

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 1st Year Backlog Examination, 2018

Math-1221
(Mathematics-II)

Time: 3 Hours

Total Marks: 210

- N.B.: i) Answer any THREE questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) Find the rotational angle of the axes to remove the xy - term from the equation $3x^2 + 2xy + 3y^2 = 1$. Hence find the transformed equation. 11
- 1(b) Find the transformed coordinates of $(-2,1)$ with respect to $3x - 4y + 1 = 0$ and $4x + 3y - 1 = 0$ as the x-axis and y-axis respectively. Also find the distance from the point $(-2,1)$ to the point of intersection of these two axes. 12
- 1(c) Identify the conic represented by the equation: 12
 $x^2 - 5xy + y^2 + 8x - 20y + 15 = 0$, and also find its standard form.
- 2(a) Find the rectangular and spherical polar coordinates of the point A, whose cylindrical coordinate is $(3, \frac{2\pi}{3}, 4)$. 12
- 2(b) Find the equation of the plane through the point $(2, -1, -4)$ and perpendicular to the planes $3x + 4y - 5z + 6 = 0$ and $x - 2y + 2z + 1 = 0$. 11
- 2(c) Find the distance from a point $P(2,3, -4)$ to the plane $x + y + 6z - 2 = 0$ measured parallel to the line $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-3}{-2}$. 12
- 3(a) Test whether or not the straight lines $\frac{x-3}{-3} = \frac{y-8}{1} = \frac{z-3}{-1}$ and $\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4}$ are coplanar. If they are non-coplanar, then find the shortest distance between them. 15
- 3(b) A line in 3-D space makes angle 90° with x and z axes. Find its direction cosines. 10
- 3(c) Find the standard form of the equation of a line- 10
 $3x + 2y - 3z - 4 = 0 = 4x + y - z + 3$.
- 4(a) Define great circle. Find the equation of the sphere, for which the circle $x^2 + y^2 + z^2 + 7y - 2z + 2 = 0, 2x + 3y + 4z = 8$ is a great circle. 13
- 4(b) Define right circular cone. Find the semi-vertical angle of the right circular cone, $z^2 - 2x^2 - 2y^2 = 0$. Also find its axis. 10
- 4(c) Find the coordinates of the point where the line joining the points $(3, -4, -5)$ and $(2, -3, 1)$ cuts the plane $2x + y + z - 12 = 0$. 12

SECTION-B

- 5(a) Formulate a differential equation from the relation: 12
 $y = c_1 e^{-2x} \cos 3x + c_2 e^{-2x} \sin 3x$
Where C_1 and C_2 are arbitrary constants. Also write the order, degree and state whether it's linear or nonlinear.
- 5(b) Solve the differential equation $9yy' + 4x = 0$ and sketch two integral curve from the solution. 10
- 5(c) Find the general solution of $\frac{du}{dt} = -k[u - T_0 - A \sin t]$. 13
- 6(a) Find an integrating factor for the equation $(3xy + y^2) + (x^2 + xy)y' = 0$ and then solve the equation. 10
- 6(b) Solve $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$. 12
- 6(c) A body at a temperature $40^\circ F$ is placed outside where the temperature is $90^\circ F$. If after 5 minutes the temperature of the body is $50^\circ F$, find the time required by the body to reach $60^\circ F$. 13
- 7(a) Solve $(D^2 + 1)y \approx \tan x$ by using the method of variation of parameter. 13
- 7(b) Solve $y'' + 4y = x^2 + \sin 2x + e^{-x}$. 12
- 7(c) Find the work done in moving an object along a straight line from $(3, 2, -1)$ to $(5, -1, 7)$ in a force field given by $\underline{F} = 4\underline{i} - 3\underline{j} + 2\underline{k}$. 10
- 8(a) Show that the vector field represented by 12
 $\vec{F} = (2xz^3 + 6y)\underline{i} + (6x - 2yz)\underline{j} + (3x^2z^2 - y^2)\underline{k}$
is conservative and hence find its scalar potential.
- 8(b) If $\vec{F} = 4xz\underline{i} - y^2\underline{j} + yz\underline{k}$, evaluate 12
$$\iint_S \vec{F} \cdot \hat{n} \, ds$$
- Where S is the surface of the cube bounded by
 $x = 0, x = 1; y = 0, y = 1; z = 0, z = 1$.
- 8(c) Find the acute angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$. 11

----END----

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 1st Year Backlog Examination, 2018

Ph-1221
(Physics)

Time: 3 Hours

Total Marks: 210

N.B.: i) Answer any THREE questions from each section in separate scripts.

ii) Figures in the right margin indicate full marks.

iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) What is interference of light? Discuss interference of light analytically and obtain the conditions of maximum and minimum intensities. 12
- 1(b) Discuss Young's double slit experiment and hence show that, the spacing between two consecutive bright and dark fringes are the same. 13
- 1(c) In a Newton's rings experiment the diameter of the 15th ring was found to be 0.590 cm and that of the 5th ring was 0.336 cm. If the radius of the plano-convex lens is 100 cm, calculate the wavelength of the light used. 10
- 2(a) Discuss the Fraunhofer diffraction at a single slit. Draw the intensity distribution for the diffraction pattern. 13
- 2(b) What is polarization of light? Explain Brewster's Law and show that, when light is incident on a transparent substance at the polarizing angle, the reflected and refracted rays will be at right angle. 12
- 2(c) A 20 cm long tube containing sugar solution rotates the plane of polarization by 11°. If the specific rotation of sugar is 66°, calculate the strength of the solution. 10
- 3(a) Derive an expression for magnification of compound microscope. 12
- 3(b) What is Compton effect? Explain and derive an expression for Compton shift $\Delta\lambda$ on the basis of quantum theory. 13
- 3(c) The threshold frequency of photoelectric emission in copper is 1.1×10^{15} Hz. Find the maximum energy of photoelectrons (in eV) when light of frequency 1.5×10^{15} Hz is directed on a copper surface. 10
- 4(a) Discuss uncertainty principle and show that electron cannot stay in the nucleus with the help of uncertainty principle. 12
- 4(b) Derive an expression for energy of an electron of hydrogen atom. 13
- 4(c) Calculate the limiting value of wavelength for Lyman series. 10

SECTION-B

- 5(a) Explain the concept of Miller indices. How are they calculated? How the orientation of a plane is specified by Miller indices? 15
- 5(b) Define Primitive cell and Atomic Packing fraction. Show that, for FCC structure, atomic packing fraction is 74%. 10
- 5(c) Show that for a cubic lattice, if (hkl) are corresponding Miller indices, then interplanar spacing can be written as, 10

$$d_{hkl} = \frac{a}{\sqrt{h^2 + k^2 + l^2}}$$

- 6(a) Describe the formation of energy band in solids. Explain how it helps to classify the materials into metals, insulators and semiconductors. 10
- 6(b) Show that according to Einstein model, lattice heat capacity can be written as- 15

$$C_v = 3R \left(\frac{\theta_E}{T} \right)^2 \frac{e^{\frac{\theta_E}{T}}}{\left(e^{\frac{\theta_E}{T}} - 1 \right)^2}$$

Hence, at low temperature, compare the result with experimental observation.

- 6(c) Show that the ratio between thermal and electrical conductivity is proportional to absolute temperature. 10
- 7(a) What is Hall effect? Show that, Hall coefficient R_H can be written as - 13
- $$R_H = \frac{1}{ne}$$
- 7(b) Show that average kinetic energy of a free electron is $\frac{3}{5}E_f$, where E_f is Fermi energy and average speed is $\frac{3}{4}v_f$, where v_f is the velocity of Fermi surface. 12
- 7(c) Calculate the inter collision time at room temperature and drift velocity in a field of 100 Vm^{-1} in sodium, whose conductivity is $2.16 \times 10^7 \Omega^{-1} \text{m}^{-1}$. 10
- 8(a) What is LASER? Discuss the properties of LASER and give some applications of Laser. 13
- 8(b) Discuss the following terms briefly- 12
- i) Population inversion
 - ii) Stimulated emission
 - iii) Spontaneous emission
- 8(c) Discuss the fundamental theory of a chemical LASER. 10

-----END-----

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 1st Year Backlog Examination, 2018

Math-1121
(Mathematics-I)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) A function $f(x)$ is defined as follows: 13

$$f(x) = \begin{cases} -2x - 2 & \text{for } x < -3 \\ 4 & \text{for } -3 \leq x < 1 \\ 2x + 2 & \text{for } x \geq 1 \end{cases}$$

Discuss the continuity and differentiability of $f(x)$ at $x = 1$.

- 1(b) At a certain instance the side of a square is a 3 ft long and increasing at a rate of 2 ft/minute. How fast is the area increasing at that instance? 12

- 1(c) Find the n th derivative of- 10

$$y = \frac{1}{x^2 - 3x + 2} + 3 \cos 3x$$

- 2(a) State Leibnitz's theorem. 12

If $y = (\sin^{-1} x)^2$, then find y_{n+2} by using Leibnitz's theorem.

- 2(b) If $u = f(y - z, z - x, x - y)$, then determine the value of $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z}$. 11

- 2(c) State mean value theorem and verify it for $f(x) = x^2 + 3x + 2$ in $[1, 2]$. 12

- 3(a) State Rolle's theorem. Is Rolle's theorem applicable for the function 12

$$f(x) = \frac{1}{4-x^2} \text{ in } [-1, 1] ?$$

- 3(b) Evaluate $\sin 31^\circ$ using the value of $\sin 30^\circ$ by Taylor's series. 11

- 3(c) Find the equation of tangent and normal at the point $(1, -1)$ to the curve 12
 $x^3 + xy^2 - 3x^2 + 4x + 5y + 2 = 0$.

- 4(a) Determine the radius of curvature at the origin of the curve $y - x = x^2 + 2xy + y^2$. 12

- 4(b) Determine all the asymptotes of the curve $x^3 - 2x^2y + xy^2 + x^2 - xy + 2 = 0$. 13

- 4(c) Evaluate $\lim_{x \rightarrow 0} \left(\frac{\tan x}{x} \right)^{\frac{1}{x}}$ 10

SECTION-B

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

5(b) Evaluate $\int \frac{2 \sin x + 3 \cos x}{4 \cos x + 5 \sin x} dx$ 12

5(c) Calculate $\int \sin^{-1}\left(\sqrt{\frac{x}{2+x}}\right) dx$ 12

6(a) Obtain a reduction formula for $\int \sin^2 x dx$ and hence evaluate $\int \sin^5 x dx$. 11

6(b) Define Beta function and Gamma function. Establish the relation between Beta function and Gamma function. 14

6(c) Determine the value of- 10

$$\lim_{n \rightarrow \infty} \left[\left(1 + \frac{1}{n^2}\right)^{\frac{2}{n^2}} \left(1 + \frac{2^2}{n^2}\right)^{\frac{4}{n^2}} \left(1 + \frac{3^2}{n^2}\right)^{\frac{6}{n^2}} \dots \left(1 + \frac{n^2}{n^2}\right)^{\frac{2}{n}} \right]$$

7(a) Evaluate $\int_0^1 \frac{\log(1+x)}{1+x^2} dx$ 12

7(b) Evaluate $\int_0^\pi \frac{x \tan x}{\sec x + \cos x} dx$ 12

7(c) Evaluate $\int_0^{\frac{\pi}{2}} \frac{dx}{1+\sqrt{\cot x}}$ 11

8(a) Test whether the set of vectors $\{(2, -1, 4), (3, 6, 2), (2, 10, -4)\}$ are linearly independent or not. 11

8(b) Find the inverse of the matrix A, if exists, where- 12

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 0 \\ 0 & 1 & 2 \end{bmatrix}$$

By elementary row transformations.

8(c) Solve the following system of linear equations 12

$$x + 2y + 3z = 14$$

$$2x + 3y + 4z = 20$$

$$3x + 4y + 6z = 33$$

----END----

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 1st Year Backlog Examination, 2018

TE-1123

(Polymer Engineering)

Time: 3 Hours

Total Marks: 210

N.B.: i) Answer any THREE questions from each section in separate scripts.

ii) Figures in the right margin indicate full marks.

iii) Assume reasonable data if missing any.

SECTION-A

- | | |
|---------------------------------------------------------------------------------------------------------------------------|----|
| 1(a) Define: i) Monomer, ii) Homopolymer, and iii) Repeating unit. | 06 |
| 1(b) Describe the criteria of fiber forming polymer. | 10 |
| 1(c) Write down the monomer and repeat unit of the following polymers:
i) Nylon, ii) Polystyrene, and iii) Poly ethene | 09 |
| 1(d) Write down the importance of polymer in textiles. | 10 |
| 2(a) What is polymerization? | 05 |
| 2(b) Describe the free radical polymerization with examples. | 12 |
| 2(c) Show the relation between DP and extent of reaction. | 10 |
| 2(d) What is Nylon 6:6? How this is formed? | 08 |
| 3(a) Define polymer degradation. Write down the changes happened due to polymer degradation. | 08 |
| 3(b) How polymer degradation can be controlled? | 07 |
| 3(c) Write short notes on the followings:
i) Anti-oxidants, and ii) Hydrolytic | 07 |
| 3(d) Describe photo-degradation process of polymer. | 13 |
| 4(a) What are T_m and T_g ? Write down the relation between T_m and T_g . | 10 |
| 4(b) Discuss the factors that influence the glass transition temperature of polymer. | 10 |
| 4(c) What is softening point temperature? Briefly describe the measuring process of temperature for polymer. | 15 |

SECTION-B

- 5(a) Mention the names of different polymerization techniques. What are the reasons for choosing different polymerization techniques? 08
- 5(b) Describe the Bulk polymerization with advantages and disadvantages. 12
- 5(c) State the different steps of emulsion polymerization. 10
- 5(d) Write short note on suspension polymerization. 05
- 6(a) What is meant by liquid crystal phase? 05
- 6(b) Discuss the adjacent reentry chain-folded model for smooth and rough surface with sketch. 10
- 6(c) Why some polymers are highly crystalline and some are highly amorphous? Explain. 12
- 6(d) Write short note on spherulite structure. 08
- 7(a) Why tensile strength, impact strength, and chemical resistivity of a polymer increases with the increase of molar mass? 09
- 7(b) Differentiate between number average and weight average molecular weight. 06
- 7(c) What are the different types of polymer molecular weight? Give the equation for each type. 10
- 7(d) What are the properties dependent on polymer molecular weight? Sketch the graph of molecular weight versus polymer properties. 10
- 8(a) Write down the functions of different zones of extruder in polymer processing machine. 08
- 8(b) Describe the injection molding process of thermoplastic polymer with proper sketch. 12
- 8(c) Derive the following expression for rate of polymerization in chain growth polymerization: 15

$$\text{rate} = K[I]^{1/2} [M]$$

Where [I] is initiator concentration, [M] is monomer concentration and K is constant.

----END----

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 1st Year Backlog Examination, 2018

ME-1121

(Fundamentals of Mechanical Engineering)

Time: 3 Hours

Total Marks: 210

N.B.: i) Answer any THREE questions from each section in separate scripts.

ii) Figures in the right margin indicate full marks.

iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) Define i) System, ii) Cycle, and iii) Process. 06
- 1(b) Derive the relation between C_p and C_v . 06
- 1(c) What is an adiabatic process? Derive an expression for the work done during adiabatic expansion of an ideal gas. 10
- 1(d) A container contains 0.5 m^3 of gas at a pressure of 2.5 bar and 170°C . It is compressed adiabatically to a pressure of 10.0 bar. Determine the work required. Take $C_p = 1.06 \text{ Kj/kg.K}$ and $C_v = 0.731 \text{ Kj/kg.K}$. 13
- 2(a) State and explain Zeroth law of thermodynamics. 06
- 2(b) What is PMM1? Is it possible or not? Explain. 09
- 2(c) What are meant by reversible and irreversible process? Explain the phenomena about the cause of irreversibility and condition for reversibility. 08
- 2(d) Describe the working principle of a four stroke diesel engine. 12
- 3(a) Classify IC engine. Write down the advantages and disadvantages of IC engine. 08
- 3(b) Describe the working principle of four stroke diesel engine. 10
- 3(c) Differentiate between petrol engine and diesel engine. 07
- 3(d) During the test on single cylinder oil engine, working on the four stroke cycle and fitted with a rope brake, the following readings are taken: Effective diameter of brake wheel = 630 mm; Dead load on brake = 200 N; Spring balance reading = 30 N; Speed = 450 rpm; Mean effective pressure = 7.7 bar; Calorific value of Oil = 42000 Kj/kg.
Calculate brake power, indicated power, and mechanical efficiency. 10
- 4(a) Draw the $P - V$ and $T - S$ diagram of i) Bryton cycle, ii) Dual cycle, and iii) Diesel cycle. 09
- 4(b) What is gas turbine? Classify gas turbine with necessary explanation. 09
- 4(c) What is pump? Write down the classification of pump. Describe the working principle of a reciprocating pump. 11
- 4(d) Write short note on i) Compressor, and ii) Blower. 06

SECTION-B

- 5(a) What is meant by steam generating unit? Write down the differences between fire tube boilers and water tube boilers. 10
- 5(b) Describe the working principle of "La-Mont" boiler with necessary sketches. 10
- 5(c) Write down the functions of the following components in a steam boiler: 15
i) Safety valve, ii) Water level indicator, iii) Feed pump, iv) Air preheater, and v) Economizer.
- 6(a) Define i) Refrigerant, ii) Tonne of refrigeration, and iii) C.O.P. 06
- 6(b) State the properties of a good refrigerant. Establish how an actual cycle differs from a theoretical vapour compression cycle. 10
- 6(c) Show that $(COP)_{HP} = (COP)_R + 1$ 07
- 6(d) Describe the working principle of Vapour Absorption Refrigeration System with neat sketch. 12
- 7(a) Define the following terms: 09
i) Specific humidity, ii) Wet bulb temperature, and iii) Dew point temperature.
- 7(b) Describe the working principle of "Summer air conditioning" system with neat sketch. 12
- 7(c) Define comfort. What are the factors which affect comfort air conditioning? 07
- 7(d) What is condensation? Distinguish between film wise condensation and drop wise condensation. 07
- 8(a) Define pool boiling. Describe the pool boiling phenomena of water with mentioning its regime with a clear sketch. 12
- 8(b) What is black body? State Stefan-Boltzman's Law and Wein's displacement law. 08
- 8(c) Consider slab of thickness L . The boundary surface at $X = 0$ and $X = L$ are maintained at constant but different temperature of T_1 and T_2 respectively. There is no energy generation in the solid and the thermal conductivity K is constant. Develop an expression for the temperature distribution $T_{(x)}$ in the slab and the thermal resistance of the slab for the heat flow through an area A . 15

----END----

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 1st Year Backlog Examination, 2018

TE-1221

(Textile Fibers)

Time: 3 Hours

Total Marks: 210

N.B.: i) Answer any THREE questions from each section in separate scripts.

ii) Figures in the right margin indicate full marks.

iii) Assume reasonable data if missing any.

SECTION-A

- | | | |
|------|----------------------------------------------------------------------------------------|----|
| 1(a) | What is textile fiber? Classify the textile fibers with examples. | 12 |
| 1(b) | Discuss the morphological diagram of cotton fiber mentioning the chemical composition. | 15 |
| 1(c) | What is ginning? Differentiate between lint and linters. | 08 |
| 2(a) | State the grading system for jute and cotton. | 15 |
| 2(b) | Describe the physical and chemical properties of cotton fiber. | 15 |
| 2(c) | Why jute is called bast fiber? | 05 |
| 3(a) | Write down the chemical composition of jute fibers. How and why retting is done? | 10 |
| 3(b) | Discuss the micro structure of wool fiber with neat sketch. | 10 |
| 3(c) | State a procedure of distinguishing wool fiber from silk fiber. | 05 |
| 3(d) | Discuss the chemical composition and favorable properties of Coir and banana fiber. | 10 |
| 4(a) | What is Sericulture? Describe the production stages of silk filament. | 15 |
| 4(b) | Write short notes on: i) Degumming of silk, and ii) Carbonizing. | 08 |
| 4(c) | Mention the chemical composition and physical properties of silk. | 12 |

SECTION-B

- 5(a) Describe the characteristics of fiber forming polymers. 10
- 5(b) Explain the spinning methods of man-made fibers with their merits and demerits. 20
- 5(c) Mention the spinning systems for the following fibers:
i) Carbon, ii) Nylon, iii) Polyester, iv) Viscose-rayon, and v) Glass fiber. 05
- 6(a) Describe the manufacturing process of polyester fibers. 12
- 6(b) State the chemical properties of polyester fibers. 10
- 6(c) Mention the MR% and MC% for the following fibers:
i) Cotton, ii) Jute, iii) Nylon, iv) Polyester, and v) PALF. 05
- 6(d) Differentiate between Nylon 6 and Nylon 66. 08
- 7(a) Write short notes on: i) Carbon fiber, ii) Kevlar fiber, and iii) Glass fiber. 12
- 7(b) What are acrylic and modacrylic? Write down the physical and chemical properties of acrylic fiber. 12
- 7(c) Describe the manufacturing process of polypropylene fiber. 11
- 8(a) State the various steps involved in viscose process. 12
- 8(b) What is elastomeric fiber? Show the flowchart of production of spandex fiber. 15
- 8(c) Show the polymerization reaction of acetate and triacetate. 08

----END----

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 1st Year Backlog Examination, 2018

Ch-1121
(Chemistry-I)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) What is electrophoresis? How can you prove that colloid particles are electrically charged? 11
- 1(b) Define coagulation and precipitation. In between $MgCl_2$ and KCl , which one is the better coagulant and why? 12
- 1(c) Explain dialysis and electro dialysis methods for the purification of sols. 12
- 2(a) Explain photosensitized reaction with relevant example. 07
- 2(b) State Stark-Einstein law of photochemical equivalence. Explain the term "Quantum Yield" in a photochemical reaction. 12
- 2(c) The quantum efficiency for the hydrogen and chlorine reaction is very high, why? 08
- 2(d) Calculate the energy (in joule) associated with one photon of wavelength 8000 Å. 08
($h = 6.62 \times 10^{-27}$ erg-sec)
- 3(a) What is bleaching agent? Compare the bleaching mechanism of $NaClO_2$ and $HOCl$. 12
- 3(b) Explain with an example why pH of a buffer solution does not change significantly on small addition of acids or bases. 13
- 3(c) Discuss the Ostwald's theory of acid-base indicator. 10
- 4(a) What is bond order? Predict the bond order and magnetic properties of O_2 and H_2 molecule. 12
- 4(b) How does molecular orbital theory differ from valence bond theory? Explain with suitable example. 12
- 4(c) " N_2 is diatomic but Ne is monoatomic" – Explain by MOT. 11

SECTION-B

- 5(a) What is equivalent conductance? Show graphically the variation of equivalent conductance against concentration for $NaCl$ and CH_3COOH . Explain the nature of these curves. 12
- 5(b) State Kohlrausch's law of independent migration of ions. 12
- 5(c) Define transport number and establish the relation $t_+ + t_- = 1$. 11
- 6(a) Explain that the fully exposed metal surface is more beneficial than the partially exposed metal surface from the corrosion point of view. 10
- 6(b) Explain why the presence of acid increases but base decreases the rate of under-water corrosion. 10
- 6(c) "Bolts and nuts are made of the same metal in practice"- why? 07
- 6(d) Define the following terms with examples: 08
i) Hydrolysis, ii) Pyrolysis
- 7(a) What are the colligative properties and why are they so called? 07
- 7(b) Deduce from Raoult's law an expression relating the molecular mass of a solute with the lowering of vapour pressure. 10
- 7(c) State and explain the Vant Hoff's laws of osmotic pressure. 10
- 7(d) Show that the elevation of boiling point is directly proportional to the lowering of vapour pressure. 08
- 8(a) Write down the IUPAC name of the following complexes: 06
i) $[CO(NH_3)_4Cl_2]^+$, ii) $K_4[Fe(CN)_6]$
- 8(b) Indicate the primary and secondary valencies of the central metal in the following complex compounds: 10
i) $[CO(NH_3)_6]Cl_3$, ii) $[CO(NH_3)_4Cl_2]Cl$
- 8(c) Apply VB theory to explain hybridization, shape, and magnetic behavior of the complex $[Fe(CN)_6]^{4-}$. 12
- 8(d) What is meant by "Effective Atomic Number"? Calculate the EAN in the following complex: 07



----END----

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 1st Year Backlog Examination, 2018

Ch-1221

(Chemistry-II)

Time: 3 Hours

Total Marks: 210

N.B.: i) Answer any THREE questions from each section in separate scripts.

ii) Figures in the right margin indicate full marks.

iii) Assume reasonable data if missing any.

SECTION-A

- | | |
|---------------------------------------------------------------------------|----|
| 1(a) Define functional group isomerism and geometrical isomerism. | 10 |
| 1(b) What is plane polarized light? Explain. | 07 |
| 1(c) Explain the terms enantiomers and meso compound. | 10 |
| 1(d) What is racemic mixture? Explain. | 08 |
| 2(a) Define staggered and eclipsed conformations giving examples. | 08 |
| 2(b) Outline the stereochemistry of cyclohexane giving energy diagram. | 10 |
| 2(c) Discuss the stereochemistry of SN_1 and SN_2 reactions. | 10 |
| 2(d) Predict about R and S configuration of the compound CH_3C^*ClFBr . | 07 |
| 3(a) Define aromaticity and ring current. | 10 |
| 3(b) Discuss the mechanism of Friedel-Craft's reaction. | 10 |
| 3(c) Mention two important methods of synthesis of benzene. | 08 |
| 3(d) What is meant by free radical and carbocation? Explain. | 07 |
| 4(a) How can you distinguish between a ketone and an aldehyde? | 08 |
| 4(b) Alcohols and amines are highly soluble in water. Why? | 09 |
| 4(c) Methylamine is stronger base than ammonia. Why? | 08 |
| 4(d) Synthesize 2° amine and 3° alcohol. | 10 |

SECTION-B

- 5(a) What are carbohydrates? How are they classified? 12
- 5(b) What is mutarotation? Explain with the help of an example. 13
- 5(c) What are epimers? Differentiate between anomers and epimers. 10
- 6(a) What are polysaccharides? Write the composition of starch. 10
- 6(b) Deduce the structure of amylopectin by end group analysis. 13
- 6(c) What happens when cellulose is treated with: 12
i) $HNO_3 + H_2SO_4$, ii) Acetic acid + Acetic anhydride.
- 7(a) Discuss the chemical properties of dyes and pigments. 10
- 7(b) Discuss the modern theory of color. 12
- 7(c) What are dye intermediates? Briefly discuss the application of dye intermediates. 13
- 8(a) Explain the terms iso-electric point and peptide linkage. 10
- 8(b) Most of the α -amino acids are optically active. Why? 07
- 8(c) What are amino acids? Mention their importance. 08
- 8(d) How can you detect C-terminal and N-terminal residue of proteins? 10

----END----

KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Textile Engineering

B. Sc. Engineering 1st Year Backlog Examination, 2018

Hum-1221

(Business and Communicative English)

Time: 3 Hours

Total Marks: 210

- N.B.:** i) Answer any THREE questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if missing any.

SECTION-A

- 1(a) Frame W/H questions from the following answer: 14
- i) Dr. Smith is the author of this book.
 - ii) Jack's plan succeeded at last.
 - iii) You must go home now.
 - iv) I depend on authentic books for data collection.
 - v) I want to know his address.
 - vi) He is moving towards south.
 - vii) The manager was late due to traffic jam.
- 1(b) Make sentences using the following words as directed- 12
- Pen (as verb); Pen (as adjective); Money (as adjective); Place (as verb);
While (as conjunction); What (as pronoun).
- 1(c) Make sentences using the following phrases and idioms: 09
- A piece of cake, add insult to injury, all at once, black sheep, for good, in time
- 2(a) Correct the following sentences: 14
- i) I am the younger in the family.
 - ii) He is comparatively better today.
 - iii) Most of the apples is rotten.
 - iv) One must do her work.
 - v) Cattles are grazing in the field.
 - vi) He rests in evening.
 - vii) He gets a good pay.
- 2(b) Transform the following sentences: 12
- i) Her work is better than yours. (Positive)
 - ii) The police tried all plans. (Negative)
 - iii) Their glory can never fade. (Interrogative)
 - iv) I met a strange man. (Complex)
 - v) He danced as if he were an expert dancer. (Simple)
 - vi) In spite of my annoyance, I kept quiet. (Compound)
- 2(c) Define present participle, infinitive and gerund with example. 09

- 3(a) Complete the following sentences with subordinate clauses: 14
- i) My mother taught me to read
 - ii) Mina went on reading
 - iii) The journey took longer than
 - iv) The passage is so difficult
 - v) He is intelligent though
 - vi) Go to bed if
 - vii) Shella had to wait an hour
- 3(b) Make one synonym and one antonym of each of the following words and use them in sentences. 12
- Adverse; Bonafide; Cordial.
- 3(c) Supply a suitable word to fill in the blanks of the following: 09
- i) Hearing the news, he hurried home.
 - ii) at home, he met his parents.
 - iii) walking along the road, he met me.
 - iv) He was the talkative lady.
 - v) The man is to die.
 - vi) The police men are for the criminals.
- 4(a) Make sentences using the following modals as directed- 14
- i) May (To express guess about the future)
 - ii) May (To express guess about the present)
 - iii) Could (To express past ability)
 - iv) Could (To express polite request)
 - v) Be to (To express arrangement)
 - vi) Be to (To express command)
 - vii) Had better (To express performance)
- 4(b) Express the following notions in sentences: 12
- Worry, anger, surprise, disappointment, sympathy, revenge
- 4(c) Identify the parts of speech of the underlined words of the following sentences. 09
- i) He runs fast.
 - ii) I fast every monday.
 - iii) Respect your better.
 - iv) I know English better than you.
 - v) Either you or your brother should go.
 - vi) Either of the pens will do.

SECTION-B

5(a) Read the passage and answer the questions: 20

Advertising has become a very specialized activity in modern times. In the business world of today, supply is usually greater than demand. There is a great competition between different manufacturers of the same kind of product to persuade customers to buy their own particular brand. They always have to remind the consumer of the name and qualities of their product. They do this by advertising. The manufacturer advertises in the newspaper and on poster. He employs attractive sales girls to distribute samples of it. He organizes competitions, with prizes for the winners. He often advertises on the screens of local cinemas. Advertisements are also broadcasted on television and radios. Manufacturers often spend large sum of money on advertisements. We buy a particular product because we think it is the best as the advertisements said so. Some people never pause to ask themselves if the advertisements are telling the truth.

- i) How many kinds of advertisements are mentioned in the passage? What are they?
- ii) Why do manufacturers spend so much money on advertising?
- iii) Which do you think is the most effective advertisement?
- iv) Do you think we buy goods because they are advised? Give reasons for your answer.

5(b) Make a précis of the above passage. 15

6(a) Write a list paragraph on a good student. 15

6(b) Amplify the idea contained in the following statement: 20
Borrowed garments never fit well.

7(a) Write a report on 21st February you observed in your campus. 15

7(b) Write a letter to the editor of a newspaper about student indiscipline and suggesting remedies. 20

8(a) Write a free composition on any one of the followings: 35

- a) Student politics: Its merits and demerits.
- b) Religious festivals and their values.

----END----

