

**SECTION – A**

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

1. (a) What do you understand by “human settlement”? Briefly discuss the rural settlement types with necessary illustrations. (5+20=25)
- (b) Write down the features of the Kahun colony of Egyptian civilization. (10)
2. (a) Which city in history is known as the ‘mound of the dead’ and why? (5)
- (b) What distinctive features are seen in the road pattern and dwellings of medieval towns? (12+12=24)
- (c) How did the discovery of gunpowder influence the forms of cities? (6)
3. (a) How has the caste system of Hinduism been incorporated in the city layout of ancient India? Show with illustration the pre-industrial and post-independence city forms in India. (5+8=13)
- (b) “Some fundamental considerations in town and transport planning (like organized road structure, separation of public and private space, provision of water supply in an efficient way, etc) are even found in ancient and classic cities” – Do you agree with the statement? Discuss with relevant examples. (15)
- (c) Discuss about the Hippodamian city layout pattern. Why is it criticized? (7)
4. (a) What factors influenced the development of Dhaka as a city in the Mughal period? (7)
- (b) Write short notes on – (8×3=24)
  - (i) Sacred precinct of Ur, (ii) Agora, (iii) City of Gournia.
- (c) What are the factors responsible for the characters of cities? (4)

**SECTION – B**

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

5. (a) Describe the direct and indirect measurements of migration. (10)
- (b) Define Level of Urbanization and Urban growth. Calculate the level of Urbanization and Annual average growth rate of urban population from the following table and interpret the result. (5+17=22)

**PLAN 111**

**Contd ... Q. No. 5(b)**

Year	Total Population	Urban Population
1961	25,65,090	54,780
1971	28,97,286	77,205
1986	31,64,370	99,430
1991	35,17,890	1,56,724
2001	43,27,931	2,58,302
2006	49,68,879	3,84,700
2011	54,97,204	5,09,930

- (c) What is relay migration? (3)
6. (a) In Vertical City concept, Le Corbusier tried to satisfy four apparently irreconcilable but most important demands of modern cities. What are those? (4)
- (b) Discuss the main elements of Radburn concept with appropriate diagram. (13)
- (c) Briefly explain the sources of collecting information about international migration. (10)
- (d) Write down the merits and demerits of corridor plan. (8)
7. (a) Briefly describe the factors affecting migration. (14)
- (b) Assume, the real rural wage of a person is 35 taka per day and expected urban wage is 80 taka per day, where the probability of securing urban job is 42%. Under this circumstances, what will be the migration decision of the person and why? (8)
- (c) Write down the effects of urbanization in the context of Bangladesh. (13)
8. Write short notes on (any five) (5×7=35)
- (a) Features of Garden City Planning,
- (b) Municipality (Paurashava),
- (c) Transportation System of Vertical City Planning,
- (d) Urban hierarchy,
- (e) Urban pull factors of migration,
- (f) Metropolitan area, Megalopolis, Conurbation,
- (g) Concept of New town.
-

**SECTION – A**

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

1. (a) Define income elasticity and cross-price elasticity of demand. How would you derive the formulae for measuring these two types of elasticity of demand? (15)
- (b) What do you know about point elasticity and arch elasticity of demand? (10)
- (c) The demand function of Igloo ice-cream is given by  

$$Q_{dx} = 1790 - 25P_x + 0.008 M + 3.8 P_y$$
 Where price of Igloo ice-cream,  $P_x = \text{Tk. } 60$ , price of Polar ice-cream,  $P_y = \text{Tk. } 50$  and Income of the consumer,  $M = 60000$ . Find the income elasticity and cross-price elasticity of Igloo ice-cream. State the implications of the results you have obtained. (10)
  
2. (a) Evaluate the critique of the cardinalist approach of utility analysis. (5)
- (b) State the assumption of the ordinalist approach of utility analysis. (10)
- (c) Prove that the equilibrium conditions are identical in the cardinalist approach and in the indifference-curve (ordinalist) approach. (20)
  
3. (a) Illustrate the law of diminishing marginal utility. (10)
- (b) Clarify the concepts of consumer surplus and producer surplus with graphical and mathematical presentations. (15)
- (c) From the following demand and supply functions (given respectively)  

$$P = 36 - X^2 \text{ and } 4P - 6 = X^2$$
 (The notations bear usual meanings)  
 Calculate consumer surplus and producers surplus. (10)
  
4. Write short notes on any **THREE** of the following (35)
  - (i) Substitution effect and income effect of a price change
  - (ii) Factors affecting demand for a commodity
  - (iii) Price consumption curve and Engel curve.
  - (iv) Market equilibrium

**HUM 171**

**SECTION – B**

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

5. (a) What is meant by the concept of market in Economics? Discuss the various classifications of market. (10)
- (b) Distinguish between the concepts of fixed cost and variable cost. (5)
- (c) Complete the following table and sketch the graph explaining the relations among the various short run cost curves. (10)

(1) Quantity of output	(2) Total fixed cost	(3) Total variable cost	(4) Total cost	(5) Average fixed cost	(6) Average variable cost	(7) Average Total cost	(8) Marginal cost
1	\$ 60	\$ 30					
2	60	40					
3	60	45					
4	60	55					
5	60	75					
6	60	120					

- (d) What are the conditions of profit maximization? (10)
6. (a) What are the conditions of monopoly market? Explain the barriers which prevent a firm to enter the monopoly industry. (5)
- (b) Explain the nature of demand curve under monopoly market. Graphically discuss the short run equilibrium of a firm under monopoly market. (10)
- (c) What is meant by the concept of long run in the theory of production? How would you derive a long run average cost (LAC) curve of a firm from its short run cost curves? Why is LAC curve often called the planning curve? (10)
- (d) Given the following total revenue (TR) and total cost (TC) function for a firm (10)

$$TR = 5900Q - 10Q^2$$

$$TC = 2Q^3 - 4Q^2 + 140Q + 845$$

where Q is the quantity of output.

- (i) Set up the profit function.
- (ii) Find out the quantity which makes the profit maximum.
- (iii) Calculate the maximum profit and verify that it is maximized.
7. (a) What do you understand by an 'effective demand in Economics? State the assumptions of the law of demand. (10)
- (b) Discuss the factors other than price that determine supply of a commodity in general. (15)
- (c) Distinguish between 'change in demand' and 'change in quantity demand'. (10)

**HUM 171**

8. Write short notes on any Three of the following:

**(35)**

- (a) Assumptions of perfect competition.
- (b) The closing down point of production of a firm under perfectly competitive market.
- (c) Application of Euler's theorem in the theory of distribution of production.
- (d) Internal economics of scale of production.

-----

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1 B. Urp. Examinations 2015-2016

Sub : **CHEM 123** (Environmental Chemistry)

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** questions.

1. (a) What is meant by the photoelectric effect? What role did Einstein's explanation of the photo electric effect play in the development of the particle-wave interpretation of the nature of electromagnetic radiation? (9)
- (b) State the de-Broglie relationship. What is the de Broglie wavelength (in cm) of a 12.4 g humming bird flying at  $1.20 \times 10^2$  mph? (1 mile = 1.61 km). (9)
- (c) If you have one mole of H atoms with their electrons in the  $n = 1$  level, what is the minimum number of photons you would need to interact with these atoms in order to have all of their electrons promoted to the  $n = 3$  level? What wavelength of light would you need to perform this experiment? (8)
- (b) Describe the shapes of 1S, 2P, and 3d – orbitals. How are these orbitals related to the quantum numbers  $n$ ,  $l$ , and  $m_l$ ? (9)
2. (a) What is the hybridization of atomic orbitals? How does a hybrid orbital differ from a pure atomic orbital? What hybrid orbitals are used by nitrogen atoms in these species? (10)
  - (i)  $\text{NH}_3$  (ii)  $\text{H}_2\text{N} - \text{NH}_2$  (iii)  $\text{NO}_3^-$
- (b) Sketch the shapes of these molecular orbitals:  $\sigma_{1s}$  and  $\sigma_{1s}^*$ ,  $\pi_{2p}$  and  $\pi_{2p}^*$ . How do their energies compare? (8)
- (c) Use VBT to explain the bonding in  $\text{N}_2\text{F}_2$  molecule. (7)
- (d) Use molecular orbital theory (MOT) to compare the relative stability of these two species:  $\text{O}_2$ ,  $\text{O}_2^+$ . Indicate their magnetic properties (diamagnetic or paramagnetic). (10)
3. (a) What are the four environmental segments? Describe each of them briefly. (8)
- (b) There are three important catalytic cycles that cause loss of ozone. Describe one of these processes that needs atomic chlorine to get started. How does CFC generate Cl and enters into the cycle? (8)
- (c) What are the green house gases? How does the greenhouse effect determines the surface temperature of the earth? (7)
- (d) Please calculate the temperature of the earth assuming that there is no greenhouse effect. Given that the magnitude of solar constant is  $1372 \text{ W/m}^2$  and earth's albedo is 30%, Stefan-Boltzmann constant is  $5.67 \times 10^{-8} \text{ W/m}^2\text{K}^4$ .

## **CHEM 123**

### **Contd ... Q. No. 3(d)**

- Assuming the Earth's surface temperature is 288 K calculate the amount of greenhouse effect in  $W/m^2$ . (12)
4. (a) Air pollution can be caused by both natural and unnatural reasons. Give some examples. What are something you could do as an urban planner to reduce unnatural air pollution? (7)
- (b) What are the five major air pollutants? Which two of these cause acid rain? Explain. (8)
- (c)  $CO_2$  emission is a big problem in urban area. What are the strategies that you can take to decrease  $CO_2$  emission? (6)
- (d) What is meant by nonpoint source water pollution? Is chemical run off an example of point source or nonpoint source? Briefly explain your answer. (8)
- (e) What is dissolved oxygen? Why is it important for aquatic lives? (6)

### **SECTION – B**

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

5. (a) Classify pesticides depending on the modes of poisoning. How pesticides are transported in water and soil? (5+5=10)
- (b) Why the degradation of pesticides is essential? Describe the following methods for the degradation of pesticides: (i) Hydrolysis (ii) Dehalogenation (iii) Oxidation. (3+9=12)
- (c) State the effects of synthetic fertilizers on soil ecosystem. Why are organic fertilizers better than chemical fertilizers? (8+5=13)
6. (a) How does formaldehyde enter into human body? Write down the adverse effects of formaldehyde on human body. (4+5=9)
- (b) What are the important properties of PVC? Discuss toxic effects of PVC. (5+5=10)
- (c) How does surfactant improve the properties of detergents? Explain the cleansing action of soaps and detergents. (2+6=8)
- (d) Discuss the biodegradability of urea-aldehyde condensation products. (8)
7. (a) Define salt hydrolysis. Predict the pH (7, <7 or  $\approx$  7) of the aqueous solutions containing the following salts: (i) KBr (ii) NaF (iii)  $Al(NO_3)_3$ . (7)
- (b) (i) How to prepare a buffer solution with a specific  $p^H$ ? (8+6=14)
- (ii) The pH of a 0.10 M solution of formic acid ( $HCOOH$ ) is 2.39. What is the  $K_a$  of the acid?
- (c) Predict the relative strengths of the oxoacids in each of the following groups: (8)
- (i)  $HClO$ ,  $HBrO$  and  $HIO$  (ii)  $HNO_3$  and  $HNO_2$

**CHEM 123**

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

(d) Classify each of the following species as a Lewis acid or a Lewis base: **(6)**

(i)  $\text{CO}_2$  (ii)  $\text{H}_2\text{O}$  (iii)  $\text{NH}_3$  (iv)  $\text{BCl}_3$ .

8. (a) (i) Define ionic radius. How does the size change when an atom is converted to an anion and a cation? **(8+5=13)**

(ii) Why is the first ionization energy of nitrogen higher than Oxygen?

(b) How is nuclear transmutation achieved? What is the difference between radioactive decay and nuclear transmutation? **(8)**

(c) Why do heavy elements such as uranium undergo fission while light elements such as hydrogen undergo fusion? **(6)**

(d) Write a short note on radioactive decay. **(8)**

-----



---

**SECTION – A**

There are **FOUR** questions in this Section. Answer Q. No. 1 and any **TWO** from the rest.

1. (a) Explain with reference to the context any one of the following: (8)
- (i) "His reading suggested a man swimming in the sea among the wreckage of his ship, and trying to save his life by greedily clutching first at one spar and then at another."
- (ii) "All these things which another woman of her station would not have noticed, tortured and angered her."
- (b) Answer any one of the following: (10)
- (i) How did the lawyer become a changed man during his fifteen years in jail?
- (ii) Evaluate the story of 'The Garden Party' as a picture of class differences.
- (c) Answer any three of the following: (12)
- (i) How did Mrs. Matilda Loisel enjoy herself at the party given by the Minister of Education?
- (ii) How did the Loisel couple manage to collect the money for returning the lost necklace?
- (iii) What happened in the morning on which the lawyer escaped from jail?
- (iv) What were the views of the guests about capital punishment?
2. Recast and correct any ten of the following sentences: (20)
- (i) The amount of horses on the range was small.
- (ii) Walt Whitman occupies a most unique place in literature.
- (iii) The jury is arguing among itself.
- (iv) I was in a dilemma about what to have for dinner.
- (v) It was they who was to do the work.
- (vi) If I were him I should not accept the post.
- (vii) Abraham Lincoln was one of the great man in American history.
- (viii) The team played real good for the first five minutes.
- (ix) Erosion is where the soil is washed away.
- (x) We haven't scarcely any sugar.
- (xi) He had a need and interest in athletics.
- (xii) I have more mistakes on my paper than him.

**HUM 125**

3. (a) Give meanings of any ten of the following words: (10)

Alleviate, baffle, castigate, decrepit, emulate, flicker, gauche, induce, loathe, protrude, retard, sinuous.

- (b) Make sentences with any ten of the following words: (10)

Acrid, bellow, chasm, diffidence, expound, indictment, meticulous, outrageous, ratify, sagacity, tiptoe, zealot.

4. Write a précis of the following passage with a suitable title: (20)

Ever since humans have inhabited the earth, they have made use of various forms of communication. Generally this expression of thoughts and feelings has been in the form of oral speech. When there is a language barrier, communication is accomplished through sign language in which motion stands for letters, words and ideas. Tourists, the deaf and the mute have had to resort to this form of expression. Many of these symbols of whole words are very picturesque and exact and can be used internationally; spelling, however, cannot. Body language transmits ideas or thoughts by certain actions, either intentionally or unintentionally. A wink can be a way of flirting or indicating that the party is only joking. A nod signifies approval, while shaking the head indicates a negative reaction. Other forms of non-linguistic language can be found in Brail (a system of raised dots read with the finger prints), signal flags, Morse code, and smoke signals. Road maps and picture signs also guide, warn and instruct people. While verbalization is the most common form of language, other systems and techniques also express human thoughts and feelings.

**SECTION – B**

There are **FOUR** questions in this Section. Answer Q. No. 5 and any other **TWO** from the rest.

5. Read the following passage carefully and answer all the questions given below: (30)

The journey from irresponsibility to responsibility is full of hazards. Every individual first encounters his problems of security and personal significance while he is still a helpless infant. His first efforts to get what he wants are made long before he enjoys either independence or competence. They are, therefore, directed at getting other people to give him what he wants. Thus, at the most vulnerable time of his life, he faces a double danger: of consolidating habits of “successful” dependence upon others, so that he never finds a sufficient motive for growing into mature respectably; or of experiencing so much frustration that his natural drive towards independence is replaced either by a submissive acceptance of whatever happens or by an aggressive resistance.

## **HUM 125**

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

We know that many irresponsible adult behaviours stem from causes other than their apparent causes. The person who is never on time, for example, even though he consciously tries for punctuality, may be expressing an unconscious resentment carried over from childhood: resentment, perhaps against stringent rules of 'niceness' and orderliness that set him apart from his playmates and won him the label of sissy. The stumbling person who seems pitifully to fail, and fail again, in spite of honest effort, may unconsciously want to fail – because failure allows him to remain in some measure dependent.

Man in brief, does not grow automatically from dependence to independence, helplessness to competence, irresponsibility to responsibility. But the linkage life brought about by such growth is indispensable to maturity.

Questions:

- (i) What is the double danger?
  - (ii) What is the outcome of stringent rules and restriction upon childhood practices?
  - (iii) How does the journey to maturity take place?
  - (iv) What is the cause of irresponsible adult behaviour?
  - (v) Why does some one like to fail?
  - (vi) Give meaning of the following words as used in the passage:  
Vulnerable, consolidate, resentment, stringent, indispensable.
6. (a) Goods were assured to be delivered within two weeks of placing the order. But you have not yet received the goods. Now write a complaint letter to your supplier, pointing out the delay and specifying a date by which you wish to get the goods. **(10)**
- (b) Write phonetic transcriptions of the following words: (Any five) **(10)**  
Enrich, cottage, angel, thank, near, paper.
7. (a) Write a dialogue between two students of URP Department about the unplanned housing system in Bangladesh. **(10)**
- (b) Write a short essay on any one of the following topics: **(10)**
- (i) Popular Entertainments
  - (ii) Parent – Children Relationship
  - (iii) My favourite subject of Study.

**HUM 125**

**Contd ... Q. No. 5**

8. (a) Transform the following sentences as directed: (Any five) (10)

- (i) Nobody loves me as much as my mother. (Simple)
- (ii) When he whistled, the dog came back. (Compound)
- (iii) What he has said is true. (Simple)
- (iv) A relation needs to be tended to like a plant. (Compound)
- (v) The news is too good to be true. (Complex)
- (vi) Be just and fear not. (Complex)

(b) Write short notes on any two of the following: (10)

- (i) The Diphthongs
  - (ii) Components of a formal report
  - (iii) Barriers to Communication.
-