

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1 B. Sc. Engineering Examinations 2016-2017

Sub : **BME 101** (Introduction to Biomedical Engineering)

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) An experiment is ongoing on a group of volunteers by isolating them in a simulated environment where gravitational force is 30% compared to earth. What type of bone modeling is expected to be experienced by the volunteers over a long period of time? How bone/muscle mass and strength change can be prevented? (7)
- (b) Describe the stance phase of the gait cycle. (12)
- (c) Discuss the reason for progressive difficulty in abdominal exercises, lying flat on the back: (a) with outstretched arms and the hands in the direction of the feet, (b) with the arms crossed over the chest, and (c) with the fingers interlaced under the load. (8)
- (d) The tibia is the major weight-bearing bone in the lower extremity. If 88% of body mass is proximal to the knee joint, how much compressive force acts on each tibia when a 500 N person stands in anatomical position? How much compressive force acts on each tibia if the person holds a 20 N sack of groceries? (8)
2. (a) Define Newtonian fluid. Is blood a Newtonian fluid or non-Newtonian Fluid? Justify your answer. (8)
- (b) Describe the working principles of electrospinning process. Assume, you are working with a voltage sensitive protein. Which biomanufacturing process will you use to process such protein? Why? (15)
- (c) You are asked to manufacture a dental implant model using photo curable polymer. Which additive manufacturing technology you are going to use? Describe the basic principle of that additive manufacturing technology. (12)
3. (a) Polymers can be used for controlled local drug delivery. With schematic briefly describe how polymer provides a versatile matrix for controlled release of drugs. (10)
- (b) Assume, you are designing a degradable implant for cortical bone. What are the mechanical, structural, material and biological properties should be considered while designing this implant? (10)
- (c) Draw a schematic of the hierarchical structure of the bone. (8)
- (d) An elderly person has a stainless steel total hip. Now s/he needs the other hip replaced, and the doctor wants to use one made of a cobalt chromium alloy. Is that a problem for corrosion? (7)

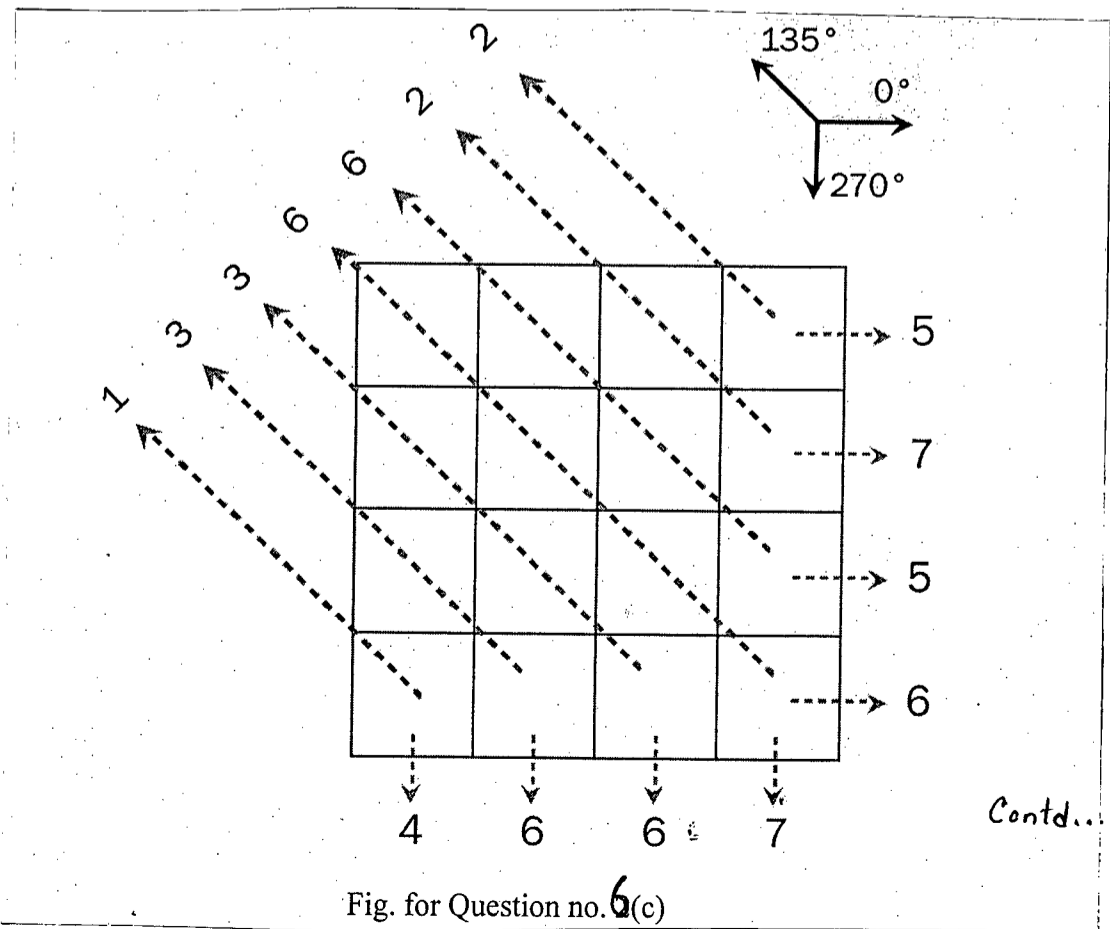
**BME 101**

- 4. (a) What is the central dogma in molecular biology? (10)
- (b) Write short notes on – (12)
  - (i) Protein folding; (ii) ECM and (iii) Importance of pH in human body.
- (c) What is DNA finger printing and how is it done? (13)

**SECTION – B**

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

- 5. (a) Discuss the structure of a neuron cell and explain how an action potential is generated and how it is transmitted through the neuron. Illustrate the different phases of an action potential with progressing time. (15)
  - (b) What is homeostasis? Briefly explain the concept of negative feedback. Give five examples of homoeostasis in the human body. (10)
  - (c) What is bioinformatics? How is it related to computational biology? Discuss the major application areas of bioinformatics and discuss its limitations. (10)
- 6. (a) Mention two main limitations of X-ray imaging and discuss how new imaging techniques have been invented to overcome them. Briefly discuss these two inventions. (10)
  - (b) Why is it necessary for the quality assurance of conventional X-ray machine? How are the X-ray machines tested for quality? Use Illustrations where appropriate. (10)
  - (c) During a computed tomography (CT) imaging of an organ the X-ray projections obtained from a region (4x4 matrix) is shown below. The X-ray source and detector could image the organ in only three different angles: 0°, 135°, and 270°. (10)



**BME 101**

The values shown represent the summation of element density in the matrix along the direction of the arrow as measured by the X-ray image. The tissue density can take the values: 1 (fluid), 2 (soft tissue) and 3 (dense tissue). Determine the CT image and identify if there are any dense tissue inside the organ, which may indicate the presence of a tumor.

(15)

7. (a) Describe the circulatory function of the heart and discuss how electrical signals regulate its normal operation. Use illustrations as necessary.

(15)

(b) What is the Einthoven triangle and how is it useful for an ECG system? What are the different types of leads? Draw a typical ECG signal and show the various events that occur during different regions of the waveform.

(15)

(c) What are the Korotkoff sounds? Briefly explain how a Sphygmomanometer is used for blood pressure measurement. Use illustration as required.

(5)

8. (a) Describe how an ultrasound image is generated using a standard probe. What are the different types of reflecting that occur in the ultrasound imaging process of biological tissue? Explain how the type of reflection is related to the brightness of the generated image.

(12)

(b) Why is it necessary to have a time delay between successive ultrasound pulses generated by a probe? What is the effect of increasing or decreasing this delay?

(08)

(c) Write short notes on any three (3) of the following:

(15)

(i) Glucose meter

(ii) Doppler imaging

(iii) SpO2 sensor

(iv) EEG

(v) MRI

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BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-1 B. Sc. Engineering Examinations 2016-2017

Sub : **CHEM 125** (Organic and Inorganic Chemistry)

Full Marks : 210

Time : 3 Hours

The figures in the margin indicate full marks.

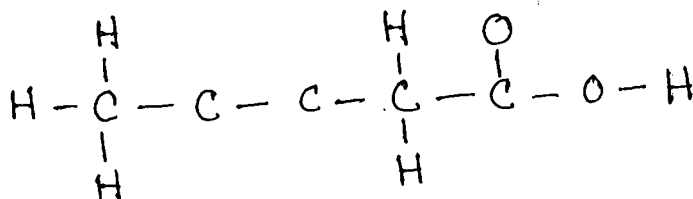
USE SEPARATE SCRIPTS FOR EACH SECTION

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

1. (a) What is meant by quantization of energy? How does de Broglie's hypothesis account for the fact that the energies of the electron in a hydrogen atom are quantized? (6)
- (b) In your own words, explain the photoelectric effect. How does the photon concept explain this effect? (10)
- (c) (i) Consider  $Ca^{19+}$  a ion with its electron in the 5th excited state (i) Calculate the longest wavelength of light that could be emitted when the  $Ca^{19+}$  electron transitions to a lower energy state. [Rydberg's constant is  $2.18 \times 10^{-18}$  J]. (10+4)
- (ii) Suppose the same transition as in part (i) took place in a hydrogen atom, would the wavelength of emission be longer than, shorter than or the same as your answer to part (i)
- (d) Why does the Bohr model of hydrogen atom violate the uncertainty principle? How is the concept of electron density used to describe the position of an electron in the quantum mechanical treatment of an atom? (5)
2. (a) For a given value of the principal quantum number, n, how do the energies of the s, p, d and f sub levels vary for (i) hydrogen (ii) a many electrons atom? (4)
- (b) For each element/ion, indicate the number of valence electron, core electrons and unpaired electrons in the ground state: (i) Carbon (ii) phosphorus (iii)  $S^+$  (iv) neon (6)
- (c) Draw a rough sketch of a periodic table and indicate where alkali metals, chalcogens and halogens are located. Write the name and symbol for one element from each of these groups. (12)
- (d) State how each of these properties of the representative elements generally increases or decreases across the periodic table: (i) electron affinity (ii) ionization energy (iii) Metallic character (iv) acidity of oxides. (8)
- (e) What is meant by the term "Effective nuclear charge ( $Z_{eff}$ )" in an atom? Describe the effect of shielding on the 1st ionization energy of second row elements in the periodic table. (5)

**CHEM 115(BME)**

3. (a) What is lattice energy and what role does it play in the stability of ionic compounds? (3)
- (b) Explain how the lattice energy of an ionic compound such as KCl can be determined using Born-Haber cycle. On what law this procedure is based? (9)
- (c) Complete the Lewis structure for the simple organic molecule whose skeletal structure is shown below. Add multiple bonds and lone pairs as needed but no additional atoms. Then list the total number of the sigma, pi bonds and lone pairs. (6)



- (d) What is a polar covalent bond? Sketch the bond moments and resultant dipole moments for the following molecules:  $\text{H}_2\text{O}$ ,  $\text{PCl}_3$ ,  $\text{XeF}_4$ ,  $\text{NH}_3$ ,  $\text{PCl}_5$ . (7)
- (e) Why is the study of molecular geometry important? Find out the geometry and shape of the following ions/molecules:  $\text{ICl}_2$ ,  $\text{IF}_2^+$ ,  $\text{OF}_2$ ,  $\text{CO}_3^{2-}$  (10)
4. (a) What is the hybridization state of the central N atom in the azide ion,  $\text{N}_3^-$ ? Show the formation of the hybrid orbitals you determined for this molecule. (6)
- (b) (i) Sketch the shapes of the molecular orbitals formed by the linear combination of any two  $p$  atomic orbitals.
- (ii) Compare the Lewis and molecular orbital treatments of the Oxygen molecule. (6+8)
- (c) Determine the bond orders for these dinitrogen species:  $\text{N}_2$ ,  $\text{N}_2^{2+}$ ,  $\text{N}_2^-$  and  $\text{N}_2^{2-}$ . List the species in order of decreasing bond energy and in order of decreasing bond length. (10)
- (d) What effect of  $2s - 2p$  mixing is observed in relative energy level order of Molecular orbitals ( $\text{MO}_s$ ) in homonuclear diatomic molecules of period 2 elements. (5)

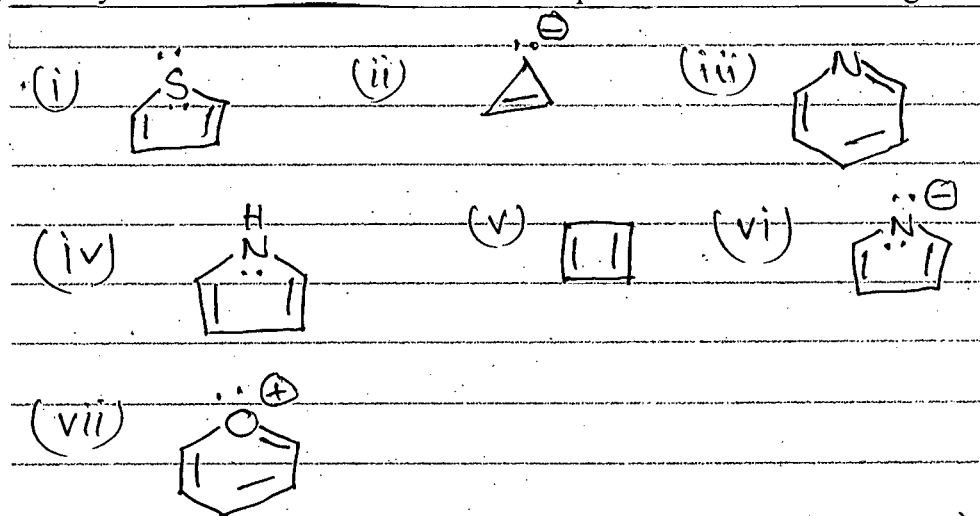
**SECTION – B**

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

5. (a) What is constitutional isomer? Give examples? (6)
- (b) Explain the Newman-Projection formulas of n-butane. (9)
- (c) Draw the energy diagram and explain the energy difference of different conformers of cyclohexane. (12)
- (d) Relative reactivity of hydrogen for chlorination of n-butene is  $\text{H} : 3^\circ : 2^\circ : 1^\circ = 5.0 : 3.8 : 1.0$  measure the percentage yield of the products for the reaction of chlorine with n-butane. (8)

**CHEM 125(BME)**

6. (a) Show the mechanism of electrophilic addition of  $H^X$  to alkenes. (7)  
 (b) How can you convert alkenes to vicinal halohydrins. (8)  
 (c) What is epoxydation reaction of alkenes? Show mechanism. (5)  
 (d) Give the reaction for electrophilic addition of water to alkyne. (8)  
 (e) Identify the aromatic and non-aromatic compounds from the following. (7)



7. (a) Show the mechanism of acid catalyzed hydration reaction of alkenes to synthesize alcohols. (10)  
 (b) What are protecting groups and how do they work? Explain with example. (10)  
 (c) Give the reaction mechanism for synthesis of aldehyde from alcohols. (7)  
 (d) How can you prepare propylphenylketone from (8)



Explain with retro synthetic analysis.

8. (a) Write down the structures of two chair conformations of 1-tert-butyl-1-methylcyclohexane. Which conformation is more stable? (7)  
 (b) Write down the structural formulas for the products that form when 1-butene reacts with each of the following reagents: (9)  
 (i) HCl in presence of alumina  
 (ii)  $O_3$ , in presence of Zn and HOAC  
 (iii) Dilute  $KMnO_4$ , in presence of  $OH^-$   
 (c) Show how you would use oxymercuration-demercuration to prepare each of the following alcohols from appropriate alkene: (9)  
 (i) 2-pentanol  
 (ii) 1-cyclopentylethanol  
 (iii) 1-Ethylcyclopentanol  
 (d) Show the mechanisms for acetal and ketal formation from alcohols. (10)

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

1. (a) Test the continuity and differentiability of the following function at
- $x = 0$
- when

$$f(x) = \begin{cases} \sqrt{|x|} & , x \geq 0 \\ -\sqrt{|x|} & , x < 0 \end{cases} \quad (12)$$

- (b) If
- $y^{1/m} + y^{-1/m} = 2x$
- then show that

$$(x^2 - 1)y_{n+2} + (2n + 1)xy_{n+1} + (n^2 - m^2)y_n = 0 \quad (13)$$

- (c) If
- $y = \frac{1}{x^2 + 9}$
- then find
- $y_n$
- .
- (10)

2. (a) State Rolle's theorem. Discuss the applicability of Rolle's theorem for the function

$$\text{defined by } f(x) = \begin{cases} x^2 + 1 & , 0 \leq x \leq 1 \\ 3 - x & , 1 < x \leq 2 \end{cases} \quad (13)$$

- (b) If
- $f(x+h) = f(x) + hf'(x) + \frac{h^2}{2}f''(x+\theta h)$
- , (
- $0 < \theta < 1$
- ), where
- $f(x) = (x-a)^{3/2}$
- then

find the value of  $\theta$  for  $x = a$ . (12)

- (c) Evaluate
- $\lim_{x \rightarrow 0} \frac{\log \log(1-x^2)}{\log \log \cos x}$
- .
- (10)

3. (a) If
- $u = \operatorname{cosec}^{-1} \left[ \frac{\sqrt{x} + \sqrt{y}}{\sqrt[3]{x} + \sqrt[3]{y}} \right]^{\frac{1}{2}}$
- , then show that

$$x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = \frac{1}{12} \tan u \left[ \frac{13}{12} + \frac{1}{12} \tan^2 u \right] \quad (15)$$

- (b) State Euler's theorem for homogenous function. Verify Euler's theorem for the

$$\text{function } u = x^2 \log \left( \frac{y}{x} \right). \quad (9)$$

- (c) Show that the maximum value of
- $\left( \frac{1}{x} \right)^x$
- is
- $e^{1/e}$
- .
- (11)

= 2 =

### MATH 113(BME)

4. (a) If the straight line  $x \cos \alpha + y \sin \alpha = p$  touches the curve  $\left(\frac{x}{a}\right)^m + \left(\frac{y}{b}\right)^m = 1$ , then show

$$\text{that } (a \cos \alpha)^{m/m-1} + (b \sin \alpha)^{m/m-1} = p^{m/m-1}. \quad (12)$$

(b) Find the equation of the circle of curvature at the point (3, 1) on the curve  $y = x^2 - 6x + 10$ . (11)

(c) Find all the asymptotes of  $4x^3 - x^2y - 4xy^2 + y^3 + 3x^2 + 2xy - y^2 - 7 = 0$ . (12)

### SECTION - B

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

5. Workout the following:

(a)  $\int \frac{dx}{(2x+3)\sqrt{x^2+3x+2}}$  (11)

(b)  $\int \frac{dx}{\sin x + \tan x}$  (12)

(c)  $\int \frac{dx}{x^2(1+x^2)^2}$  (12)

6. (a) Obtain a reduction formula for  $\int \sin^m x \sin^n x dx$  and then use this formula to evaluate

$$\int \sin^4 x \sin^3 x dx \quad (15)$$

(b) Evaluate  $\lim_{n \rightarrow \infty} \left[ \frac{n+2}{n^2+1} + \frac{n+4}{n^2+4} + \frac{n+6}{n^2+9} + \dots + \frac{n+2n}{n^2+n^2} \right]$  using definite integrals. (10)

(c) Evaluate  $\int_0^\pi \frac{x \tan x}{\sec x + \tan x} dx$  (10)

7. (a) Evaluate the improper integral  $\int_0^\infty \frac{1}{\sqrt{x}(x+1)} dx$  (11)

(b) Show that  $\int_0^\infty \frac{dx}{(x^2+a^2)(x^2+b^2)} = \frac{\pi}{2ab(a+b)}$  (12)

(c) Show that  $\int_0^\infty e^{-x^2} x^{a^2} dx = \frac{1}{2} \Gamma\left(\frac{a^2+1}{2}\right)$  (12)

8. (a) Evaluate  $\int_{-\infty}^\infty e^{-x^2} dx$  (12)

(b) Find the area included between the curve  $xy^2 = 4a^2(2a-x)$  and its asymptote. (12)

(c) Find the volume of the solid produced by the revolution of the loop of the curve  $y^2(a+x) = x^2(a-x)$  about the  $x$ -axis. (11)

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**SECTION – A**

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

1. (a) What do you mean by mean free path of the molecules of a gas? Obtain an expression for the mean free path in terms of the molecular diameter and concentration. Also show that the mean free path is inversely proportional to the pressure of the gas. (13)
- (b) What are the most probable, average and root mean square velocities of the molecules of a gas? Find their expressions and also calculate the ratio of these velocities. (12)
- (c) Calculate the number of molecules per  $\text{cm}^3$  of a gas if the mean free path of the molecules is  $2.4 \times 10^{-6}$  cm and the molecular diameter is equal to  $2.0 \times 10^{-8}$  cm. What will be the collision frequency if the root mean square speed of the molecules at N.T.P. is about  $1 \times 10^5$  cm/sec. (10)
  
2. (a) Explain a Carnot cycle and obtain an expression for the work done during each operation when the working substance is a perfect gas. (15)
- (b) Prove that all reversible engines working between the same temperature limits have the same efficiency. (12)
- (c) A reversible heat engine of efficiency  $\frac{2}{5}$  has its efficiency increased to  $\frac{1}{2}$  when the temperature of the sink is lowered by 50 K. Find the temperature of the source. (8)
  
3. (a) Define entropy. Show that entropy remains constant in a reversible process and increases in an irreversible process. (16)
- (b) State the second and third law of thermodynamics in terms of entropy. Draw the P-V and T-S diagram for a Carnot cycle. Deduce the efficiency of the cycle using the T-S diagram. (12)
- (c) Find the difference of entropy between one gram of water at  $0^\circ\text{C}$  and one gram of water at  $100^\circ\text{C}$ . (7)
  
4. (a) Differentiate between progressive wave and stationary wave. Using the expression for plane progressive wave establish the differential equation for one dimensional plane progressive wave motion. (20)

**PHY 123(BME)**

**Contd ... Q. No. 4**

(b) The equation of a wave motion is given by,  $y = x^2 - 3v^2t^2$ . Does the equation represent the solution of the one dimensional wave equation? (5)

(c) Find the expression of resultant stationary wave due to the interference of sound waves reflected at a free boundary by using analytical treatment. Discuss the formation of modes with respect to time. (10)

**SECTION – B**

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

5. (a) Define damped oscillation. Establish the equation of motion for a damped harmonic oscillator and find the general solution of the equation. Discuss conditions for under-damping, over-damping and critical-damping. (25)

(b) Establish an expression for logarithmic decrement of amplitude of a damped oscillator. (10)

6. (a) Prove that total energy of a simple harmonic oscillator at any instant of time is conserved. Draw the energy versus displacement graph for a simple harmonic oscillator. Find out the relation between average kinetic energy and total energy of a simple harmonic oscillator. (25)

(b) The equation of displacement of a particle of mass 100 g undergoing simple harmonic motion is  $y = 5 \sin (4t + \pi/6)$  m. Explain under which condition the acceleration of the particle will be maximum. Evaluate the maximum acceleration and the average kinetic energy of the particle. (10)

7. (a) What are Newton's rings? (5)

(b) Describe the experimental arrangement and give necessary theory of Newton's rings by reflected light. Why Newton's rings are circular? (24)

(c) In Newton's rings experiment the diameter of 5th dark ring is reduced to half of its value after placing a liquid between plane glass plate and concave surface. Calculate the refractive index of liquid. (6)

8. (a) What is a diffraction grating and how it is fabricated? (7)

(b) Obtain the expression of intensity formed on a screen by a plane transmission diffraction grating. (22)

(c) Calculate the missing orders in a double slit Fraunhofer diffraction pattern, if the widths of slits are  $0.08 \times 10^{-3}$  m and they are  $0.4 \times 10^{-3}$  m apart. (6)

**SECTION – A**

There are **FOUR** questions in this section. Answer any **THREE** questions including **Q. No. 1** as compulsory. Symbols indicate their usual meaning.

1. (a) Explain with reference to the context any two of the following: (15)
- (i) "There must be more money! There must be more money!"
- (ii) He had left his village without previous thought or plan.
- (iii) Feelings like these are the normal by-products of imperialism.
- (b) Answer any one of the following: (15)
- (i) Discuss "An Astrologer's Day" as a story of crime, remorse and redemption.
- (ii) Examine Orwell's use of symbolism in "Shooting an Elephant". What do these symbols really represent?
- (c) Answer any three of the following: (15)
- (i) What made Orwell feel that he had to shoot the elephant?
- (ii) What evidence does Ralph give to the other boys to persuade them that they will be rescued?
- (iii) Discuss the role of fate in the story "An Astrologer's Day".
- (iv) How does R.K. Narayan describe the appearance and paraphernalia of the Astrologer?
- (v) What is the main problem of the family from Paul's mother's point of view?
2. (a) Recast and correct any ten of the following sentences: (15)
- (i) A trio of boys were scheduled to recite poems.
- (ii) The widow woman entered the courtroom slowly.
- (iii) The orange tested badly.
- (iv) I have more mistakes on my paper than him.
- (v) The reason I am ill is because I ate too much.
- (vi) Our teacher told us that in France they eat pancakes with honey.
- (vii) Mr. Hardy is a professional cashier.
- (viii) We suspicioned that something was amiss.
- (ix) Each individual person must handle the question.
- (x) You should take the medicine every alternative day.
- (xi) The memoranda is not important.
- (xii) Due to the weather, there was a large crowd.
- (b) Give the meaning of and make a sentence with any ten of the following words: (15)
- Astray, Benchmark, Castigate, Drench, Flounder, Hubbub, Impromptu, Lustrous, Munch, Outrageous, Posterity, Ratify.

**HUM 187/BME**

3. Amplify the idea in any one of the following: (30)
- (i) Speech is silver, silence is golden.
  - (ii) A journey of a thousand miles begins with a single step.

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

"You're rushing around your house and you accidentally knock a precious vase to the floor. It smashes into pieces immediately. What do you do next? Do you see the vase as garbage now and throw it in the bin? Do you collect the pieces and try to put them together exactly as it was? Or do you pick up your favourite pieces from the pile and use them to create something new, like a colourful mosaic?" These are the beautiful words of leading post-traumatic researcher Professor Stephan Joseph. They are a great representation of how adversity can lead to positive change if you choose it to. But first, let's be clear about a few things. Post-traumatic growth doesn't mean that you suppress the sorrow, stress or anger you feel after a traumatic event. Neither does it mean that you seek to understand the situation right then and there when you're in the midst of it. Last, but no least, it's also not about denying that something was as traumatic as it was. Instead, post-traumatic growth is about accepting the trauma as a part of who you are. It's about accepting that it can change and evolve who you are, which is why you shouldn't fixate on putting back those vase pieces back together exactly as they used to be. It's also about realizing that how you view the world can change, as can your experience of some of your relationships. All in all, it's about acknowledging that personal growth can be found from the suffering that comes from trauma. Professor Stephan Joseph talks about how this post-traumatic growth can lead to positive change in three different ways: 1. Your perspective changes. You stop worrying about the nitty gritty details and start appreciating the big picture. You learn to live more mindfully and feel a stronger connection to what truly matters. 2. Your perception of yourself changes. You realize you're stronger than you ever thought was possible. You start to do things you used to be scared of doing because you feel more confident in your abilities. You start loving yourself for exactly who you are, appreciating your best qualities and accepting your limitations. 3. Your relationships improve. You start to feel more gratitude towards the people you love in your life. You feel more compassion towards them and you crave deeper, more intimate relationships with them. If you've shared a trauma with someone, this could strengthen the connection you have between each other. These kinds of positive changes have been observed in war veterans, natural disaster survivors and those suffering severe healthy challenges. They have even been reported in people following accidents, bereavement and other traumatic events – such as mass shootings. However, the most important things to remember is not to force this idea of personal growth and positive change upon yourself right away. You do need time to deal with the grief and frustration of it first and foremost. This is a natural first step in any healing process. Only once you have had some time and distance from the traumatic event you can start to explore its meaning in your life. You really need to feel ready and well equipped to do this – if you don't, it's too soon. Once you are no longer grieving or suffering extremely negative emotions from the trauma, you can start to explore positive change in a healthy, productive way.

**HUM 187/BME**

**SECTION – B**

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

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

**(45)**

Great books do not spring from something accidental in the great men who wrote them. They are the affluence of their very core, the expression of the life itself of the authors. And literature cannot be said to have served its true purpose until it has been translated into the actual life of him who reads. It does not succeed until it becomes the vehicles of the vitals. Progress is the gradual result of the unending battle between human reason and human instinct, in which it forms slowly but surely wins. The most powerful engine in this battle is literature. It is the vast reservoir of true ideas and high emotions and life is constituted of ideas and emotions. In a world deprived of literature, the intellectual and emotional activity of all but a few exceptionally gifted men would quickly sink and retract to a narrow circle. The broad, the noble, the generous, would tend to disappear for want of accessible storage. And life would be correspondingly degraded, because the fallacious ideas and the pretty emotion would never feel the upward pull of the ideas and emotions of genius. Only by conceiving a society without literature can it be clearly realized that the function of literature is to raise the plain towards the top level of the peaks. Literature exists so that where one man has lived finally, ten thousand may afterwards live finally. It is a means of life, it concerns the living essence.

**Questions:**

- (i) What, according to the author, is the source of a great book?
- (ii) When does literature serve its true purpose?
- (iii) What is the most important function of literature?
- (iv) What happens in a world deprived of literature?
- (v) 'Literature is a means of life', Explain this idea in brief.
- (vi) Give the meaning of the following words as used in the passage:

affluence, instinct, retract, fallacious, essence.

6. (a) What are the principles we need to follow while writing a business letter?

**(10)**

(b) Write a letter to a firm complaining against the supply of damaged and defective goods.

(Provide necessary details from your own).

**(10)**

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

**(10)**

Exam, chair, thank, pleasure, donate, teach

Contd ..... P/4

**HUM 187/BME**

7. (a) What are the classifications of Report? How does 'Interpretive report' differ from 'Informational report'? (10)
- (b) Write a short essay on any ONE of the following topics: (10)
- (i) Green Earth Fresh Heart
  - (ii) Reading Books: A Habit on the Wane
  - (iii) My Favourite Subject of Study
- (c) Write a dialogue between two resident students of BUET about the unhygienic condition of the footpaths in Palashi. (10)
8. Transform the following sentences as directed (Any five) (10)
- (i) She has come here after finishing the works at hand. (Make it Complex)
  - (ii) Nobody loves me as much as my mother. (Simple)
  - (iii) He speaks too fast to be understood. (Complex)
  - (iv) She was listening to the news when I returned. (Compound)
  - (v) I would like to know how he succeed. (Simple)
  - (vi) Although I tell him to be quiet, he takes no notice of it. (Compound)
- (b) What is a sales letter? (5)
- (c) Write short notes on any THREE of the following: (15)
- (i) Barriers to Communication
  - (ii) The Diphthongs
  - (iii) Annual Confidential Report (ACR)
  - (iv) Parts of a Paragraph
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