SECTION – A

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

1. (a) Consider the function \( f(x) = \begin{cases} x+3, & -2 \leq x < 2 \\ 5 & x = 2 \\ x^2+2 & x > 2 \end{cases} \)

\( (i) \) Find the Domain of the function \( (ii) \) Locate the intercepts \( (iii) \) Graph the function \( (iv) \) Based on the graph, find the range.

(b) Sketch the function of \( f(x) = \frac{4x}{x^2-1} \)

\( (i) \) Find the domain and asymptote lines of function \( f(x) \) and \( (ii) \) List the intercepts and test the symmetry of function \( f(x) \).

2. (a) For the polynomial function \( f(x) = 2x^3 + 5x^2 - 28x - 15 \),

\( (i) \) Determine the maximum number of real zeros that the function may have.
\( (ii) \) Determine the real zeros of \( f \) and factor \( f \) over the reals.
\( (iii) \) Find the \( x \)- and \( y \)-intercepts of the function of \( f \).
\( (iv) \) Determine whether the graph crosses or touches the \( x \)-axis at each \( x \)-intercept.
\( (v) \) Find the power function that the graph of \( f \) resembles for large values of \( |x| \).
\( (vi) \) Determine the behaviour of the graph of \( f \) near each \( x \)-intercept.
\( (vii) \) Put all the information together to obtain the graph of \( f \).

(b) Find the horizontal or oblique asymptote, (if exists),

\( (i) \) \( f(x) = \frac{3x^4-x^2}{x^3-x^2+1} \) \( (ii) \) \( f(x) = \frac{8x^2-x+2}{4x^2-1} \).

3. (a) Suppose that the quantity supplied \( S \) and quantity demanded \( D \) of T-shirts at a concert are given by the following functions: \( S(p) = -200+50p \) and \( D(p) = 1000-25p \), where \( p \) is the price of a T-shirt.

\( (i) \) Find the equilibrium price for T-shirts at this concert. What is the equilibrium quantity?
MATH 101

Contd... Q. No. 3(a)

(ii) Determine the prices for which quantity demanded is greater than quantity supplied.

(iii) What do you think will eventually happen to the price of T-shirts if quantity demanded is greater than quantity supplied?

(b) A quadratic function is of the form \( f(x) = ax^2 + bx + c \) which also be written in the form \( f(x) = a(x - r_1)(x - r_2) \), where \( r_1 \) and \( r_2 \) are the \( x \)-intercepts of the graph of the quadratic function.

(i) Find a quadratic function whose \( x \)-intercepts are \(-5\) and \(3\) with \(a = 1\), \(a = 2\), \(a = -2\), \(a = 5\).

(ii) How does the value of \(a\) affect the intercepts?

(iii) How does the value of \(a\) affect the axis of symmetry?

(iv) How does the value of \(a\) affect the vertex?

(v) Compare the \(x\)-coordinate of the vertex with the midpoint of the \(x\)-intercepts. What might you conclude?

4. (a) Solve \(\log_{16} x + \log_4 x + \log_2 x = 7\) \(\cdots 6\)

(b) Prove that \(\tanh^{-1} x = \frac{1}{2} \ln \left(\frac{1+x}{1-x}\right)\) \(\cdots 6\)

(c) For the given functions \(f(x) = \frac{3}{2x-1}\) and \(g(x) = \frac{2}{x}\), find (i) \(gof\) (ii) \(gog\); with their domains. \(\cdots 6\)

SECTION-B

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

5. (a) Define Symmetric matrix, Skew-Hermitian matrix and Minor of a matrix with examples. \(\cdots 12\)

(b) Find the adjoint of the matrix \(A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 3 \end{bmatrix}\) and hence find \(A^{-1}\). \(\cdots 6\)

6. (a) Define rank of a matrix with examples. Show by examples that the elementary row transformations do not change the rank of a matrix. \(\cdots 12\)
MATH 101
Contd., Q. No. 6

(b) Find the inverse of the matrix \( A = \begin{bmatrix} 2 & 4 & 3 & 2 \\ 3 & 6 & 5 & 2 \\ 2 & 5 & 2 & -3 \\ 4 & 5 & 14 & 14 \end{bmatrix} \) by using elementary row transformation.

7. (a) Find the canonical form of the matrix \( A = \begin{bmatrix} 1 & 2 & -3 & -4 & 6 \\ 1 & 3 & 1 & -2 & 4 \\ 2 & 5 & -2 & -5 & 10 \end{bmatrix} \) hence find the rank of the matrix.

(b) Find nonsingular matrices \( P \) and \( Q \) such that \( PAQ \) is in the normal form \( B \), where

\[
A = \begin{bmatrix} 2 & 1 & -3 & -6 \\ 3 & -3 & 1 & 2 \\ 1 & 1 & 1 & 2 \end{bmatrix}
\]

8. (a) Find the solution of the following set of equations by using matrix:

\[
\begin{align*}
& x_1 + x_2 + x_3 + x_4 = 4 \\
& 2x_1 - x_2 - x_3 + 3x_4 = 6 \\
& 3x_1 + 4x_2 - 5x_3 + 6x_4 = -11 \\
& 7x_1 - 5x_2 + 7x_3 + x_4 = 46 \\
\end{align*}
\]

(b) Obtain the solution of the following homogeneous equations by using matrix.

\[
\begin{align*}
& x_1 - x_2 - x_3 + 2x_4 = 0 \\
& x_1 + 3x_2 - x_3 - 6x_4 = 0 \\
& 2x_1 + x_2 - 3x_4 = 0 \\
\end{align*}
\]
SECTION – A

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

1. (a) Distinguish between absolute humidity and relative humidity. Define hygrometer and classify it. Draw a schematic diagram of Regnault’s dew point hygrometer. (10)

(b) State Newton’s law of cooling. How would you determine the specific heat of a liquid by Newton’s law of cooling? (16)

(c) A liquid takes 4 minutes to cool from 75°C to 60°C. What will be its temperature after next 10 minutes? The temperature of surroundings is 30°C. Assume that Newton’s law of cooling holds good throughout the process. (9)

2. (a) Describe the terms thermal conductivity, thermal resistance and temperature gradient. (8)

(b) In the case of conduction of heat through composite blocks show that

\[ \frac{x_1 + x_2}{K} = \frac{x_1}{K_1} + \frac{x_2}{K_2}, \]

where the symbols have their usual meaning. (17)

(c) The temperature at inside and outside of a class room in the Architecture department are 28°C and 18°C, respectively. The room has a wall 8 m by 3 m made of bricks 24 cm thick lined with plaster 1 cm thick. It has a glass window of area 2 m² and thickness 0.4 cm. Calculate the heat conducted per second through (i) the glass and (ii) the plaster lined brick. Given the thermal conductivities of brick, plaster and glass are 1.4 \times 10^{-3}, 1.0 \times 10^{-3}, and 2.0 \times 10^{-3} \text{ cal cm}^{-1} \text{s}^{-1} \text{°C}^{-1}, respectively. (10)

3. (a) Explain the terms black body, emissive power, absorptive power, reflecting power and transmitting power. (10)

(b) State and prove Kirchhoff’s law of radiation. (17)

(c) What do you understand by solar constant? Calculate the temperature of the Sun surface. (8)

4. (a) What do you mean by (i) echo, (ii) reverberation, and (iii) coefficient of absorption of sound energy? (9)

(b) What is Doppler Effect of sound? Explain the Doppler Effect of sound under six different cases. (18)

(c) A wire of length 50 cm and mass 6.5 \times 10^{-3} kg is stretched so that it makes 80 vibration per second. Calculate its stretching tension. (8)
PHY 115(ARCH)

SECTION – B

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

5. (a) Obtain the differential equation for a particle moving with progressive wave. (10)

(b) Derive an expression for the total energy of a particle executing simple harmonic motion. (15)

(c) A particle of mass 10 gm executes simple harmonic motion given by the equation:
   \[ y = 12 \sin \left( \frac{2\pi t}{10} + \frac{\pi}{4} \right) \]. At \( t = 1.25 \) s, calculate its displacement and average kinetic energy. (10)

6. (a) What do you mean by free vibration, forced vibration and resonance? (10)

(b) Deduce an expression of motion of a particle, when it is influenced simultaneously by two simple harmonic oscillations at right angles. For what condition, the shape of Lissajous' figure can be an ellipse? Explain in details. (15)

(c) A spring of mass 100 gm is allowed to oscillate simple harmonically. When the spring is loaded with 200 gm, it extends by 10 cm. Determine its time period and spring constant. (10)

7. (a) Distinguish between interference and diffraction of light. What do you understand by Fraunhofer and Fresnel classes of diffraction? (10)

(b) With a suitable diagram explain the method of magnification to determine the slit separation in the Fresnel biprism experiment. (15)

(c) In a Fresnel's biprism experiment, the fringe width is observed to be 0.130 cm. If the slit separation is reduced by \( \frac{3}{4} \) of the original value, what will be the fringe width? (10)

8. (a) What do you understand by polarization of light? How would you obtain plane polarized light by reflection? (15)

(b) Write short notes on:
   (i) Law of Malus (12)
   (ii) Laws of illumination

(c) At what angle should the light be incident on a glass plate of refractive index \( \mu = 1.5697 \) to get a plane polarized light by reflection? (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) “The geniuses of all ages and of all lands speak different languages, but the same flame burns in them all.”
   
   (ii) “How singular is life, and how full of changes! How small a thing will ruin or save one!”

   (b) Answer any one of the following: (10)
   
   (i) Make a critical discussion on the note that the lawyer wrote before his departure from jail.
   
   (ii) Do you think that Mrs. Matilda Loisel suffered more than she deserved? Give your opinion according to the story “The Diamond Necklace”

   (c) Answer any three of the following: (12)
   
   (i) What impression do you get about Mr. Loisel as a husband?
   
   (ii) How was the weather of the night on which the banker went out to kill the lawyer?
   
   (iii) What were the terms and conditions of the bet?
   
   (iv) Who is the protagonist of the short story ‘The Garden Party’, and why?

2. Recast and correct any ten of the following sentences: (20)

   (i) This tanker is able to be restored.
   
   (ii) We were altogether for the first family reunion in ten years.
   
   (iii) We had a large amount of students on hand for the rally.
   
   (iv) The matter was to be discussed between the electricians, the plumbers and the carpenters.
   
   (v) We have less staff members than we had last year.
   
   (vi) We had heard a sound somewhere in the distant woods.
   
   (vii) Mr. Phillips, together with some friends and neighbours, are planning a celebration.
   
   (viii) Both of the mouse is underfed.
   
   (ix) It's a long way home.
   
   (x) This is the case what I want.
   
   (xi) Last week our clergyman reminded us that living the upright life is a discipline.
   
   (xii) He is something better today.

Contd .............. P/2
possible threats. Some managers or entrepreneurs, being proactive in orientation, may be able to convert threats into opportunities for themselves or for their organizations. Of course, history is replete with situations when managers could not even make use of the opportunities. However, leaving aside these two extreme groups, professional managers are expected to make use of the opportunities and to get around the threats. We have already stepped into the ‘Information Age’. Explosion of information technology has pervaded our home and office. Individuals and organizations are now busy in structuring their operation in this new era of information technology. Now that every one has an easy access to information, it has become an important input in the decision making process. The competitive edge of an organization will depend how well it has an access to information. No matter whether you are free riding on information or you are making planned investment, you have to use information to survive and to grow in the market. Thus, we are heading towards a knowledge – based society.

Questions:
(i) In which context is the passage written?
(ii) What type of managers may be able to convert threats into opportunities?
(iii) Did the author express optimism about the new year?
(iv) How does the author claim that we are heading towards a ‘knowledge-based society’?
(v) What do we need to meet the challenges of the emerging world order?
(vi) Give the meanings of the following words as used in the passage: unfolds, myriad, proactive, orientation, replete.

6. (a) As the Chief Engineer of a firm you have recently bought some products for your organization. But after the delivery the products are found to be defective. Now write a letter of complaint for the replacements of those products.

(b) Write phonetic transcriptions of the following words (Any five):

Actual, judge, pleasure, there, colonel, reach.

7. (a) Write a dialogue between two friends about their favorite pastime.

(b) Write a short essay on any ONE of the following:

(i) Environmental disaster
(ii) Dhaka: My Dream City
(iii) Online Education

Contd ........... P/4
3. (a) Give meanings of any ten of the following words:

Ajar, bicker, cataclysm, deprecate, erudite, flounder, gash, intrepid, meddle, penetrate, smolder, vicarious.

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

Admonish, brawl, concoct, exasperate, hilarious, lustrous, ordeal, posterity, recluse, sagacity, throng, wrinkle.

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

Men are not made in the same mould, like a lot of bricks. It would have ill suited the wants of the world. Consequently, even in the same country, men differ in disposition, and inclination and manners, and opinion, more probably than they do in face or form. And between the people of different countries the contrast is even more striking. We have then, also, different sentiments, different sympathies, different hopes, different ways altogether. It will always be so. So long as there are different minds, there will be different views on all matters that admit of opinion. So long as there are different latitude and longitude, as well as differing circumstances there will be different interests, different attachment and different habits. It behoves us therefore, to cultivate generous sprit of forbearance towards those, of whatever race, who may think differently and act differently, from ourselves. Even though we may be convinced that they are wrong, if we know them to be sincere, we shall still bear with them and give them credit for their sincerity. This is value of toleration or bearing with others when we may differ from them, or may not like their ways. Toleration should be shown in all differences of opinion on even the highest matters of life and death; and here it is of more value than anywhere else. When we cannot agree with one about a point of science, or philosophy, or faith, we can at least agree to differ from him, and there is an end. We must always remember that we are likely to make mistakes and weaknesses, and that we ourselves need the same forbearance and sympathy. We are, besides, all the same human brotherhood, and should, “like brothers agree”.

SECTION – B

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

5. Read the following passage carefully and answer the questions that follow:

Every new year, new decade, and new century brings a host of threats and unfolds a myriad of opportunities for many organizations and individuals. Year 2018 will definitely bring both threats and opportunities. Who can avail the opportunities and effectively face the threats? Only those who are capable of identifying the trends and will do homework before entering into the new year should be able to make good use of opportunities and to get around the
8. (a) Transform the following sentences as directed (Any five):  
   (i) The war is over and silence prevails (Make it Simple).  
   (ii) He cannot go unless I give consent (Simple).  
   (iii) He worked to the best of his ability (Complex).  
   (iv) Against the wishes of his family he left school (Complex).  
   (v) It was much regretted that he was absent (Simple).  
   (vi) To his misfortune he lost all his money (Compound).  
(b) Write short note on any TWO of the following:  
   (i) The Diphthongs  
   (ii) Process of communication  
   (iii) Components of a formal report
SECTION - A
There are FOUR questions in this Section. Answer any THREE.

1. (a) Explain the evolution of cities including the factors affecting gradual change with necessary illustrations. (25)
   (b) Describe important features of Greek Cities. (10)

2. (a) Compare the important features of ancient river valley civilizations. (20)
   (b) Describe the evolution of Dhaka city as an administrative unit and its’ city boundary during Mughal Period. (15)

3. (a) Identify the civilization as well as city in which “temonos” was developed. Define “temonos” and state its’ different components. (11)
   (b) Describe the features of town planning during Mughal Period. (24)

4. (a) Which time frame in Neo-Classical period is designated as “The Renaissance”? Describe the changes in city life, city planning features, and features of structures at this time frame. (15)
   (b) Describe the effect of change in power on Dhaka city during British Colonial Period. (20)

SECTION - B
There are FOUR questions in this Section. Answer any THREE questions.

5. (a) Explain ‘Rank Size Rule’ and ‘Primate City’ concept with example. Suppose, country X’s city A is the largest city and city B is the second largest. The population of A and B are 1,23,375 and 35,800 respectively. Is A a primate city. Can you determine the population of 4th largest city in this context using rank-size rule? Justify your answer. (8+5=13)
   (b) Discuss the structural determinants of migration. (17)
   (c) Define circular migration with an example. (5)

6. (a) What are the main principles of designing ‘superblocks’ of Radburn concept? Explain.
   (b) Draw a comparative scenario between Satellite Town and New Town.
   (c) What is ‘conurbation’? Provide example.

Contd ........ P/2
PLAN 111

7. (a) Suppose, mid-year population of city A and B were 2,30,000 and 1,50,000 respectively, in 2011. 10,000 people migrated from city A to B in 2011. From city B, 5000 people migrated to city C and D in 2011. Determine the following:
   (i) Rate of out migration for city A in 2011.
   (ii) Rate of in migration for city B in 2011.
   (iii) Net migration rate for city B in 2011.

(b) Explain the three distinct areas in Le Corbusier's 'Vertical city'.

(c) Describe the disadvantages of corridor plan.

8. Write short notes on the following (Any Five):
   (i) Level of urbanization
   (ii) Suburb
   (iii) Return Migration
   (iv) Three magnets of Garden City Planning
   (v) Weakness of Finger Plan
   (vi) Indirect measurement of internal migration.
1. (a) How is melamine synthesized? What problems can melamine cause if people eat food contaminated with it? (12)
(b) Discuss the health concerns about phthalate plasticizers and metal stabilizers in PVC. (6)
(c) (i) How does ethylene affect fruit ripening? (5+5=10)
(ii) Why fruits ripened with carbide are dangerous to health? (7)
(d) What are the side effects of formaldehyde exposure? (7)

2. (a) (i) Briefly discuss the sources of organic pollutants in water. (7+6=13)
(ii) What is eutrophication and why is it a problem? (6)
(b) Why organic fertilizer is better than chemical fertilizer? (6)
(c) How do plants absorb nitrogen from the soil? (6)
(d) How does the use of fertilizers affect the environment? (10)

3. (a) Define salt hydrolysis. Categorize salts according to how they affect the pH of a solution. (12)
(b) Calculate the pH of 0.24 M sodium formate (HCOONa) solution. What is the percent hydrolysis? (8)
(c) State the general rules for predicting nuclear stability. (6)
(d) (i) What are the different types of radioactive decay? (5+4=9)
(ii) Why does electron capture occur? (7)

4. (a) (i) Define ionization energy. Why is the second ionization energy always greater than the first ionization energy for any element? (10+6=16)
(ii) Why does the metallic character decrease across a period? (6+6=12)
(b) Explain the following statements-
(i) Lithium forms normal oxide while other group 1 elements form peroxides or superoxides.
(ii) Lead has an oxidation number of +2 while carbon and other elements in the same group have an oxidation number of +4.
(c) How does the electron configuration of chromium and copper contradict the Aufbau principle? (7)
CHEM 123 (BURP)

SECTION – B

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

5. (a) If matter has wave properties, why are they not commonly observed? Using your concept from de Boglie relation explain this phenomena. (8)

(b) Explain Heisenberg’s uncertainty principle in your words. Why this principle is so important in quantum mechanics? (7)

(c) What are the physical significance of $\psi$? Show how the radial probability of finding the electron within shells at various distances form the nucleus changes. (10)

(d) Which of the following orbitals are not possible? Why? 2d, 4s, 3f, 1p (10)

6. (a) How do you explain the bonding of LiF using Born-Haber cycle? (8)

(b) Determine the geometry of the central atoms in the following molecules: IF$_3$, SO$_2$, XeF$_2$ (9)

(c) Using VBT explain the bonding in XeF$_4$ and N$_2$F$_2$. (8)

(d) How does the pi bond form in CH$_2$ = CH$_2$ molecule. Explain using VBT and show the orbital diagram. (10)

7. (a) Why O$_2$ is a paramagnetic substance? Explain using the concept of MOT. (8)

(b) Air pollution is primarily caused by human effects – explain this statement. Figure out at least four ways how you can reduce the air pollution. (8)

(c) What are five major air pollutants? Describe the carcinogenic effects of any two briefly. (10)

(d) What is acid rain? What are the causes and effects of acid rain? (9)

8. (a) Ozone depletion is an environmental issue that involves atmospheric chemistry. Where could you find ozone layer in the atmosphere? How does ozone get depleted in the atmosphere? What are the major catalytic cycles to lose ozone? Describe one of them. What are the consequences of the depletion? (15)

(b) Draw schematic diagram to show the temperature profile of the atmospheric layers. Explain the causes behind the temperature inversions from one region to another region in the atmosphere. (10)

(c) Given that the solar constant is 1372 W/m$^2$, the Earth’s albedo is 30%, and greenhouse effect is 150 W/m$^2$. By how much would the Earth’s atmospheric temperature change if the greenhouse effect, the albedo, and the solar constant are all increased by 1.5% relative? (10)
L-1/T-1/BURP

Date: 06/08/2017

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1  B. Urp. Examinations 2016-2017

Sub: HUM 171 (Microeconomics)

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.

Symbols indicate their usual meaning.

1. (a) What do you know about the basic economic problems that every economy has to face? How are these problems solved with reference to the mixed economic system? (15)

(d) Describe the assumptions of cardinal approach to utility analysis and the condition of the consumer equilibrium for a single commodity. (10)

(c) Using the axiom of diminishing marginal utility show that the positive segment of a marginal utility curve represents the demand curve of a commodity. (10)

2. (a) Explain the principle of equi-marginal utility and prove it mathematically using the Lagrange Multiplier. (20)

(b) What do you know about elasticity of demand? Given the demand function of a commodity, say H

\[ Q_{dh} = 2050 - 20P_h + 0.01 M + 2.8 P_n - 5P_r \]

Where, price of H(P_h) is tk. 70, price of N (P_n) is tk. 90, price of R (P_r) is tk. 100 and the level of income (M) is tk. 60000. Find the income elasticity and cross-price elasticities of demand for commodity H. Define the relationship between H and each of the other two commodities based on the results. (15)

3. (a) Define price consumption line and income consumption line. (10)

(b) Explain substitution effect and income effect of a price change. Graphically show how you would split these two effects from a price effect. (25)

4. Write short notes on any THREE of the following (35)

(i) Consumer surplus

(ii) Properties of an indifference curve

(iii) Basic determinants of price elasticity of demand

(iv) Marginal Rate of Substitution (MRS)

Contd .......... P/2
5. (a) Explain the concept of production function. (5)
(b) What is meant by the returns to scale of production? Discuss the various returns to scale of production. (15)
(c) Write down the statement of application of Euler's theorem in the theory of distribution of production. How can you show the exhaustion of factor income according to Euler's theorem? (15)

6. (a) Explain the concepts of short run and long run. (5)
(b) Distinguish between the concepts of fixed cost and variable cost. Explain graphically. (5)
(c) Explain short run total cost curves and short run per unit cost curves. Present hypothetical average and marginal cost schedules, plot these schedules on graph and show that short run cost curves are u-shaped. (10)
(d) What is meant by optimization? How can it be achieved? Why is optimization necessary with reference to the production of a firm? (15)

7. (a) Briefly discuss the various factors of production with reference to the context of Bangladesh. (15)
(b) Explain the various internal and external economies and diseconomies of scale of production. (20)

8. (a) Describe the factors that determine the demand for a commodity in general. (15)
(b) Differentiate between 'change in demand' and 'change in quantity demanded'. (8)
(c) Illustrate the mechanism by which equilibrium price and output of a commodity are established in the free market economy. (12)
BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA
L-1/T-1 B. Arch. Examinations 2016-2017
Sub: HUM 709 (Human Psychology and Environment)
Full Marks: 140 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) What do psychologists study? (6)
    (b) Compare different approaches to study behavior and mental processes. (17⅔)

2. (a) Differentiate between absolute and difference thresholds giving examples. (6)
    (b) Describe the Gestalt Laws of perceptual organization with clear pictures for each. (17⅔)

3. (a) Why do we get frustrated? (6)
    (b) What are the theories of human motivation? Draw Maslow’s need hierarchy theory. (17⅔)

4. (a) Is emotion necessary in our life? Justify your answer. (6)
    (b) “We feel sad, because we cry or we cry, because we feel sad” which one is true and why? Explain. (17⅔)

SECTION – B
There are FOUR questions in this Section. Answer any THREE questions.

5. (a) What do you mean by Personality? (6)
    (b) What are the components of personality structure according to Sigmund Freud? (17⅔)

6. (a) How is someone’s IQ score measured? (6)
    (b) Describe different types of intelligence with appropriate example for each. (17⅔)

7. (a) Why do we forget information? (6)
    (b) Delineate the structure of human memory. (17⅔)

8. (a) What are the differences between classical conditioning and operant conditioning? (6)
    (b) How do we learn from others’ experiences instead of our own? (17⅔)
L-1/T-1/ARCH

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1  B. Arch. Examinations 2016-2017

Sub: **HUM 701** (Principles of Economics)

Full Marks: 140  Time: 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

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**SECTION – A**

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

1. (a) What are the assumptions of a perfectly competitive market? Explain them.
   
   **(10)**

   (b) Graphically explain the short run equilibrium of a firm under perfect competition.
   
   **(13 ¾)**

2. (a) Define GNP and NNP.
   
   **(10)**

   (b) What are the methods of measuring national income? Explain the problems of measuring national income in a developing country like Bangladesh.
   
   **(13 ¾)**

3. (a) What do you understand by localization of industries? What are the causes of localization of industries?
   
   **(13 ¾)**

   (b) Explain the advantages of localization of industries.
   
   **(10)**

4. (a) What do you understand by division of labour? Explain different types of division of labour.
   
   **(8 ⅔)**

   (b) What are the advantages and disadvantages of division of labour? Explain them.
   
   **(15)**

**SECTION – B**

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

5. (a) State the assumptions of the cardinal approach to utility analysis and explain the law of diminishing marginal utility with numerical as well as graphical presentations.
   
   **(10 ¾)**

   (b) How would you derive the demand curve of a commodity based on the axiom of diminishing marginal utility?
   
   **(8)**

   (c) State the conditions for equilibrium of the consumer for a single commodity.
   
   **(5)**

6. (a) What do you know about the fundamental economic problems and how are these problems addressed in different economic systems? Explain.
   
   **(15 ½)**

   (b) Define the following concepts: substitute goods, complementary goods, normal goods and inferior goods.
   
   **(8)**

Contd .......... P/2
7. (a) Define demand function. Other than price, what are the factors that determine demand for a commodity in general? Explain the factors. (10 2/3)

(b) What do you understand by movement along and shifts in the demand curve? Use graphs to explain your answer. (5)

(c) From the following demand and supply functions of commodity X

\[ Q_d = 1220 - 50P_x \]
\[ Q_d = 550 + 15P_x \]

Find the equilibrium price and quantity of the commodity X. If the Government imposes 15% VAT on unit price, what will be the new equilibrium price and quantity? (8)

8. Write short notes on any THREE of the following: (23 3/4)

(i) Factors affecting supply for a commodity
(ii) Substitution effect and income effect of a price change
(iii) Elasticity of demand
(iv) Price and output determination in the free market economy