph and describe the change in equilibrium points on graph.

8. (a) Define budget line and budget set. (10)  
(b) What are the assumptions of an indifference curve analysis? Explain the properties of an indifference curve. (15)  
(c) Explain consumer's equilibrium. (10)
-

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations 2011-2012

Sub : **ME 171** (Computer Programming Language)

Full Marks : 210

Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

**SECTION - A**

There are **FOUR** questions in this Section. Answer any **THREE**.

1. Print the output of the following codes:

(a)

```
int number[10] = {1, 0, 0, 0, 0, 0, 0, 0, 0, 0};
int i, j;
for(j=0; j<10; ++j)
    for(i=0; i<j; ++i)
        number[j] += number[i];
for(j=0; j<10; ++j)
    printf("%i\n", number[j]);
```

(10)

(b)

```
float f = 12.978;

printf("%f %e %g \n", f, f, f);
printf("%.2f %.2e \n", f, f);
printf("%.0f %.0e \n", f, f);
```

(7)

(c)

```
char *message = "Mechanical Engineering";

printf("%s\n", "Mechanical Engineering");
printf("%s\n", message);
printf("%s\n", &message[0]);
printf("%s\n", &message[11]);
printf("%s\n", message + 11);
printf(message);
```

(6)



**ME 171**

**Contd ... Q. No. 1**

(d)

(12)

```
int a = 10;
void test(int);
void main(){
    int i, b = 20;
    for(i=0; i<3; ++i) test(b);
}
void test(int b){
    int c = 30;
    static int d = 40;
    printf("%d %d %d %d \n", a, b, c, d);
    ++a;
    ++b;
    ++c;
    ++d;
}
```

2. (a) A program has to evaluate the absolute larger number between two numbers. Suppose  $b = -10$ ,  $a = 5$ , and  $b = 10$ , then  $b$  is larger than  $a$ . Write the program by using conditional operator and macro function to perform the task. (14)

(b) Write a function that will receive three integer numbers (say  $a$ ,  $b$  and  $c$ ). The job of the function is to interchange the numbers in a cyclic order such that  $a$  gets the value of  $b$ ,  $b$  gets the value of  $c$ , and  $c$  gets the value of  $a$ . A fourth variable cannot be used. (21)

3. (a) Consider a two dimensional array holds the temperature distribution of a heated plate. Write the necessary code to write the data stored in the array to file named "temperature.dat". Output data must be in matrix form. (15)

(b) Work can be defined as

$$W = F \cdot d$$

where  $W$  is the work done,  $F$  is the force vector, and  $d$  is the displacement vector. Force  $F$  and displacement  $d$  can be defined as  $F = f_x i + f_y j + f_z k$  and  $d = d_x i + d_y j + d_z k$ , respectively. So work done  $W$  can be determined by  $W = f_x d_x + f_y d_y + f_z d_z$ . Now, consider a function receives two arrays containing force and displacement values and returns the value of work done. Write the function assuming all force and displacement components to be integers.

**ME 171**

4. Define a structure that contains x and y coordinates of a point in Cartesian coordinate system and name it *Point*. Define another structure named *Triangle* containing three *Points*. To calculate the distance between any two *Points*, define a function and name it *distance*. The distance function will receive two *Points* and return the distance between them. Write a program that will receive from console three vertices of a triangle by using *Point* and *Triangle* structures as mentioned earlier. The program should then determine whether the triangle is equilateral (all three arms are equal), isosceles (any two arms are equal) or scalene (none are equal) triangle. (35)

**SECTION - B**

There are **FOUR** questions in this Section. Answer any **THREE**.

5. (a) What are the minimum number of hardware components required to make a workable computer? Classify different categories of software. (7)
- (b) With a top-down layered model show how abstractions are provided between the user, software and hardware. Explain the abstraction process<sup>by</sup> describing how a file is opened from a hard disc, modified and saved back to the hard disc. (9)
- (c) How would you define a 'computing platform'? Give some examples of computing platforms. Why is a sense of computing platform? *necessary?* (9)
- (d) Briefly discuss the different programming modules needed for computing and running a computer program. (10)
6. (a) What is an algorithm? Mention its significance. (4)
- and* (b) Make a comparison between pseudo-code ad flowchart methods of expressing an algorithm. (5)
- (c) Develop a general algorithm to compute the roots of a quadratic equation  $Ax^2 + Bx + C = 0$  with the possibility that  $B^2 - 4AC \leq 0$ . (6)
- (d) Express the algorithm in Q. 6(c) in pseudo code and also show it using a flowchart. (20)
7. (a) Rewrite the statement using if-else construct : (6)
- $x = (a \neq b) ? y * y : y * y * y * y ;$
- (b) Rewrite the following program segment using switch statement: (7)
- if (x == 8) y = 7;  
if (x == 7) y = 9;  
else y = 12;

**ME 171**

**Contd ... Q. No. 7**

- (c) Why is the 'goto' statement discouraged in C programming? (6)
- (d) What is the minimum number of iterations that (i) a 'while-loop' can make and (ii) a 'do-while-loop' can make. (4)
- (e) Using 'do-while' loop construct write a C program that will accept a positive integer number n and will give the factorial value of n as output. (12)
8. (a) Make a detail comparison between a compiler and an interpreter. (10)
- (b) Elaborate the meaning of the following abbreviations used in Computing and state their functions: (12)
- (i) OCR (ii) OMR (iii) MICR
- (c) What are the number systems and used by humans and by computers? Why is the hexadecimal number system used? (4)
- (d) Convert the following numbers as indicated: (show step-by-step processes)
- (i) octal '703' to decimal (ii) hexadecimal '1AF' to binary (iii) decimal '29.8' to binary (9)
-