

BANGLADESH TECHNICAL EDUCATION BOARD

4- YEAR

DIPLOMA-IN- JUTE TECHNOLOGY PROGRAM

**FIRST AND SECOND SEMESTER
COURSE STRUCTURE**

AND

SYLLABUS

FIRST SEMESTER

Sl No	Subject Code	Name Of The Subjects	Periods & Credits			Marks		
			T	P	C	Theory	Practical	Total
1.	TT 112	Textile Raw Materials-I	2	0	2	100	-	100
2.	TT 124	General Textile Processes-I	3	3	4	150	50	200
3.	DRG 112	Engineering Drawing	1	3	2	50	50	100
4.	MS 114	Mathematics-I	3	0	3	150		150
5.	MS 124	Physics-I	3	3	4	150	50	200
6.	MS 133	Chemistry-1	3	3	4	150	50	200
7.	SS 112	Bangla-I	2	0	2	100	-	100
8.	SS 122	English-I	2	0	2	100	-	100
9.	PED III	Physical Education	0	1	1	-	50	50
TOTAL			19	13	24	950	250	1200

SECOND SEMESTER

Sl No	Subject Code	Name Of The Subjects	Periods & Credits			Marks		
			T	P	C	Theory	Practical	Total
1.	TT 212	Textile Raw Materials-II	2	0	2	100	-	100
2.	TT 224	General Textile Processes-II	3	3	4	150	50	200
3.	WP 112	Workshop Practice	0	3	1	-	50	50
4.	MS 214	Mathematics-II	3	0	3	150	-	150
5.	MS 223	Physics-II	2	3	3	100	50	150
6.	MS 233	Chemistry-II	3	3	4	150	50	200
7.	SS 212	Bangla-II	2	0	2	100	-	100
8.	SS 222	English-II	2	0	2	100	-	100
9.	SS 232	Social Science-I (Civics & Economics)	3	0	3	150	-	150
TOTAL			20	12	24	1000	200	1200

TT 112

TEXTILE RAW MATERIALS-I

T P C
2 0 2**AIMS**

1. To develop the basic knowledge of Textile raw materials.
2. To familiarize with the basic knowledge of natural Textile fibres.
3. To develop the knowledge of natural Textile fibres.
4. To acquaint with the knowledge of different fibre properties.

SHORT DESCRIPTION

To understand the basic concepts of Jute fibres; Cotton fibres; Flax; Hemp fibre; Sisal fibres; Wool fibres; & Silk fibres.

DETAIL DESCRIPTION**Theory****1. Understand the Textile raw materials.**

- 1.1 State the term "Textile raw materials".
- 1.2 Define fibre and textile fibre.
- 1.3 Describe about the characteristics of textile fibre.
- 1.4 Mention the classification of textile fibres with examples.
- 1.5 Define natural fibre.
- 1.6 Classify natural fibre.
- 1.7 Define manmade fibres.
- 1.8 Classify manmade fibres.
- 1.9 Describe the properties of natural and manmade fibres.
- 1.10 Distinguish between natural and manmade fibres.

Natural fibres**2. Understand the jute fibre.**

- 2.1 Describe about the history of jute fibre.
- 2.2 Mention the different name of jute fibre.
- 2.3 Describe the cultivation of jute fibre.
- 2.4 Classify the jute fibre.
- 2.5 Describe the grading of jute fibre.
- 2.6 Mention the different in jute fibre.
- 2.7 Describe about the physical properties of jute fibre.
- 2.8 Discuss about the chemical properties of jute fibre.
- 2.9 State the end uses of jute fibres

3. Understand the Cotton fibre.

- 3.1 Describe the history of cotton fibre.
- 3.2 Mention the botanical name of cotton fibre
- 3.3 Describe the cultivation of cotton fibre
- 3.4 Discuss about the factors to be considered for cotton grading.
- 3.5 Mention the different system of grading.
- 3.6 Describe the characteristics of cotton fibre.
- 3.7 Describe the physical and chemical properties of cotton fibre.
- 3.8 Mention the defects of cotton fibre
- 3.9 Mention the end-uses of cotton fibre.

4. Understand the Flax fibre.

- 4.1 Describe about the history of flax fibre.
- 4.2 Describe the cultivation of flax fibre.
- 4.3 Classify the flax fibre.
- 4.4 Mention the composition of flax fibre.
- 4.5 Describe the physical properties of flax fibre.
- 4.6 Describe the chemical properties of flax fibre.
- 4.7 Mention the end uses of flax fibre.

5. Understand the hemp fibre.

- 5.1 Describe about the history of the hemp fibre.
- 5.2 Describe the cultivation of hemp fibre.
- 5.3 Describe the retting of hemp fibre.
- 5.4 Classify the of hemp fibre.
- 5.5 Mention the composition of hemp fibre.
- 5.6 Mention the physical properties of hemp fibre.
- 5.7 Describe the chemical properties of hemp fibre.
- 5.8 State the end uses of hemp fibre.

Animal fibres.**6. Understand the wool fibre.**

- 6.1 Describe the history of wool fibres.
- 6.2 Mention the classification of wool fibre.
- 6.3 Describe the grading of wool fibre.
- 6.4 State the chemical composition of wool fibre
- 6.5 Describe the preparatory process of wool fibre.
- 6.6 Mention the physical properties of wool fibre.
- 6.7 Describe the chemical properties of wool fibre.
- 6.8 Mention the end uses of wool fibre.

7. Understand the silk fibre.

- 7.1 Describe the history of silk fibre.
- 7.2 Describe production system of cocoons.
- 7.3 Describe the silk production in Bangladesh.
- 7.4 Mention the composition of silk fibre.
- 7.5 Mention the classification of silk fibre.
- 7.6 Describe the degumming of silk fibre.
- 7.7 Mention the physical properties of silk fibre.
- 7.8 Describe the chemical properties of silk fibre.
- 7.9 Mention the end uses of silk fibre.

REFERENCE BOOKS

1. Textile science
- E.P.G Gohl
2. Textile Fiber of Fabric
- Bernard P. Corbman
3. Textile fibres
- Dr. V. A. Shenai
4. Textile fibre (BTEB)
- Engr. Md. Mohibul Islam

TT 124 GENERAL TEXTILE PROCESSES-I

**T P C
3 3 4**

AIMS

To provide the students with an opportunity to acquire preliminary knowledge, skill and attitude in the area of Yarn Manufacture and Fabric Manufacture.

SHORT DESCRIPTION

To understand the flow-chart of yarn manufacturing; Ginning; Mixing and Blending; Blow-Room; Batch & Batching; Cotton & Jute carding; Cotton and Jute drawing & doubling; Lap forming; Combing; Simplex; Ring frame; Jute spinning frame; Yarn numbering system. To understand the basic concepts of Winding; Warping; Sizing; Drafting & Denting; Weaving and knitting.

DETAIL DESCRIPTION

YARN MANUFACTURING

Theory

- 1. Understand the flow-chart of yarn manufacturing.**
 - 1.1 Define flow-chart and its importance.
 - 1.2 Mention the flow-chart of cotton yarn (Carded) Manufacturing .
 - 1.3 Mention the flow-chart of cotton yarn (Combed) Manufacturing.
 - 1.4 Mention the flow-chart of rotor yarn spinning.
 - 1.5 Mention the flow-chart of Jute yarn Manufacturing.
 - 1.6 Mention the flow-chart of carpet backing cloth (CBC) or Hessian warp.
 - 1.7 Mention the flow-chart of sacking warp yarn.
 - 1.8 Mention the flow-chart of sacking weft yarn.
- 2. Understand ginning.**
 - 2.1 Define ginning.
 - 2.2 State the objectives of ginning.
 - 2.3 Mention the types of ginning machines.
- 3. Understand mixing and blending.**
 - 3.1 Define mixing and blending.
 - 3.2 Mention the objectives of mixing and blending.
 - 3.3 Mention the types of mixing and blending.
 - 3.4 State the main factors to be consider for mixing and blending procedure.

4. Understand basic things of Blow-room.

- 4.1 State the term “Blow-room”.
- 4.2 Mention the functions of Blow-room.
- 4.3 List the blending and mixing machineries of Blow-room.
- 4.4 List the opening and cleaning machineries of Blow-room.

5. Understand Batch & Batching.

- 5.1 Define batch & batching.
- 5.2 Define jute emulsion, ingredients used in jute emulsion, composition of a standard jute emulsion.
- 5.3 Define Softening.
- 5.4 Mention the objectives of softening.
- 5.5 Name the machines used for softening.

6. Understand cotton & jute carding .

- 6.1 Define carding.
- 6.2 Mention the purposes of carding.
- 6.3 Name the types of carding machine used in cotton & jute yarn processing.
- 6.4 List the main parts of cotton & jute carding machines .

7. Understand cotton and jute drawing & doubling.

- 7.1 Define drawing, doubling & draft.
- 7.2 State the objectives of drawing.
- 7.3 List the main parts of cotton drawing frame.
- 7.4 State the purposes of jute drawing frame.
- 7.5 Mention the functions of jute drawing frame.
- 7.6 Give the classification of jute drawing frames.
- 7.7 List the main parts of different jute drawing frame.

8. Understand the basic concepts of lap forming and combing.

- 8.1 State the purposes of mini-lap preparation.
- 8.2 List the lap forming machines.
- 8.3 State the term combing.
- 8.4 Mention the purposes of combing.

9. Understand the basic ideas of simplex and spinning frame (Jute and Cotton).

- 9.1 State the purposes of simplex.
- 9.2 Mention the functions of simplex.
- 9.3 State the purposes of ring frame.
- 9.4 Mention the functions of ring frame.
- 9.5 State the purposes of jute spinning frame.
- 9.6 Mention the functions of jute spinning frame.
- 9.7 Classify different types of jute spinning frames.
- 9.8 List the main parts of jute spinning frame.

10. Understand Yarn Numbering system.

- 10.1 Define yarn numbering system.
- 10.2 Classify the different yarn numbering systems.
- 10.3 Define English count, Jute counting, Tex & Denier.

FABRIC MANUFACTURING

11. Understand the basic ideas of winding.

- 11.1 Define winding.
- 11.2 Mention the objectives of winding.
- 11.3 Mention the types of winding.
- 11.4 Mention the different type of wound packages.

12. Understand the concept of warping.

- 12.1 Define warping.
- 12.2 Mention the objectives of warping.
- 12.3 Mention the types of warping.

13. Understand the basic things of sizing.

- 13.1 Define sizing.
- 13.2 State the purposes of sizing.
- 13.3 List different sizing ingredients.
- 13.4 Mention the pure sizing recipe.

14. Understand the basic things of drafting and denting .

- 14.1 State drafting and denting .
- 14.2 Mention the purposes of drafting and denting .
- 14.3 Mention the types of drafting & denting.

15. Understand the basic ideas of weaving and knitting.

- 15.1 Define weaving.
- 15.2 Mention the flow-chart of weaving.
- 15.3 State the sequence of weaving process.
- 15.4 Classify the different types of looms.
- 15.5 Define knitting.
- 15.6 Classify the knitting systems.
- 15.7 Differentiate between knitting & weaving.
- 15.8 List the warp and weft knitting machines.

Practical**Yarn manufacture :**

- 1. Identify yarn manufacturing machines.
- 2. Prepare batch & emulsion.
- 3. Show the fibre path through a cotton carding machine.
- 4. Show the fibre path through a jute breaker card machine.
- 5. Show the fibre path through a jute finisher card machine.
- 6. Show the fibre path through a cotton drawing frame.
- 7. Show the fibre path through a jute drawing frame.
- 8. Show the fibre path through simplex machine.
- 9. Show the fibre path through ring spinning frame
- 10. Show the fibre path through jute spinning frame.

Fabric Manufacture :

- 1. Practice cone, pirn, cheese, spool & cop winding.
- 2. Practice warp preparation.
- 3. Practice drafting.
- 4. Practice denting through a reed..

5. Identify the different working parts of hand loom.
6. Identify the different working parts of power loom.
7. Identify the different working parts of circular knitting machine
8. Identify the different working parts of a flat knitting machine.
9. Identify the different accessories used in textile processing viz . can, bobbin, pirn, cone, cheese, spool, cop, shuttle, needle, etc.

REFERENCE BOOKS

1. Fibre Science -R Gopalakrishnar
2. Manual of cotton Spinning volume-II &III -Byerley and Buckley
3. Technology of Textile Processing volume-III-Dr. V.A. Shenai
3. General Textile Processing (BTEB) -Engr. Alauddin Khalifa

Drg 112**ENGINEERING DRAWING****T P C****1 3 2*****OBJECTIVES***

- To develop the ability to use various drawing instruments and materials.
- To enable in constructing and using various types of scales in drawing.
- To provide the ability to construct various geometrical figures.
- To enable to adopt various symbols used in drawing.
- To provide the skill of freehand sketching with shades and shadows.
- To provide the basic skill of drawing orthographic views.

SHORT DESCRIPTION

Drawing instruments and their uses; Lettering, numbering and constructing title strip; Adopting alphabet of lines and dimensioning; Constructing scales; Construction geometrical figures; Constructing conic sections; Adopting symbols, Freehand sketching (with shades and shadows) Drawing orthographic views.

DETAIL DESCRIPTION***DRAWING INSTRUMENTS AND MATERIALS*****1. Know instruments and materials for basic drawing technique.**

- 1.1 Identify the different types to drawing instruments.
- 1.2 Identify the standard sizes of drawing board and sheets.
- 1.3 Draw the border lines in drawing sheets following standard rule.
- 1.4 Draw horizontal, vertical and inclined lines with the help of set squares and T-square.
- 1.5 Draw 15 degree, 75 degree, 105 degree and 120 degree angles with the help of set squares.
- 1.6 Use lettering guide, template, scale pantograph and French curve.

LETTERING NUMBERING AND TITLE STRIP

2. Show skill in lettering and Numbering .

- 2.1 Identify the necessity of good lettering in engineering drawing.
- 2.2 Draw freehand single stroke vertical letters from A to z (upper and lower case) and numbers 0 to 9.
- 2.3 Draw freehand inclined (65 degree to 75 degree) single stroke letters from A to Z (upper and lower case) and numbers form 0 to 9.
- 2.4 Draw block letters (Gothic) using 5 : 4 and 7 : 5 proportions and height.
- 2.5 Select a suitable size of letters and write a few sentences using all the letters selection suitable scale.
- 2.6 Draw title strip with proper placement using suitable size of letters and measurements.

ALPHABET OF LINES AND DIMENSIONING

3. Adopt proper lines.

- 3.1 Select different lines in drawing.
- 3.2 Use center line, hidden line, phantom line, break line, dimension line, extension line, section line and cutting plane line.
- 3.3 Use different thickness of line to emphasize a part of drawing.
- 3.4 Select recommended grades of pencils for various types of lines for engineering drawing.

4. Adopt the elements and theory of dimensioning.

- 4.1 Put dimension in engineering drawing according to an accepted standard.
- 4.2 Identify the elements of dimensions from a given dimensioned drawing.
- 4.3 Apply aligned and unidirectional system of dimensioning.
- 4.4 Draw size and location of dimension, continuous dimension, staggered dimension and dimensioning in limited space.
- 4.5 Add necessary dimension to a given drawing with suitable arrows.

CONSTRUCTION OF SCALE

5. Prepare scale for drawing application.

- 5.1 Calculate representative fraction and interpret a scale reading.
- 5.2 Use different types scale to find full size dimension.
- 5.3 Draw a plain scale to show meters, centimeters and millimeters of a given distance on object.
- 5.4 Draw a diagonal scale to show three units having given RF.
- 5.5 Read particular distance on plain and diagonal scale.
- 5.6 Use scale of chord.
- 5.7 Draw angle of 49 degree 78 degree and 95 degree with the help of scale of chord.

GEOMETRICAL CONSTRUCTIONS

6. Construct geometric figures (lines, triangles & squares).

- 6.1 Divide given straight line into any number of equal parts.
- 6.2 Draw perpendicular when the given point is at or near the end of the line.
- 6.3 Bisect a given angle.
- 6.4 Trisect a given angle.
- 6.5 Draw a straight line parallel to given straight line at some given distance.
- 6.6 Draw a square on a given straight line.

7. Construct geometric figures (circles and regular polygons).

- 7.1 Draw regular polygons i.e. pentagon, hexagon and octagon having given one side.
- 7.2 Locate the center of circle and arc.
- 7.3 Inscribe circle in triangles.
- 7.4 Inscribe a circle about a triangle.
- 7.5 Divide a triangle into any number of equal parts.
- 7.6 Draw an equilateral triangle equal in area of a square.
- 7.7 Determine the length of the circumference of circle.

CONIC SECTIONS

8. Construct conic sections.

- 8.1 Draw an ellipse by concentric circle method.
- 8.2 Draw an ellipse by parallelogram Method.
- 8.3 Draw an ellipse by four center method.
- 8.4 Draw a parabola having given foci and directrix.
- 8.5 Draw a parabola from given abscissa and ordinate.

SYMBOLS

9. Adopt standard symbols in drawing.

- 9.1 Identify symbols used in drawing.
- 9.2 Draw a legend using symbols of different engineering materials.
- 9.3 Draw the symbols of different plumbing fittings and fixtures used in drawing.
- 9.4 Draw the symbols of different electrical fittings and fixtures used in drawing.
- 9.5 Interpret information from drawing containing standard symbols.

FREEHAND SKETCHING (WITH SHADES AND SHADOWS)

10. Sketch freehand with shades and shadows.

- 10.1 Produce freehand sketches of the following with shade and shadow technique.

a. Book	h. Bib-cock
b. Brick	i. Bench vice
c. Step	j. Open box
d. Cylinder	k. Nuts and bolts
e. Hand tubewell	
f. Spade with handle	
g. Pipe wrench	
- 10.2 Use different materials and methods of shading and shadowing freehand sketches.

11. Translate pictorial views of simple objects into orthographic views.

11.1 Identify different planes.

11.2 Draw third angle orthographic views of simple objects.

11.3 Draw first and third angle views of simple object and add proper dimensions.

REFERENCE BOOKS

1. Geometrical Drawing.

- I H Morris

2. Prathamik Engineering Drawing

- Hemanta kumar Bhattacharia

OBJECTIVES

- To Acquaint The Students With The Basic Terminology Of Algebra.
- To Develop An Understanding Of Complex Numbers (J-Operator) Which Are Being Used In Electrical Engineering.
- To Give An Understanding Of The Binomial Expansion.
- To Enable In Using The Knowledge Of Trigonometry In Solving Problems Of Engineering Importance.

Short Description

Algebra: Set, Indices, Logarithms, Variation, Ap & Gp, Polynomials & Polynomial Equations, Complex Number, Permutation & Combination, Binomial Theorem For Positive Integral Index.

Trigonometry: Trigonometrical Ratios Of Different Angles; Ratio Of Associated Angles, Compound Angles, Transformation Formulae, Multiple Angles And Sub-Multiple Angles.

Detail Description

Algebra:

1 Apply The Concept Of Set In Solving Problem.

- 1.1 Define Set, Sub-Set And Universal Set.
- 1.2 Define The Different Types Of Number Set.
- 1.3 Define Union Of Set, Intersection Of Set, Complement Of Set, Power Set, Disjoint Set.
- 1.4 Prove (Using Venn Diagram) The Relation Of Following Types Where A, B And C Are Any Set.
 - I) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
 - ii) $(A \cup B)^c = A^c \cap B^c$
 - iii) $(A \cap B)^c = A^c \cup B^c$
- 1.5 Find The Number Of Elements In The Union Of Two Sets.
- 1.6 Solve The Problems Using Above.

2 Apply The Laws Of Indices In Solving Mathematical Problem.

- 2.1 State The Laws Of Indices.
- 2.2 Apply The Laws Of Indices To Solve The Problem.
- 2.3 Perform Algebraic Operation On Surd.
- 2.4 Use The Scientific Calculator In Solving The Problems Of Indices.

3 Apply The Concept Of Logarithms.

- 3.1 Define Logarithm.
- 3.2 Prove The Following Laws Of Logarithm.
 - A) $\log_a (M \times N) = \log_a M + \log_a N$
 - B) $\log_a \left(\frac{m}{n} \right) = \log_a M - \log_a N$

$$C) \log_a (m)^n = N \log_a M$$

$$D) \log_b A \times \log_a B = 1$$

$$E) \log_a 1 = 0$$

3.3 Solve Problems Using 3.2.

3.4 State The Difference Between Napierian And Common Logarithms.

4 Understand The Concept Of Ap & Gp.

4.1 Define Ap And Common Difference.

4.2 Find Last Term And Sum Of N Terms, Given First Term And Common Difference.

4.3 Define Gp And Common Ratio.

4.4 Find The Sum Of N Terms Given First And Common Ratio.

5 Apply The Concept Of Polynomial In Solving The Problems.

5.1 Define Polynomials And Polynomial Equation.

5.2 Explain The Roots And Co-Efficient Of Polynomial Equations.

5.3 Find The Relation Between Roots And Co-Efficient Of The Polynomial Equations.

5.4 Determine The Roots And Their Nature Of Quadratic Polynomial Equations.

5.5 Form The Equation When The Roots Of The Quadratic Polynomial Equations Are Given.

5.6 Find The Condition Of The Common Roots Of Quadratic Polynomial Equations.

5.7 Solve The Problems Related To The Above.

6 Understand The Concept Of Complex Numbers.

6.1 Define Complex Numbers.

6.2 Perform Algebraic Operation (Addition, Subtraction, Multiplication, Division, Square Root) With Complex Number Of The Form $A+Jb$.

6.3 Find The Cube Roots Of Unity.

6.4 Apply The Properties Of Cube Root Of Unity In Solving Problems.

7 Apply The Concept Of Permutation .

7.1 Explain Permutation.

7.2 Find The Number Of Permutation Of N Things Taken R At A Time When,

i) Things Are All Different.

ii) Things Are Not All Different.

7.3 Solve Problems Of The Related To Permutation :

8 Apply The Concept Of Combination.

8.1 Explain Combination.

8.2 Find The Number Of Combination Of N Different Things Taken R At A Time.

8.3 Explain ${}^n C_r$, ${}^n C_n$, ${}^n C_0$

8.4 Find the number of combination of n things taken r at a time in which p particular things

i) Always occur ii) never occur.

8.5 ESTABLISH I) ${}^n C_r = {}^n C_{n-r}$

ii) ${}^n C_r + {}^n C_{r-1} = {}^{n+1} C_r$

8.6 SOLVE PROBLEMS RELATED TO COMBINATION.

9. **Apply the concept of binomial theorem for a positive integral index.**

9.1 State binomial expression.

9.2 Prove the binomial theorem.

9.3 Find the general term, middle term, equidistant term and term independent of x .

9.4 Use binomial theorem to find the value of

i) $(0.9998)^2$, correct to six places of decimal .

ii) $(1 + \sqrt{2})^5 - (1 - \sqrt{2})^5$

9.5 Using scientific calculator to solve the problems of permutation and combination.

Trigonometry :

9 Understand trigonometrical ratios of different angles.

9.1 Define angle.

9.2 Find ratios of 0° , 30° , 45° , 60° , and 90° .

9.3 Solve the problems on heights and distances involving the solution of right-angled triangles.

10 Apply the concept of associated angles.

10.1 Define associated angles.

10.2 Find the sign of trigonometrical function in different quadrants.

10.3 Calculate trigonometrical ratios of any angle.

10.4 Solve the problems using above.

11 Apply the principle of trigonometrical ratios of compound angles.

11.1 Define compound angles.

11.2 Establish the following relation geometrically for acute angles.

i) $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$.

ii) $\cos(A \pm B) = \cos A \cos B \pm \sin A \sin B$.

11.3 Deduce formula for $\tan(A \pm B)$, $\cot(A \pm B)$.

11.4 Apply the identities to work out the problems:

i) find the value of $\sin 75^\circ$, $\tan 75^\circ$.

ii) show that $\frac{\sin 75^\circ + \sin 15^\circ}{\sin 75^\circ - \sin 15^\circ} = \sqrt{3}$

iii) if $\alpha + \beta = \theta$, $\tan \alpha + \tan \beta = b$, $\cot \alpha + \cot \beta = a$,
show that $(a - b) = ab \cot \theta$.

12 Apply sum and product formula of trigonometrical ratios.

12.1 Express sum or difference of two sines and cosines as a product and vice-versa .

12.2 Solve problems of the followings types:

i) show that, $\sin 55^\circ + \cos 55^\circ = \sqrt{2} \cos 10^\circ$

ii) prove that, $\cos 80^\circ \cos 60^\circ \cos 40^\circ \cos 20^\circ = \frac{1}{16}$

13 Apply the concept of ratios of multiple angles.

13.1 State the identities for $\sin 2A$, $\cos 2A$ and $\tan 2A$.

13.2 Deduce formula for $\sin 3A$, $\cos 3A$ and $\tan 3A$.

13.3 Solve the problems of the followings types.

i) express $\cos 5\theta$ in terms of $\cos \theta$.

ii) if $\tan \alpha = 2 \tan \beta$, show that, $\tan (\alpha + \beta) = \frac{3 \sin 2\alpha}{1 + 3 \cos 2\alpha}$

14 Apply the concept of ratios of sub-multiple angles.

14.1 Find mathematically the identities for $\sin \alpha$, $\cos \alpha$ and $\tan \alpha$ in terms of $\frac{\alpha}{2}$ and $\frac{\alpha}{3}$

14.2 Solve the problems of the type :

find the value of $\cos 3^\circ$, $\cos 6^\circ$, $\cos 9^\circ$, $\cos 18^\circ$, $\cos 36^\circ$, etc.

1412

PHYSICS-I

T P C
3 3 4

OBJECTIVES

- To provide the students a background of basic science i.e. Physics required for understanding technological subjects.
- To develop a working knowledge of common engineering and industrial materials and to enable to determine through experiments the properties of such materials.
- To develop through experiments an understanding of fundamental scientific concept.
- To develop a basic knowledge and concept of physical properties of common engineering and industrial materials.

Short description

Units and measurements; vector and scalar quantities; motion and equations of motion; force and newton's laws of motion; gravity and gravitation; simple harmonic motion; hydrostatics; pressure, density and specific gravity; sound : concepts and nature of sound, velocity of sound, resonance, ultrasonic.

Detail description

Theory :

Units and measurements

1 understand units and measurements.

- 1.1 List the fundamental si units for measuring time, mass, distance, temperature, electricity, light and substance.
- 1.2 Identify the symbols for fundamental units and some common derived si units.
- 1.3 Solve problems on multiples and sub-multiples of si units of measurement using prefix and symbols.
- 1.4 Identify the common instruments used to measure fundamental si units and compare their operation and accuracy.
- 1.5 Identify suitable accurate measuring instruments for measuring time, mass, distance and temperature in a given situation.

Vector and scalar quantities

Understand vector and scalar quantities.

- Define vector quantities with examples.
- Define scalar quantities with examples.
- Show the various presentations of the vector quantities.
- Distinguish between vector and scalar quantities.
- Find the resultant of two vectors in different directions.
- Define laws of triangle of vector.
- Solve problems relating to vector and scalar quantities .

Motion and equations of motion

Understand motion and equations of motion.

- Define rest and motion.
- Classify motion.
- Define displacement, speed, velocity, acceleration and retardation.
- Explain the units of measurement of speed, velocity, acceleration and retardation.
- Deduce the relationship between displacement, velocity, acceleration and retardation from these definitions.
- Distinguish between (i) speed and velocity (ii) velocity and acceleration.
- Solve problems relating to motion and equation of motion.

Understand circular motion

- Define circular motion.
- Define angular velocity and linear velocity with their units.
- Distinguish between angular velocity and linear velocity.
- Calculate, length = radius \times angular distance.
- Deduce the relation between angular velocity and linear velocity.
- Define centripetal and centrifugal force with examples.

Prove centrifugal force = $\frac{mv^2}{r}$

Solve problems relating to circular motion.

Force and newton's laws of motion

Understand force.

Define force.

Define different units of force and their correlation and also mention the dimension of force.

Define different types of action and reaction, which creates different types of force.

State the laws of parallelogram of forces, and calculate the resultant of two forces acting at a point.

Resolve a force into horizontal and vertical components.

Define parallel force and a couple.

Find out the resultant of parallel forces.

Understand newton's laws of motion.

Define inertia and momentum.

State the simple units and dimension of momentum.

State and prove the principles of conservation of momentum.

State newton's laws of motion.

Verify the principle of conservation of momentum.

Prove $p=mv$, from newton's 2nd law of motion.

Solve problems relating to newton's laws of motion.

Gravity and gravitation

Understand gravity and gravitation.

Define and explain the kepler's law.

Define gravity and gravitation.

State the laws of gravity and gravitation.

Define and determine the gravitational constant (g) and also mention its units and dimension.

Define acceleration due to gravity 'g' and also mention its units and dimension.

Discuss the variation of 'g' at different places.

Define mass and weight with their units and dimension.

Distinguish between mass and weight.

State and explain the laws of falling bodies and mention the equation of motion of a body when it is projected vertically upwards or downwards.

Solve problems relating to gravity and gravitation.

Simple harmonic motion (shm)

Understand simple harmonic motion.

Define simple harmonic motion (shm).

State the characteristics of shm.

Describe a simple pendulum and a second pendulum.

Define effective length, amplitude, phase, complete oscillation, period of oscillation, frequency.

State and explain the laws of simple pendulum.

Describe a compound pendulum.

Discuss the conditions under which a pendulum clock will go slow or fast.

Draw $l - t^2$ graph and calculate the value of 'g' for a specific effective length.

Solve problems relating to simple harmonic motion.

Work, power and energy

Understand work, power and energy.

Define work, power and energy.

State the units and dimensions of work, power and energy.

State and prove the principle of the conservation of energy.

Define potential energy (p_e) and kinetic energy (k_e).

Derive the equation of potential and kinetic energy.

Show that the k.e. gained by a falling body is equal to the p.e. lost by the body.

Describe transformation of energy and mention the mass-energy relation.

Recognize that the useful work can be found from:

$$\text{Efficiency} = \frac{\text{output work}}{\text{input work}} \times 100.$$

Solve problems relating to work, power and energy.

Elasticity

Understand the concept of elasticity.

Name some of the general and special properties of matter.

Define elasticity and elastic limit.

Define perfectly elastic body and perfectly rigid body.

Define stress and strain with their units and dimensions.

State and explain the hook's law.

Describe various kinds of modulus of elasticity.

Mention the units and dimensions of modulus of elasticity.

Define poisson's ratio and determine the young's modulus of elasticity by searles method.

Solve problems relating to elasticity.

Friction

Understand friction

Define friction.

Describe the different kinds of friction.

Define the laws of static friction.

Define the co-efficient of static friction.

Describe the angle of static friction and angle of repose.

Describe the laws of kinetic friction.

State the co-efficient and angle of kinetic friction.

Show that the co-efficient of static friction is equal to the tangent of angle of repose.

Describe an experiment to determine the co-efficient of static friction.

State the merits and demerits of friction.

Solve problems relating to friction.

Hydrostatics

Understand behavior of fluids.

Define pressure as force per unit area and state that it is measured in n/m^2 or pa (pascal).

State characteristics of liquid pressure.

Establish that pressure at a point in a fluid is dependent upon the density of the fluid, the depths in the fluid and acceleration due to gravity.

Calculate the magnitude of pressure at a point within a fluid.

Identify that the pressure at a point on an immersed surface in a fluid is not dependent upon the area of the surface or the volume of fluid.

Calculate fluid pressure in different liquids at different depths in cylinders of different diameters.

Solve problems relating to hydrostatics.

Density and specific gravity

Understand density and specific gravity

State and prove Archimede's principle.

Define density and specific gravity.

State the units of density and specific gravity.

Distinguish between specific gravity and density.

Show that in S.I. system the density is thousand times greater than its specific gravity.

Establish the density of water at different temperatures.

Find out specific gravity of solids and liquids.

Solve problems relating to density and specific gravity.

Sound

Understand nature and behavior of sound.

Identify that sound is produced by vibration and travels through a medium as a longitudinal wave.

Distinguish between the production and behavior of longitudinal and transverse waves.

Recognize that sound can be produced of different pitches (frequencies) & that the human ear has an audible frequency range covering approximately 20 Hz to 20 kHz.

State the approximate frequency range for

A. Infrasonic sound

B. Ultrasonic (supersonic) sound.

Explain how sound is absorbed, reflected & refracted by different types of surface.

Describe the practical uses of echo sounding devices.

Define velocity of sound.

State the velocity of sound at NTP in still air.

Compare the effects of pressure, temperature & humidity on the velocity of sound in air.

Practical

Observations and measurements

1. Determine accurate diameter/side of an object using vernier calipers.
2. Measure the diameter of a wire by micrometer screw gage.
3. Measure the thickness of a glass plate by spherometer.
4. Verify the law of parallelogram of forces by a force board.
5. Verify the Newton's 2nd law of motion.
6. Determine the value of 'g' by using a simple pendulum.
7. Determine the coefficient of static friction.
8. Verify Hooke's law.

9. Determine young's modulus of a steel wire by searle's apparatus.
10. Verify archimedes principle.
11. Determine gravity of a solid heavier than and insoluble in water by hydrostatic balance.
12. Determine specific gravity of a solid lighter than & insoluble in water by hydrostatic balance.
13. Determine specific gravity of a liquid by specific gravity bottle.
14. Determine velocity of sound by resonance air column method.

MS 133

CHEMISTRY-1

T P C
3 3 4***OBJECTIVES***

- To provide the students a background of basic science required for understanding technology subjects.
- To develop a working knowledge of common engineering and industrial materials including physical and chemical properties and to enable to determine through experiments the properties of such materials.
- To develop a basic knowledge and concept of chemical reactions of common engineering and industrial materials.
- To develop through experiments the understanding of fundamental scientific concept will provide a common base of further studies in science and technology.

SHORT DESCRIPTION

Role of Chemistry in the field of engineering and technology; Matter and its changes; Symbol, valency and chemical equations; Different types of chemical reactions; Catalyst and catalysis; Properties of gases; Dalton atomic theory; Avogadro's hypothesis, Laws of chemical equivalent; Atomic weight and molecular weight; Atomic structure; Quantum numbers; Periodic table; Chemical bond; Electrolytic conductance and electrolysis; Acid base equilibria; Nitric Acid; Sulfuric acid; Halogen, Ammonia and Carbon dioxide; Metals.

DETAIL DESCRIPTION**Theory :**

- 1. Understand the role of science in the field of engineering and technology.**
 - 1.1 Name the different branches of science and state their differences.
 - 1.2 List five examples of role science in industries.
 - 1.3 Explain the importance of scientific principles and processes in the field of engineering and technology.

2. Understand matter and its changes.

- 2.1 Define and describe with the aid of diagrams and practical examples the terms: matter, element, compound, mixtures, solutions and suspensions.
- 2.2 Distinguish between; "atoms and molecules", "physical change and chemical change", exothermic and endothermic changes and reactions".
- 2.3 Identify exothermic and endothermic reactions form a given, list of reactions.

3. Understand symbols, valency and chemical equations.

- 3.1 Define symbol and formula, valency of elements and radicals.
- 3.2 Name the elements from a given list of symbols.
- 3.3 Distinguish between molecular formula, empirical formula and structural formula .
- 3.4 Discuss the variation of valency with examples.
- 3.5 Define active and latent valency.
- 3.6 Define chemical equation and balance some unbalanced chemical equations.
- 3.7 Explain the full meaning of a given chemical equation.

4. Understand the concept of chemical reactions.

- 4.1 Define chemical reaction.
- 4.2 Name the methods of bringing about chemical reaction.
- 4.3 Give examples of eight different types of chemical reaction with suitable examples.

5. Understand catalysis and catalysts.

- 5.1 Define catalysis and catalyst.
- 5.2 Mention different types of catalyst with examples.
- 5.3 List five uses of catalysts in industries.
- 5.4 Explain the criterion of a catalyst.

6. Understand properties of gases.

- 6.1 Identify the basic properties of gases.
- 6.2 Explain the kinetic theory of matter in relation to volume change and pressure change in a gas.

- 6.3 Identify the effects of temperature on a gas.
 - i) at a constant volume and
 - ii) at a constant pressure.
- 6.4 Compare the relationship between pressure, volume and temperature of a gas to establish Boyle's Law, Charles's law and the law of pressure.
- 6.5 Combine the gas laws to establish the gas equation.
- 6.6 Establish the partial pressure of mixed gases using Dalton's law of partial pressure.
- 6.7 Define absolute temperature and N. T. P.
- 6.8 Solve problems in relation to pressure, volume, temperature and partial pressure of a mixture of gases.
- 7. Understand Dalton's atomic theory.**
 - 7.1 List the four postulates of Dalton's atomic theory.
 - 7.2 Explain at least five limitations of Dalton's atomic theory.
- 8. Understand Avogadro's hypothesis**
 - 8.1 State Avogadro's hypothesis.
 - 8.2 Explain Avogadro's constant.
 - 8.3 Explain at least five applications of Avogadro's hypothesis in Chemistry.
 - 8.4 Solve problems using the knowledge of Avogadro's hypothesis.
- 9. Understand chemical equivalent.**
 - 9.1 Define the chemical equivalent of an element, a compound, a radical, an alkali and a salt.
 - 9.2 Explain the variations in chemical equivalent of an element.
 - 9.3 State the principles involved in the determination of chemical equivalent of metals.
 - 9.4 List four uses of chemical equivalent.
 - 9.5 Solve problems relating chemical equivalent.
- 10. Understand atomic weight and molecular weight.**
 - 10.1 Define atomic weight and molecular weight.
 - 10.2 Establish a relationship among chemical equivalent, valency and atomic weight.
 - 10.3 Explain four methods of determination of atomic weight.
 - 10.4 Solve problems to find out atomic weight, chemical equivalent and valency.

11. Understand the modern concept of atomic structure.

11.1 Write the name of fundamental particles of atom.

11.2 Explain the composition of nucleus.

11.3 Explain the following terms:

i) Avogadro's number ii) Atomic number iii) Isotopes
iv) Isobar v) Gram-atom vi) Mass Number and vii) Gram molecular weight.

11.4 Describe Rutherford's and Bohr's atomic model.

12. Understand the quantum numbers.

12.1 Define quantum numbers.

12.2 Explain the significance of the following quantum numbers.

- i) Principal quantum number
- ii) Subsidiary quantum number
- iii) Magnetic quantum number
- iv) Spin quantum number

12.3 Explain the Pauli's exclusion principle.

12.4 Explain the probability distribution of electrons round the nucleus.

12.5 Define orbit and orbital.

12.6 Explain the shapes of atomic orbital (s, p, d, f orbital)

12.7 Explain the energy level diagram.

13. Understand the modern periodic table.

13.1 State the periodic law of elements.

13.2 Describe the modern long periodic table.

13.3 Explain the limitations of periodic table.

13.4 Explain the positions of hydrogen in the periodic table.

13.5 Explain the diagonal relationship of the periodic table.

13.6 Explain the position of transitional elements in the periodic table

13.7 Explain the inert properties of zero group of elements.

14. Understand the modern concept of chemical bonds.

14.1 Define chemical bond.

14.2 List the different types of bonds.

14.3 Explain the modern concept of ionic bonds and variable ionic bond.

14.4 Explain the co-valent bonds, co-ordinate bond, Sigma bond, Pie bond, hydrogen bond, and metallic bond.

14.5 Explain the hybridization and the hybrid bond.

15. Understand the fundamentals of electrolysis.

- 15.1 Explain how the movement of electrons produces positive and negative ions.
- 15.2 Differentiate between electrical conductor and electrolyte.
- 15.3 Explain the process of electrolysis
- 15.4 Explain Arrhenius theory of electrolytic dissociation.
- 15.5 Explain Faraday's laws of electrolysis.
- 15.6 List at least four Industrial applications of electrolysis.

16. Understand pH value, Acidimetry and Alkalimetry.

- 16.1 Explain the concept of pH.
- 16.2 Explain pH scale and its uses.
- 16.3 Discuss about the acidimetry and alkalimetry.
- 16.4 Explain acidbase titration.
- 16.5 Explain the method of preparation of normal solutions.
- 16.6 Explain the concept of indicators and their uses.
- 16.7 Explain buffer solutions and their working mechanism.

17. Understand the manufacturing process of nitric acid, sulfuric acid, hydrochloric acid halogen.

- 17.1 Compare the chemical and physical properties of nitric acid sulfuric acid and hydrochloric acid.
- 17.2 Show the reaction of different common metals and alkalis to acids.
- 17.3 Define halogen.
- 17.4 Identify the properties and uses of halogen.
- 17.5 Outline the effects on the environment of the manufacturing and uses of nitric acid, sulfuric acid, chlorine and hydrochloric acid.

18. Understand the production of ammonia and carbon dioxide.

- 18.1 Explain the methods of production of ammonia.
- 18.2 Explain the properties of ammonia.
- 18.3 Show the reaction of ammonia as a base to acids and acid to base.
- 18.4 Show how the process in 18.3 can be reversed.
- 18.5 Describe the nitrogen cycle.
- 18.6 Compare the properties of CO and CO₂
- 18.7 List the uses of carbon dioxide and outline its effects on the environment.

19. Understand the extraction and refining process for Iron, Copper, zinc and Aluminum.

- 19.1 Compare the chemical reactions created during smelting and production process used for the conversion of ores to metal
- 19.2 Compare the properties of metal and non-metal.
- 19.3 Define (i) ores (ii) roasting (iii) calcination (iv) smelting (v) alloy (vi) slag.
- 19.4 Compare the properties of (i) Cast Iron (ii) Iron (iii) Steel (iv) Wrought Iron.
- 19.5 Give names and formulae of important ores of Iron, Copper, Aluminum and Zinc.
- 19.6 Outline the environment effects of mining and refining of common metals.

Practical :***OBSERVATION AND MEASUREMENT***

1. Measure the pH value of unknown solutions to classify them as neutral acidic or alkalis.
2. Prepare a decinormal solution of sodium bicarbonate.
3. Find out the end point of an acid-base reaction using suitable indicator

QUALITATIVE ANALYSIS OF KNOWN SALTS

4. Perform test tube tests for the known salt samples Copper salt, Iron salt, Lead salt, Aluminum salt, ammonium salt, etc,
5. Perform charcoal oxidation and reduction test for the different salt e.g. such as Lead salt, Copper salt, Iron salt, Calcium salt, etc.
6. Perform tests to detect unknown basic radicals e.g. Lead, Copper, Iron Calcium, Zinc, Magnesium, Ammonium and Sodium.
7. Perform tests to detect unknown acid radicals e.g. chloride, nitrate, carbonate and sulphate.

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উদ্দেশ্য

- ১। মাতৃভাষা হিসেবে বাংলার প্রকৃতি ও বৈশিষ্ট্য সম্পর্কে ধারণা লাভ।
- ২। ভাষা দৰতাসমূহের (Language skills) প্রায়োগিক যোগ্যতা অর্জন।

সংবিষ্ট বিরণী

ভাষার প্রকৃতি ও বৈশিষ্ট্য; ভাষার শৈল উপাদান; বাংলা ভাষারীতির বিভিন্নতা; বানানঘটিত সমস্যা; ধ্বনি প্রকরণ; ভাষার ধ্বনিগ্রাহ্য রূপ- শোনা ও বলা; ভাষার দৃষ্টিগ্রাহ্য রূপ- পড়া লেখা।

বিশদ বিবরণী

- ১। ভাষার প্রকৃতি ও বৈশিষ্ট্য
 - ১.১ সমাজ বন্ধনের প্রথম ও প্রধান সূত্র হিসেবে ভাষা
 - ১.২ শারীর উপাদান ও মনোজাগতিক চাহিদা
 - ১.৩ জীবনের বিকাশ ও বৈচিত্র্য
 - ১.৪ সমাজ সভ্যতা ও সংস্কৃতির অগ্রযাত্রা
- ২। ভাষার শৈল উপাদান সম্পর্কিত জ্ঞান ও ব্যবহারিক কুশলতা
 - ২.১ ধ্বনি ও বর্ণ
 - ২.২ ধ্বনি উপকরণ, বাকপ্রত্যঙ্গ ও উচ্চারণরীতি
 - ২.৩ ধ্বনি সংযোগ ও ধ্বনি পরিবর্তন
 - ২.৪ শব্দ ও পদ, শব্দের গঠন কৌশল
 - ২.৫ সমার্থক শব্দ, প্রতিশব্দ, বিপরীত শব্দ ও অতি ব্যবহৃত শব্দ
 - ২.৬ শব্দের ব্যবহারঃ যথার্থ শব্দ ও শব্দের যথার্থ ব্যবহার, শব্দশ্রীতি ও পরিমিতি বোধ
 - ২.৭ শব্দপুঁজি : ব্যবহারিক বৈশিষ্ট্য ও বৈচিত্র্য, প্রতি দিনের শব্দ, পরিচিত শব্দ, প্রমিত শব্দ, বিষয়ানুগ শব্দ, পারিভাষিক শব্দ।
 - ২.৮ বাক্য : ধ্বনি ও শব্দের সম্মিলন
 - ২.৯ পদবিন্যাস : বাক্যে শব্দের অবস্থান, বাক্যে শব্দের বিশিষ্টার্থ ও ব্যঞ্জনা
 - ২.১০ ভাল বাক্য : সম্ভাব্য ক্রটি ও ভ্রান্তি, শূন্যগর্ভ বাক্য, পুনরুক্তি ও পুনরাবৃত্তি পরিহার, বাক্যের পরিসর- ছোট ও দীর্ঘ বাক্য
 - ২.১১ ভাব/বিষয়বস্তুর প্রয়োজনে বাক্যের বিন্যাস
- ৩। বাংলা ভাষারীতির বিভিন্নতা ও বৈচিত্র্য
 - ৩.১ আঞ্চলিক ভাষারীতি : শব্দ সম্পদ ও প্রাণশক্তি
 - ৩.২ সাধু ভাষারীতি : শব্দ ও ব্যবহারিক বৈশিষ্ট্য (বিদ্যাসাগর, বঙ্কিম চন্দ্র ও রবীন্দ্রনাথ ঠাকুরের রচনা থেকে নমুনা)
 - ৩.৩ চলিত ভাষারীতি : ব্যবহারিক বৈশিষ্ট্য ও বৈচিত্র্য পদক্রম, শব্দ ব্যবহার, শব্দ সংকোচন (সর্বনাম ও ক্রিয়াপদ), প্রবহমানতা ও প্রাণশক্তি (রবীন্দ্রনাথ, প্রমথ চৌধুরী, বুদ্ধদেব বসু, সৈয়দ মুজতবা আলী, কাজী আবদুল ওদুদ প্রমুখ লেখকের রচনা থেকে নমুনা)

- ৪। বানান ঘটিত সমস্যা ও বানান ভুলের প্রবণতা
- ৪.১ বাংলা বর্ণমালা : সঠিক বর্ণরূপ ও গঠন কৌশল
- ৪.২ বাংলা বানানরীতি
- ৪.৩ সমস্যা : বানান ও উচ্চারণ, আঞ্চলিকতা, পরানুকরণ, হীনমন্যতা
- ৫। ধ্বনি প্রকরণ ও ধ্বনির উচ্চারণ
- ৫.১ ব্যঞ্জন ধ্বনি : বর্গীয় ধ্বনির উচ্চারণ স্থান
- ৬। ভাষার ধ্বনিগ্রাহ্য রূপ : শোনা ও বলা
- ৬.১ কথোপকথন, আলোচনা
- ৬.২ বক্তৃতা ও বিতর্ক
- ৬.৩ গল্প বলা
- ৬.৪ ঘটনা বর্ণন ও প্রতিবেদন উপস্থাপন
- ৬.৫ মৌখিক উপস্থাপনে উদ্দীপকের বৈচিত্র (Stimulus Variation) স্বাসাঘাত, স্বরতরঙ্গ, মীড়, স্বর, স্বাভাষিক গতি ও স্বরভঙ্গি।
- ৬.৬ মৌখিক উপস্থাপন ও দর্শন-সামগ্রীর সমন্বিত রূপ
- ৬.৭ পরিমিতিবোধ, প্রসঙ্গান্তর ও প্রবেশণরীতি, শান্তি উক্তি ও রসবোধ
- ৭। ভাষার দৃষ্টিগ্রাহ্য রূপ : পড়া
- ৭.১ শ্রবণ যোগ্যতা, শুদ্ধতা ও স্পষ্টতা
- ৭.২ মুদ্রিত সামগ্রীর অর্থবোধকতা : বই-পুস্তক, পত্র-পত্রিকা, বিজ্ঞাপন, সংকেত ও নির্দেশ
- ৭.৩ নীরব পঠন ও মন অনুধাবন এবং সংযোজিত ও সম্প্রসারিত উপস্থাপন
- ৭.৪ চিঠিপত্র, দরখাস্ত ও দলিল পাঠ
- ৮। ভাষার দৃষ্টিগ্রাহ্য রূপ : লেখা
- ৮.১ লেখার বৈশিষ্ট্য : স্পষ্ট ও পরিচ্ছন্ন লেখা (পঠন যোগ্যতা), নির্ভুলতা (শুদ্ধ বানান ও বাক্য গঠন), গতি ও স্বাচ্ছন্দ্য-টানা লেখা, টাইপ লেখা, সমতা ও দূরত্ব
- ৮.২ হস্তাবরের গঠন বৈচিত্র (Calligraphy)
- ৮.৩ প্রকাশরমতার মাধ্যম হিসেবে লেখা : বাক্য গঠন; অনুচ্ছেদ রচনা, প্রবন্ধ রচনা-বিশেষ বক্তব্য ও উপস্থাপনে প্রতিবেদন (সূচনা, মধ্যভাগ ও উপসংহার) এর খসড়া প্রস্তুত ও চূড়ান্তকরণ; সারাংশ লিখন; শ্রবত লিখন ও নোট গ্রহণ; ভাব সংকোচন ও সম্প্রসারণ; ঘোষণা ও বিজ্ঞপ্তি প্রদান; পাঠককে আকৃষ্ট ও উদ্দীপিত করা (Persuading the readers)

1112

ENGLISH – I

T P C
2 0 2**OBJECTIVES :**

After The Completion Of The Course, Learners Will Be Able To Develop-

- * Listening With Understanding
- * The Fluency Of Speech
- * Reading With Understanding
- * Grammatical Accuracy With Emphasis On Spelling & Punctuation
- * Creative Writing
- * Transferring Information
- * Communicating Effectively

Contents**Seen Comprehension**

Unit	Lesson	Title
<i>Three:</i> Learning English	1	Learning A Language
	2	Why Learn English
	3	How To Learn English
<i>Six:</i> Our Environment	1	The Environment And The Ecosystem
	2	How The Environment Is Polluted
	7	How To Manage Waste
<i>Seven:</i> Disasters We Live With	4	Erosion
	5	The Shake And The Quake
<i>Eight:</i> Towards Social Awareness	2	Waste Not, Want Not
	3	Isn't It Too Loud!
<i>Ten:</i> Entertainment	4	Entertainment Through The Ages
<i>Twelve:</i> Personalities	4	The Man Behind The Shaheed Minar

N.B: The Unit Mentioned Refers To The Text Book (1st Paper) English For Today For Class 11 – 12 By National Curriculum & Text Book Board, Dhaka.

Grammar & Composition

1. Use Of Parts Of Speech ; Articles; Phrasal Verbs; Voice; Tense; Agreement Of Verbs With The Subject
2. Sentence : A) Phrases And Clauses & Sentence Structure (Assertive, Interrogetive, Optative, Imperative, Exclamatory, Simple, Complex And Compound)
B) Question Making: Wh, Yes/No, Tag Question

3. Verbs: A) Classification Of Verbs - Auxiliary/Modal, Principal, Transitive, Intransitive, Causative
B) Right Form Of Vervs With Indicators
4. Enriching Vocabulary: Synonyms, Antonyms, Homophones & Homonyms
5. Changing Parts Of Speech & Uses Of Suffix And Prefix

Guided Writing

Writing A Guided Paragraph With Questions.

PEd 111 PHYSICAL EDUCATION**T P C**
0 1 1

OBJECTIVES

This subject is intended

- To enhance body fitness.
- To make aware of first aid procedure.
- To acquaint with the common games and sports.

SHORT DESCRIPTION

Warming up; Yoga, Muscle developing with equip ments; First aid; Games and sports.

1. Practice warming up

1.1 General Warming-up :

Head rotation, Hand rotation, Side twisting, Toe touching, Hip rotation, Keen twisting, Ankle twisting, Push up & sit up.

1.2 Squad Drill :

Line, File, Attention, Stand at easy, Stand easy, Left turn, Right turn , About turn, Mark time, Quick march, Right wheel, Left wheel, Open order march & Closed order march.

1.3 Specific warning up :

Legs raising one by one, Legs raising in slanting position, Knee bending and nose touching, Heels raising, Toes touching & Laying position.

1.4 Mass Physical Exercise (Free hand) :

Hand raising, Side twisting, Front & back bending, Front curl, Straight arms curl two hands, Hands raising overhead and Push up & Push down.

2. Yoga

2.1 Dhyanasan :

Shabasan, Padmasan, Gomukhasan, Sharbangasan, Shirshsan.

2.2 Shasthyasan :

Halasan, Matshasan, Paban Muktasn, Ustrasn

3. Practice muscle developing with equipment

3.1 Dambal :

Front curl, Hand sidewise stretching, Arms raising overhead.

3.2 Barball :

Front press, Leg press, Rowing motion with leverage bar .

3.3 Rope climbing :

Straight way climbing, Leg raising climbing.

3.4 Horizontal bar :

Chinning the bar front grip, Chinning the bar wide back grip.

3.5 Jogging Machine :

Slow, medium, and fast running.

3.6 Rowing Machine :

Toe touching with knee bending

3.7 Multigym Machine :

Leg press, Back press.

4. First aid

4.1 Primary prevention of electric shock, Snakes biting, Driving patient burning patient.

4.2 Bandage Binding : Arm sling, Heel, Finger, Knee, Hip, Head, Ring pad.

5. Games and sports

5.1 Football :

Should trap, Thigh trap, Abdomen trap, Chest trap, Heading, Shorting, tackling, tacking, Goal keeping.

5.2 Cricket :

Balling, Batting, wicket keeping, fielding.

5.3 Handball :

Catch the ball, Ball pass (all kinds of pass), Attack, Drill, Shorting

5.4 Volleyball :

Service, Dig receive and pass, Busting, Smashing, Blocking.

5.5 Badminton :

Gripping, Service, Receive, Smashing, Foot working.

5.6 Athletics :

Track events, Field events.

4- YEAR

DIPLOMA-IN- JUTE ENGINEERING PROGRAM

SYLLABUS

SECOND SEMESTER

TT 212

TEXTILE RAW MATERIALS-II

T P C
2 0 2***AIMS***

1. To develop the knowledge of different chemical fibres.
2. To enable the student a clean idea of viscose rayon fibres.
3. To make understand the basic knowledge of polyester fibres.
4. To develop the basic knowledge of polyamide, Acrylic & Spandex fibres.

SHORT DESCRIPTION

Basic idea of different chemical fibres; Viscose rayon fibres; Cellulose acetate rayon fibres; Polyamide fibres; Polyester fibres; Acrylic fibres; Polypropylene fibres; Spandex fibres.

DETAIL DESCRIPTION**Theory :**

- 1. Understand the chemical (Synthetic) fibres.**
 - 1.1 Define chemical fibre.
 - 1.2 Mention the classification of man-made fibres.
 - 1.3 List the names of different regenerated fibres.
 - 1.4 List the names of different chemical fibres.

- 2. Understand the viscose rayon (re-generated) fibre.**
 - 2.1 State the term “Re-generated fibre”.
 - 2.2 Mention the raw materials of viscose rayon fibre.
 - 2.3 Mention the flow-sheet for preparation of viscose rayon fibre.
 - 2.4 Describe the steps for production of viscose rayon fibre.
 - 2.5 Mention the physical properties of viscose rayon fibre.
 - 2.6 Discuss the chemical properties of viscose rayon fibre.
 - 2.7 Mention the end-uses of viscose rayon fibre.

3. Understand the cellulose acetate rayon fibre.

- 3.1 Define Cellulose acetate rayon fibre.
- 3.2 Mention the raw materials of cellulose acetate rayon fibre.
- 3.3 Mention the flow-chart for production of cellulose acetate rayon fibre.
- 3.4 Describe the production of cellulose acetate rayon fibre.
- 3.5 Mention the physical properties of cellulose acetate rayon fibre.
- 3.6 Discuss the chemical properties of cellulose acetate rayon fibre..
- 3.7 Mention the end-uses of cellulose acetate rayon fibre.

4. Understand the polyamide fibre.

- 4.1 Define polyamide fibre.
- 4.2 List the different chemicals required for the production of polyamide fibre.
- 4.3 Discuss the nomenclature of Nylon-6 fibre.
- 4.4 Mention the raw materials for Nylon-6 fibre.
- 4.5 Mention the flow-chart for preparation of Nylon-6 fibre.
- 4.6 Describe the production of Nylon-6 fibre.
- 4.7 Mention the physical properties of Nylon-6 fibre.
- 4.8 Mention the end-uses of Nylon-6 fibre.

5. Understand the Nylon-6.6 fibre.

- 5.1 State the term of Nylon-6.6 fibre.
- 5.2 Discuss the nomenclature of Nylon-6.6 fibre.
- 5.3 Mention the raw materials for Nylon-6.6 fibre.
- 5.4 Mention the flow-sheet for production of Nylon-6.6 fibre.
- 5.5 Describe the production of Nylon-6.6 fibre.
- 5.6 Mention the physical properties of Nylon-6.6 fibre.
- 5.7 Discuss the chemical properties of Nylon-6.6 fibre.
- 5.8 Mention the end-uses of nylon-6.6 fibre.

6. Understand the Polyester fibre.

- 6.1 State the term ``Ester & Polyester``.
- 6.2 List the chemicals for production of different polyester fibres.
- 6.3 Mention the flow-chart for production of PET Polyester fibre.
- 6.4 Describe the production of PET Polyester fibre.

- 6.5 Mention the physical properties of polyester fibre.
- 6.6 Discuss the chemical properties of polyester fibre.
- 6.7 Discuss the end-uses of polyester fibre.

7. Understand the Acrylic fibre.

- 7.1 State the term “Acrylic” fibre.
- 7.2 Mention the raw materials of acrylic fibres.
- 7.3 Mention the flow-chart for production of acrylic fibre.
- 7.4 Discuss the production of acrylic fibre.
- 7.5 Mention the physical properties of acrylic fibre.
- 7.6 Discuss the chemical properties of acrylic fibre.
- 7.7 Describe the end-uses of acrylic fibre.

8. Understand the polypropylene fibre.

- 8.1 Mention the raw materials for polypropylene fibre.
- 8.2 Mention the flow-chart for preparation of polypropylene fibre.
- 8.3 Discuss the production of polypropylene fibre.
- 8.4 Mention the physical properties of polypropylene fibre.
- 8.5 Mention the chemical properties of polypropylene fibre.
- 8.6 Discuss the uses of polypropylene fibre.

9. Understand the “Spandex” fibre.

- 9.1 Mention the raw materials of “Spandex” fibre.
- 9.2 Mention the flow-sheet for production of spandex fibre.
- 9.3 Describe the production of spandex fibre.
- 9.4 Discuss the physical properties of spandex fibre.
- 9.5 Mention the chemical properties of spandex fibre.
- 9.6 Mention the end-uses of spandex fibre.

REFERENCE BOOKS

- 1. Textiles fiber of fabric.- Bernard P. Corbman.
- 2. Man made fibres. - R.W. Moncrieff.
- 3. Textile science. - J. T Marsh.
- 4. Polyester textile. - The Textile Association.
- 5. Textile Fibre - Engr. Md. Mohibul Islam.

TT 224

GENERAL TEXTILE PROCESSES-II

T P C
3 3 4***AIMS***

To provide the students with an opportunity to acquire knowledge, skill & attitude in the area of wet processing & Garments manufacturing.

SHORT DESCRIPTION

Basic idea of Wet processing ; Singeing ; De-sizing ; Scouring ; Bleaching ; Dyeing ; Printing ; Finishing ; Basic idea of garments manufacturing; Pattern making ; Sample ; Marker ; Cutting ; Sewing ; Garment finishing.

DETAIL DESCRIPTION**Theory****10. Understand the basic idea of wet process.**

- 10.1 Define wet process.
- 10.2 Classify wet process system.
- 10.3 Mention the flow-chart of wet process for yarn.
- 10.4 Mention the flow-chart of wet process for cotton cloth.
- 10.5 Mention the flow-chart of wet process for synthetic cloth.
- 10.6 Mention the flow-chart of wet process for blended cloth.

2. Understand the basic idea of singeing.

- 2.1 Define singeing.
- 2.2 Mention the purposes of singeing.
- 2.3 Describe the classifications of singeing.

3. Understand the basic idea of De-sizing.

- 3.1 Define de-sizing.
- 3.2 Mention the purposes of de-sizing.
- 3.3 State the classifications of de-sizing methods.

4. Understand the basic idea of scouring.

- 4.1 Define scouring.
- 4.2 Mention the purposes of scouring.
- 4.3 State the methods and machines used for scouring.
- 4.4 List the ingredients used in scouring.

5. Understand the basic idea of bleaching.

- 5.1 Define bleaching.
- 5.2 Mention the purposes of bleaching.
- 5.3 State the classification of bleaching.
- 5.4 List the oxidizing and reducing bleaching agents.
- 5.5 Describe the criteria of selection bleaching agents.

6. Understand the basic idea of dyeing.

- 6.1 Define colour, dye & dyeing.
- 6.2 Mention the purposes of dyeing.
- 6.3 List the commercially important dyes with their commercial names.
- 6.4 Mention the classification of dyes & their areas of application.
- 6.5 Describe general idea of dyeing.

7. Understand the basic idea of printing.

- 7.1 Define printing.
- 7.2 Mention the purposes of printing.
- 7.3 List the methods of printing.
- 7.4 Name the ingredients of printing paste.
- 7.5 Describe general idea of printing.

8. Understand the basic idea of Finishing.

- 8.1 Define textile finishing.
- 8.2 Mention the purposes of textile finishing.
- 8.3 Describe classification of finishing treatment.
- 8.4 General idea of textile finishing.

9. Understand the basic idea to garments manufacture.

- 9.1 Discuss the history of garment industry in Bangladesh.
- 9.2 State the flow chart of garment manufacturing process.
- 9.3 Describe the garments symbols.

10. Understand the basic idea of Pattern making.

- 10.1 State pattern.
- 10.2 State the purposes of pattern making.
- 10.3 Mention the types of pattern.

11. Understand the basic idea of sample.

- 11.1 Define sample.
- 11.2 State the objectives of sample.
- 11.3 Mention the types of sample.
- 11.4 State the approval, Production and shipment sample.

12. Understand the basic idea of marker.

- 12.1 Define marker.
- 12.2 Mention the purposes of marker.
- 12.3 State the methods of marker making.

13. Understand the basic idea of cutting.

- 13.1 Define cutting.
- 13.2 Mention the purposes of cutting.
- 13.3 State the types of fabric cutting.
- 13.4 Mention the carefulness of cutting.

14. Understand the basic idea of sewing.

- 14.1 Define sewing.
- 14.2 Mention different types of sewing.
- 14.3 State the lock stitch and chain stitch.

15. Understand the basic idea of garments finishing.

- 15.1 Define garments finishing.
- 15.2 Mention the purposes of garments finishing.
- 15.3 List the steps of garments finishing.

Practical**Wet process**

1. Identify wet processing machines.
2. Show the fabric path through jigger machine
3. Sketch the sample dyeing m/c and mention its parts.
4. Sketch the winch dyeing m/c and mention its parts.
5. Sketch the Sample printing m/c and mention its parts.
6. Sketch the Sample washing m/c and mention its parts.
7. Show the Printing table, hand block, screen for printing.

Garments Manufacturing

1. Identify the garments manufacturing machines.
2. Identify the tailoring accessories viz. Scissors, Cloth measuring tape, Shape card, Tailoring chalk, Sewing needle, Sewing thread package etc.
3. Practice a general sewing machine with out yarn.
4. Practice fabric cutting procedure.
5. Practice fabric sewing procedure.
6. Practice general sewing with yarn.

REFERENCE BOOKS

1. Manual of cotton Spinning volume 1& II : Byerley and Buckley.
2. Technology of Tex Processing vol-1 : DR. V. A. Shenai
3. General Textile Processing (BTEB) : Engr. Alauddin Khalifa

WP 111

WORKSHOP PRACTICE

T P C

0 3 1

OBJECTIVES

To provide the students with an opportunity to acquire knowledge and skills to :

- Perform different metal & fitting works.
- Perform basic welding works.
- Use and take care of fitting and welding tools & equipment.

SHORT DESCRIPTION

Fitting : Common hand tools; Measuring instruments; Laying out; Sawing chipping, filing, grinding and finishing, drilling and thread cutting; Safety precautions.

Welding : Arc welding; Gas welding; Welding with non-ferrous metal; Gas metal cutting; Resistance welding; precautions.

DETAIL DESCRIPTION**Practical :**

- 1. Demonstrate the application of basic metal working hand tools.]**
 - 1.1 Identify common hand tools used for metal and fitting works.
 - 1.2 Check hand tools for sharpness.
 - 1.3 Carryout minor maintenance and sharpening of tools used for fitting works.
 - 1.4 Follow safe procedure during working in the fitting shop.

- 2. Demonstrate the application of measuring instruments and gages for bench work.**
 - 2.1 Identify the measuring and layout tools.
 - 2.2 Take measurement with vernier caliper and micrometer.
 - 2.3 Measure and layout a fitting job.

- 2.4 Check/measure with gages (sheet and wire gage, drill gage, etc).
- 3. Demonstrate the application of machines and equipment for fitting works.**
 - 3.1 Identify machines and equipment for specific use.
 - 3.2 Take care and maintenance of machines and equipment used in the fitting shop.
- 4. Show skill in sawing, chipping, filing, drilling and reaming.**
 - 4.1 Identify the operations of sawing, chipping, filing, drilling and reaming.
 - 4.2 Perform sawing, chipping, filing drilling and reaming operations.
 - 4.3 Make a job involving sawing, Chipping, filing, drilling and reaming operations (Hinge, Angle gage, etc).
 - 4.4 Follow safe procedures during sawing, chipping, filing, drilling and reaming.
- 5. Show skill in cutting threads.**
 - 5.1 Identify the taps and dies.
 - 5.2 Cut internal and external threads with tap and die.
 - 5.3 Follow safe procedures during working with taps and dies.
- 6. Show skill in making sheet metal jobs.**
 - 6.1 Select appropriate sheet metal.
 - 6.2 Select tools and equipment for sheet metal works.
 - 6.3 Layout the sheet for jobs.
 - 6.4 Make wire edge.
 - 6.5 Make seam joint.
 - 6.6 Make mug/measuring can/sugar scoup, etc.
- 7. Show skill in making pipe and duct.**
 - 7.1 Estimate the sheets required for pipe and duct.
 - 7.2 Layout a sheet for pipe and duct.
 - 7.3 Make pipe and duct.
 - 7.4 Take care during making pipe and duct.

8. Show skill in soldering and brazing.

- 8.1 Select tools and equipment for soldering and brazing.
- 8.2 Make soldering and brazing joint.
- 8.3 Take care during soldering and brazing.

9. Show skill in arc welding.

- 9.1 Select welding tools and equipment.
- 9.2 Prepare workpiece for welding joint.
- 9.3 Select proper current and voltage for arc welding.
- 9.4 Select appropriate electrodes.
- 9.5 Make arc welding joints (Lap, Butt, Tee, Corner, etc.)
- 9.6 Follow safe working procedures during arc welding.

10. Show skill in welding by gas.

- 10.1 Select tools and equipment for gas welding.
- 10.2 Select appropriate filler rod and flux.
- 10.3 Select appropriate flame for welding.
- 10.4 Make gas welding joints (Lap, Butt, Tee, Corner, etc)
- 10.5 Follow safe working procedures during arc welding.

11. Show skill in cutting metal by gas.

- 11.1 Select tools and equipment for cutting metal by gas.
- 11.2 Select the appropriate flame for cutting.
- 11.3 Cut metal by gas.
- 11.4 Follow safe working procedures during cutting metal by gas.

12. Show skill in resistance welding.

- 12.1 Identify the resistance welding machines.
- 12.2 Identify accessories and tools for resistance welding.
- 12.3 Make spot welding joints.
- 12.4 Follow safe working procedures during working with spot welding machine.

REFERENCE BOOKS

1. Basic Sheet Metal Practice
—— J. W. Giachino
2. Prathomic Fitting Sikkha
—— Hemanta kumar Bhattacharia
3. Welding Principles for Engineers
—— Morris
4. Metal Fabrication
—— Robert L. O' con
5. Sheet Metal Work
—— Blackburn & Cassidy

1421

MATHEMATICS – II

T	P	C
3	3	4

OBJECTIVES

- To enable in solving the simultaneous equations with the help of determinant.
- To make understand the binomial expansion for negative and fractional index.
- To enable to calculate the areas of regular polygons , hexagons, octagon, hydraulic mean depth (HMD) of a channel, area occupied by water of circular culvert. excavation work.
- To provide the ability to calculate volume of regular solids like pyramid frustum of pyramid, prismoid, wedge and area of curved surfaces .

SHORT DESCRIPTION

Algebra: Determinants, Partial Fractions, Binomial theorem for negative integral index, Exponential Series.

Trigonometry: Inverse circular functions, Properties of triangle and solution of triangles.

Menstruation: Area of rectangles, squares, triangles, quadrilaterals, parallelograms, rhombus, trapezium, circle, sector, segment; Volume of rectangular solids, prism, parallelepiped , pyramids, cones , spheres, frustum of pyramid and cone; Area of curved surface of prism. Cylinder cone, pyramid and frustum of cone.

DETAIL DESCRIPTION**ALGEBRA :****1 Apply determinants to solve simultaneous equations.**

- 1.1 Expand a third order determinant.
- 1.2 Define minor and co-factors.
- 1.3 State the properties of determinants.
- 1.4 Solve the problems of determinants.

1.5 Apply Cramer's rule to solve the linear equation.

2 Apply partial fraction to break the numerator and denominator.

2.1 Define proper and improper fractions.

2.2 Resolve in to partial fraction of the followings types :

- Denominator having a non-repeated linear factor.
- Denominator having a repeated linear factor.
- Denominator having a quadratic factors.
- Denominator having a combination of repeated, non-repeated and quadratic factors .

3 Solve problems using binomial theorem

3.1 Write down the binomial theorem for negative and fractional index.

3.2 Solve problems of the followings types:

Expand i) $(1 - nx)^{-\frac{1}{n}}$ ii) $\frac{1}{\sqrt{4.08}}$

4 Understand exponential series.

4.1 Define e.

4.2 Prove that e is finite and lies between 2 and 3.

4.3 Prove that $e^x = 1 + \frac{x}{L^1} + \frac{x^2}{L^2} + \frac{x^3}{L^3} + \frac{x^4}{L^4} + \dots$ to ∞

4.4 Solve problems of the followings types :

i) $1 + \frac{1}{L^2} + \frac{1}{L^4} + \frac{1}{L^6} + \dots$ to ∞

ii) $\frac{1}{L^2} + \frac{1+2}{L^3} + \frac{1+2+3}{L^4} + \frac{1+2+3+4}{L^5} + \dots$ to ∞

TRIGONOMETRY

5 Apply the concept of inverse circular function.

5.1 Explain the term inverse circular function and principal value of a trigonometrical ratio.

5.2 Deduce mathematically the fundamental relations of different circular functions.

5.3 Convert a given inverse circular function in terms of other functions.

5.4 Prove mathematically

i) $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \frac{x+y}{1-xy}$.

ii) $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \tan^{-1} \frac{x+y+z-xyz}{1-xy-yz-zx}$

iii) $\sin^{-1} x + \sin^{-1} y = \sin^{-1} \left(x\sqrt{1-y^2} + y\sqrt{1-x^2} \right)$

$$\text{iv) } 2 \tan^{-1} x = \sin^{-1} \frac{2x}{1+x^2} = \cos^{-1} \frac{1-x^2}{1+x^2} = \tan^{-1} \frac{2x}{1-x^2}$$

5.5 Solve problems of the following types.

$$\text{a) } 2 \tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{4} = \frac{\pi}{4}$$

$$\text{b) } \cos \tan^{-1} \cot \sin^{-1} x = x.$$

c) Prove that the area of the segment cut from a circle of radius r by a chord at a distance d from the centre is given by $K = r^2 \cos^{-1} \frac{d}{r} - d\sqrt{r^2 - d^2}$

6 Apply the principle of properties of triangles.

6.1 Prove the following identities :

$$\text{i) } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R.$$

$$\text{ii) } a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{iii) } a = b \cos C - c \cos B.$$

$$\text{iv) } \Delta = \frac{1}{2} bc \sin A.$$

6.2 Establish the followings.

$$\text{a) } \tan \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$$

$$\text{b) } \tan \frac{B-C}{2} = \frac{b-c}{b+c} \cot \frac{A}{2}$$

$$\text{c) } \Delta = \frac{abc}{4R}$$

6.3 Solve the problems of the following types:

$$\text{i) } \text{Prove } \cos(B - C) + \cos A = \frac{bc}{2R}$$

ii) An object experiences two forces F_1 and F_2 of magnitude 9 and 13 Newtons with an angle 100° between their directions. Find the magnitude of the resultant R .

7 Apply the concept of area of triangle.

7.1 Find the area of triangle in the form,

$$\text{i) } A = \frac{\sqrt{3}}{4} a^2, \text{ } a = \text{length of a side of equilateral triangle.}$$

$$\text{ii) } A = \frac{c}{4} \sqrt{4a^2 - c^2}, \text{ where } a = \text{length of equal sides,} \\ c = \text{third side.}$$

- iii) $A = \sqrt{s(s-a)(s-b)(s-c)}$, where a, b, c = length of the sides of a triangle and $2s$ is the perimeter of the triangle.

7.2 Use formula in 7.1 to solve problems.

8 Apply the concept of finding areas of quadrilateral & Parallelogram.

- 8.1 Define quadrilateral & Parallelogram.
 8.2 Find the areas of quadrilateral when off sets are given.
 8.3 Find the areas of a parallelogram.
 8.4 Solve problems using above formulae.

9 Apply the concept of finding areas of rhombus & trapezium.

- 9.1 Define rhombus & trapezium.
 9.2 Find the areas of rhombus when the diagonals are given.
 9.3 Find the areas of trapezium in terms of its parallel sides and the perpendicular distance between them.
 9.4 Solve problems related to rhombus & trapezium.

10 Apply the concept of finding areas of regular polygon.

- 10.1 Define a regular polygon.
 10.2 Find the area of a regular polygon of n sides, when
 i) the length of one side and the radius of inscribed circle are given.
 ii) the length of one side and the radius of circumscribed circle are given.
 10.3 Find the area of a regular .
 a) hexagon
 b) octagon
 when length of side is given.

10.4 Solve problems of the followings types:

A hexagonal polygon 6 m length of each side has a 20 cm width road surrounded the polygon. Find the area of the road.

11 Understand areas of circle , sector and segment.

- 11.1 Define circle, circumference, sector and segment.
 11.2 Find the circumference and area of a circle when its radius is given.
 11.3 Find the area of sector and segment of a circle.
 11.4 Solve problems related to the above formulae.

12 Apply the concept of volume of a rectangular solid.

- 12.1 Define rectangular solid and a cube.
 12.2 Find geometrically the volume of a rectangular solid when its length, breadth and height are given.

- 12.3 Find the volume and diagonal of a cube when side is given.
- 12.4 Solve problems with the help of 12.2 & 12.3.
- 13 Apply the concept of the volume of a prism and a parallelepiped.**
 - 13.1 Define a prism, parallelepiped and a cylinder.
 - 13.2 Find the volume of prism, parallelepiped and cylinder when base and height are given.
 - 13.3 Solve problems related to 13.2.
- 14 Apply the concept of the volume of pyramid, cone and sphere.**
 - 14.1 Define pyramid, cone and sphere.
 - 14.2 Explain the formula for volume of pyramid, cone and sphere.
 - 14.3 Solve problems related to 14.2.
- 15 Apply the concept of surface area of prism, cylinder and cone.**
 - 15.1 Explain the formulae for areas of curved surfaces of prism cylinder and cone.
 - 15.2 Solve problems related to 15.1.

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PHYSICS–II

T P C
2 3 3**AIMS**

- To provide a foundation in scientific principles and processes for the understanding and application of technology.
- To develop an understanding of fundamental scientific concepts through investigation and experimentation.
- To provide a common base for further studies in technology and science.
- To develop a working knowledge of physical properties, behavior and uses of common engineering materials.
- To develop basic knowledge of the effects of energy on the properties of common engineering materials.

SHORT DESCRIPTION

Heat: Thermometry; Calorimetry, Expansion of materials (effect of heat); Heat transfer; Nature of heat and its mechanical equivalent; Engine.

Light : Principles of light and Photometry; Reflection of light; Refraction of light ; Optical instruments; Dispersion of light, color and spectrum; Nature and theories of light.

DETAIL DESCRIPTION**Theory :****HEAT****THERMOMETRY****1 Understand the basic concept of thermometry.**

- 1.1 Define heat and temperature.
- 1.2 Mention the units of measurement of heat and temperature.
- 1.3 Distinguish between heat and temperature.
- 1.4 Mention the kinds of heat.
- 1.5 Identify the sources of heat.
- 1.6 Explain the effects of heat on a body.

- 1.7 Solve problems relating to thermometry.
- 1.8 Identify the range of the Celsius scale determined by the boiling point and melting point of water
- 1.9 Compare the Celsius scale, Roamer scale, Fahrenheit scale, Kelvin scale and Rankin scale of temperature measurement.

2 Understand the features of thermometers.

- 2.1 State the construction and graduation of a mercury thermometer.
- 2.2 Describe the operation of different types of thermometers (e.g., maximum and minimum thermometer, clinical thermometer).
- 2.3 Mention the application of different types of thermometers (e.g., maximum and minimum thermometer, clinical thermometer).

HEAT CAPACITY OF MATERIALS (CALORIMETRIC)

3 Understand the concept of specific heat.

- 3.1 State the heat as a form of energy.
- 3.2 Define specific heat capacity.
- 3.3 State SI units of measurement of specific heat capacity as J/Kgc^0 or J/Kgk^0 .
- 3.4 Define thermal capacity and water equivalent.
- 3.5 Differentiate between thermal capacity and water equivalent.
- 3.6 Mention the specific heat capacity of different materials.
- 3.7 Prove the total heat gained by an object is equal to the sum of the heat lost by all the surrounding objects.
- 3.8 Identify the total heat gained and the total heat lost in a given system.
- 3.9 Solve the problems relating to specific heat.

4 Understand the concept of latent heat.

- 4.1 Identify specific latent heat as the energy consumed or liberated when water vaporizes or condenses and when ice melts or freezes.
- 4.2 Explain the effects of a change in pressure on the melting point and boiling point of water.
- 4.3 Define various kinds of specific latent heat.
- 4.4 Determine the latent heat of fusion and vaporization from given data.
- 4.5 Solve problems relating to latent heat.

EFFECTS OF HEAT ON DIMENSION OF MATERIALS

5 Understand the effects of heat on solids.

- 5.1 Show that different materials change in size at different amounts with the same heat source.
- 5.2 Explain the meaning of differential expansion in bimetallic strip, thermostats, compensated pendulum etc.
- 5.3 Describe the capacity of bimetallic strip, thermostats and compensated pendulum.

- 5.4 Explain the methods of overcoming problems caused by the expansion of materials in buildings, machinery, railway lines and bridges.
- 5.5 Define the co-efficient of linear, superficial and cubical expansion of solids.
- 5.6 Mention the units co-efficient of linear, superficial and cubical expansion of solids.
- 5.7 Mention the linear, superficial and cubical expansion of a range of common engineering materials.
- 5.8 Solve problems related to effect of heat on solids.

6 Understand the effect of heat on liquids.

- 6.1 Define real and apparent expansion of liquid .
- 6.2 Define the co-efficient of real and apparent expansion of liquid.
- 6.3 Explain the effect of real and apparent expansion of liquid.
- 6.4 Distinguish between the co-efficient of real and apparent expansion of liquid.
- 6.5 Determine the co-efficient of real and apparent expansion of liquid.
- 6.6 Solve problems relating to effects of heat on liquids.

HEAT TRANSFER

7 Understand the of fundamental principles of heat transfer.

- 7.1 Identify the phenomenon of heat transferring from hot bodies to cold bodies.
- 7.2 Explain the methods of heat transfer by conduction, convection and radiation with examples of each type of transfer.
- 7.3 Define thermal conductivity (K) & rate of heat transfer.
State the SI units of thermal conductivity as

$$\frac{W}{mk} \quad \text{or} \quad \frac{W}{mc}$$

- 7.4 List the factors which determine the quantity of heat (Q) flowing through a material.
- 7.5 Show that the quantity of heat flowing through a material can be found from $Q = \frac{KA (\theta_H - \theta_C)t}{d}$
- 7.6 Outline the properties of materials which give thermal insulation.
- 7.7 List practical examples of the application of thermal insulation properties (e.g., refrigerators, vacuum flasks and building insulation).
- 7.8 Solve problems related to heat transfer.

NATURE OF HEAT AND ITS MECHANICAL EQUIVALENT

- 8 Understand the aspects of mechanical equivalent of heat.**
- 8.1 Describe the caloric theory and kinetic theory of heat.
 - 8.2 State the drawbacks of the caloric theory of heat.
 - 8.3 Explain the mechanical equivalent of heat.
 - 8.4 Mention the mechanical equivalent of heat.
 - 8.5 Explain the first law of thermodynamics.
 - 8.6 Solve problems relating to the mechanical equivalent of heat.

HEAT ENGINE

- 9 Understand the concept of heat engine.**
- 9.1 State what is meant heat engine.
 - 9.2 Explain the principle of work of a heat engine.
 - 9.3 Identify thermal efficiency of a heat engine.
 - 9.4 Explain the working principles of internal combustion and external combustion engines (with fair sketches).
 - 9.5 Distinguish between internal combustion engine and external combustion engine.
 - 9.6 Distinguish between steam engine and petrol engine.

LIGHT

PRELIMINARIES OF LIGHT AND PHOTOMETRY

- 10 Understand the concept of preliminary light & photometry.**
- 10.1 Define light, medium (transparent, translucent, opaque), luminous & non-luminous bodies, parallel, convergent & divergent rays, beam.
 - 10.2 Show the travel of light in straight line.
 - 10.3 Define photometry, luminous intensity, luminous flux, brightness and illuminating power.
 - 10.4 Mention the units of luminous intensity, luminous flux, brightness and illuminating power.
 - 10.5 Mention relation between luminous intensity & illuminating power.
 - 10.6 Explain inverse square law of light.
 - 10.7 Describe the practical uses of light waves in engineering.
 - 10.8 Solve problems relating to photometry.

REFLECTION OF LIGHT

- 11 Understand the features of reflection of light at plane and spherical surfaces.**
- 11.1 Define mirror (plane & spherical), image (real & virtual) and magnification of images.
 - 11.2 Describe the reflection of light.
 - 11.3 State the laws of reflection of light.
 - 11.4 Express the verification of laws of reflection.
 - 11.5 Define pole, principle axis, center of curvature, radius of curvature, principal focus in case of concave & convex mirrors.

- 11.6 Find the relation between focal length & radius of curvature of a concave & convex mirror.
- 11.7 Express the general equation of concave and convex mirror.
- 11.8 Determine the position, nature and size of the images of an object formed by a spherical mirror when the object is moved from infinity towards the pole of the mirror.
- 11.9 Solve problems relating to reflection of light at plane and spherical surfaces.

REFRACTION OF LIGHT

12 Understand the concept of refraction of light at plane surfaces.

- 12.1 Define refraction of light.
- 12.2 Give examples of refraction of light.
- 12.3 State the laws of refraction.
- 12.4 Express the verification of laws of refraction.
- 12.5 Define absolute and relative refractive index.
- 12.6 Relate absolute and relative refractive index.
- 12.7 Explain the meaning of total internal reflection and critical angle.
- 12.8 Relate total internal reflection and critical angle.
- 12.9 Give examples of total internal reflection.
- 12.10 Describe refraction of light through a prism.
- 12.11 Express the deduction of the relation between refractive index, minimum deviation and angle of the prism.
- 12.12 Solve problems related refraction of light at plane surface.

13 Understand the concept of refraction of spherical surface.

- 13.1 Define lens.
- 13.2 Identify the types of lens.
- 13.3 Define center of curvature, radius of curvature, principal axis, 1st and 2nd principal focus, optical center and power of lens.
- 13.4 Express the deduction of the general equation of lens (concave & convex).
- 13.5 List uses of lens.
- 13.6 Find the position, nature & sizes of Image at different position of an object formed by a lens (convex & concave) when the object is moved from infinity towards the optical center of the lens.
- 13.7 Solve the problems relating to refraction of spherical surface.

OPTICAL INSTRUMENTS

14 Understand the features of telescope & microscope.

- 14.1 Explain the construction of light ray patterns for simple & compound microscope (with diagram).
- 14.2 Explain the construction of light ray patterns for Astronomical & Gallillian telescope (with diagram)
- 14.3 Describe the common defects of eye.
- 14.4 Describe the remedy of common defects of eye.

- 14.5 Distinguish between eye and camera.

DISPERSION OF LIGHT, COLOR AND SPECTRUM

15 Understand the concept of dispersion of light, color and spectrum.

- 15.1 Describe dispersion of light & spectrum.
 15.2 Define pure & impure spectrum.
 15.3 Describe the production of pure spectrum.
 15.4 Identify different types of spectra.
 15.5 Explain emission spectra, absorption spectra and color of bodies.
 15.6 Identify the results of adding primary and secondary color.
 15.7 Explain absorption, reflection and filtration of color light.

Practical:

Heat

1. Compare the operation of common thermometers.
2. Determine the co-efficient of linear expansion of solid by Pullinger's apparatus.
3. Measure the specific heat capacity of various substances.
4. Investigate the latent heat of fusion and vaporization of water.
5. Investigate the effect of heat on the dimensions of solids and liquids.
6. Measure the different rates of expansion of common metals.
7. Determine the water equivalent by calorimeter.

LIGHT

8. Compare the luminous intensity of different light sources.
9. Establish the characteristics of various shaped mirrors by investigating the behavior of light rays reflected from the mirrors.
10. Verify the laws of reflection.
11. Find out the focal length of a concave mirror.
12. Study the behavior of light patterns passing through various lenses for characteristics of the lenses and nature & position of the produced imaged.
13. Determine the refractive index of a material medium.
14. Find out the focal length of a convex lens.

MS 234

CHEMISTRY-II

T P C
3 3 4***OBJECTIVES***

- To provide the students a background of basic science required for understanding wet processing subjects and to develop basic knowledge of organic chemistry and organic compounds
- To develop through experiments the understanding of fundamental scientific concepts which will provide a common base for further studies in science and technology.

SHORT DESCRIPTION

Introduction to organic chemistry; Aliphatic hydrocarbons; Alcohol; Aldehydes and ketones; formaldehyde; Acetaldehyde; Acetone, fatty acids; formic acid; Acetic acid; Dibasic acids; Benzene; Phenol; benzoic acid.

DETAIL DESCRIPTION**Theory :*****INTRODUCTION TO ORGANIC CHEMISTRY***

- 1. Understand the concept of organic chemistry and organic compounds.**
 - 1.1 Define organic chemistry.
 - 1.2 Explain the importances of organic compounds based on their physical and chemical properties.
 - 1.3 Distinguish between organic and inorganic compounds.
 - 1.4 State the importance of organic compounds.
 - 1.5 Explain homologous series of organic compounds.
 - 1.6 List the molecular formulae of methane, ethane propane and butane.
 - 1.7 Mention the structural formula of methane, ethane propane and butane.
 - 1.8 Identify the functional groups of organic compounds.

ALIPHATIC HYDROCARBONS

2. Understand the aliphatic hydrocarbons.

- 2.1 Define hydrocarbon, saturated hydrocarbon and unsaturated hydrocarbon.
- 2.2 Define alkane, alkene and alkynes.
- 2.3 Explain common system, derived system and IUPAC system of nomenclature of organic compounds.
- 2.4 Discuss the methods of preparation, properties and uses of methane, ethane, ethylene and acetylene.

ALCOHOL

3. Understand the alcohol.

- 3.1 Define alcohol.
- 3.2 Mention the functional group of alcohol.
- 3.3 Mention the classification of alcohol.
- 3.4 Describe the preparation of methyl and ethyl alcohol.
- 3.5 Describe the properties of methyl and ethyl alcohol.
- 3.6 Mention the uses of methyl and ethyl alcohol.
- 3.7 State methylated spirit.

4. Understand the Di- and Tri-hydric alcohol.

- 4.1 Define Di- and Tri-hydric alcohol.
- 4.2 State the preparation of glycol.
- 4.3 Mention the physical properties of glycol.
- 4.4 Discuss the chemical reactions of glycol.
- 4.5 Define glycerine.
- 4.6 Mention the source of glycerine.
- 4.7 Discuss the preparation of glycerine.
- 4.8 Mention the physical properties of glycerine.
- 4.9 State the chemical reactions of glycerine.
- 4.10 Mention the uses of glycerine.

5. Understand Aldehydes and Ketone.

- 5.1 Define aldehyde and Ketone.
- 5.2 Define carbonyl group.
- 5.3 Mention the functional groups of aldehydes and ketones.
- 5.4 List some aldehydes and ketones.

FORMALDEHYDE

6. Understand Formaldehyde.

- 6.1 Describe the preparation of formaldehyde.
- 6.2 Mention the physical properties of formaldehyde.
- 6.3 Explain the chemical reactions of formaldehyde.
- 6.4 Mention the uses of formaldehyde.

ACETALDEHYDE

7. Understand Acetaldehyde.

- 7.1 Describe the laboratory method of preparation of acetaldehyde from ethyl alcohol.
- 7.2 Explain the industrial preparation of acetaldehyde.
- 7.3 Mention the physical properties of acetaldehyde.
- 7.4 Explain the chemical reactions of acetaldehyde.
- 7.5 State the uses of acetaldehyde.

ACETONE

8. Understand Acetone.

- 8.1 Describe the laboratory method and industrial method of preparation of acetone.
- 8.2 Mention the physical properties of acetone.
- 8.3 Explain the chemical reactions of acetone.
- 8.4 Explain the similarity and dis-similarity between acetaldehyde and acetone.
- 8.5 State the uses of acetone.

FATTY ACIDS AND THEIR DERIVATIVES

9. Understand Fatty Acids and their Derivatives.

- 9.1 Define Carboxylic acid.
- 9.2 Mention the classification of carboxylic acids.
- 9.3 Mention the reactive group of fatty acids.

FORMIC ACID

10. Understand Formic Acid.

- 10.1 Describe the laboratory method of preparation of formic acid.
- 10.2 Explain the industrial production of formic acid.
- 10.3 Mention the physical properties of formic acid.
- 10.4 Explain the chemical reactions of formic acid.
- 10.5 Mention the uses of formic acids.

ACETIC ACID

11. Understand Acetic Acid.

- 11.1 Describe the laboratory method of preparation of acetic acid.
- 11.2 Explain the industrial production of acetic acid.
- 11.3 Mention the physical properties of acetic acid.
- 11.4 Explain the chemical reactions of acetic acid.
- 11.5 State the uses of acetic acid.

DIBASIC ACIDS

12. Understand Dibasic Acids.

- 12.1 Define dibasic acid.
- 12.2 Describe laboratory method of preparation of oxalic acid.
- 12.3 Explain the industrial production of oxalic acid.
- 12.4 Mention the physical properties of oxalic acid.
- 12.5 Explain the chemical reactions of oxalic acid.
- 12.6 Mention the uses of oxalic acid.

AROMATIC COMPOUNDS AND BENZENE

13. Understand aromatic Compounds and Benzene.

- 13.1 Define aromatic compound.
- 13.2 Mention the characteristics of aromatic compounds.
- 13.3 Mention the source of aromatic compounds.
- 13.4 Describe the methods of preparation of benzene.
- 13.5 Mention the physical properties of benzene.
- 13.6 Mention the uses of benzene.
- 13.7 Mention the derivatives of benzene.
- 13.8 Explain the chemical reactions of benzene.

ANILINE

14. Understand the Aromatic Amines (Aniline).

- 14.1 Define aniline.
- 14.2 Describe the laboratory method of preparation of aniline.
- 14.3 Discuss the industrial preparation of aniline.
- 14.4 Mention the physical properties of aniline.
- 14.5 Explain the chemical reactions of aniline.
- 14.6 Write the uses of aniline.

15. Understand the phenol (Carbolic Acid).

- 15.1 Define phenol.
- 15.2 Describe the industrial production of phenol.
- 15.3 Mention the physical properties of phenol.
- 15.4 Explain the chemical reactions of phenol.
- 15.5 Write the uses of phenol.

BENZOIC ACID

16. Understand Benzaldehyde.

- 16.1 Define benzaldehyde.

- 16.2 Describe the laboratory method of preparation of benzoic acid.
- 16.3 Explain the Industrial production of benzoic acid.
- 16.4 Mention the physical properties of benzoic acid.
- 16.5 Explain the chemical reactions of benzoic acid.
- 16.6 Mention the uses of benzoic acid.

DIAZONIUM SALTS

17. Understand the Diazonium Salts.

- 17.1 Define diazonium salts.
- 17.2 Discuss the importance of diazonium Salts.
- 17.3 Describe the laboratory method of preparation of diazonium chloride.
- 17.4 Mention the physical properties of diazonim chloride.
- 17.5 Explain the chemical reaction of diazonium chloride.
- 19.6 Write the use of diazoniom chloride.

PROTEINS

18. Understand the Proteins.

- 18.1 Define proteins.
- 18.2 Mention the importance of proteins.
- 18.3 State the classification of proteins.
- 18.4 Explain the properties of amino acid.
- 18.5 Mention the structure of proteins.

Practical :

1. Identify of Organic Compounds .
 - 1.1 Identify the functional group (O of H) alcohol-methyl alcohol, Ethyl alcohol, isopropyl alcohol. tetra-butyl alcohol.
 - 1.2 Identify the functional group of (O of H) aldehyde- acetaldehyde.
 - 1.3 Identify the functional group (COOH) of formic acid. acetic acid, benzoic acid.
 - 1.4 Identify the functional group (CO) of keton-acetone.
 - 1.5 Identify the functional group of aniline, nitro-benzene, chloro-benzene phenol etc.
2. Prepare and standardize KMnO_4 solution with oxalic acid or sodium oxalate.
3. Determine ferrous iron with standard KMnO_4 solution.
4. Determine of the $\text{Na}_2 \text{CO}_3$ content of washing soda.
5. Determine the strength of $\text{H}_2 \text{O}_2$.
6. Determine available chlorine in bleaching powder.

1121 BANGLA – II

T P C
2 0 2

উদ্দেশ্য

১. বাংলা ভাষার ব্যবহারে সৃজনশীলতা ও উদ্ভাবনা শক্তির উদ্বোধন।
২. বাংলা ভাষা ও সাহিত্য পঠন-পাঠনার মাধ্যমে জাতীয় চেতনা, দেশপ্রেম, নীতি ও মূল্যবোধের উন্মেষ সাধন।

সংক্ষিপ্ত বিবরণী

বাংলাদেশের জন্মসূত্র ও বাংলা ভাষা; মাতৃভাষা ও সৃষ্টিশীলতা; গদ্য ও পদ্য সংকলন; জীবনী।

বিশদ বিবরণী

- ১ বাংলাদেশের জন্মসূত্র ও বাংলাভাষা
 - ১.১ বাংলাভাষা ও বাংলাদেশী জাতীয়তাবোধ : ঐতিহাসিক প্রেক্ষাপট।
 - ১.২ বায়ান্নর ভাষা আন্দোলন এবং ভাষা আন্দোলন উত্তর ঘটনা প্রবাহ : ১৯৫২-১৯৭১।
 - ১.৩ আন্তর্জাতিক মাতৃভাষা দিবস।
- ২ মাতৃভাষা ও সৃষ্টিশীলতা
 - ২.১ বাক্য সংগঠনে চিন্তার সমন্বয় ও শৃংখলা, পারস্পর্য, যুক্তি, তুলনা ও সাদৃশ্য নিরূপণ : আরোহ ও অবরোহ পদ্ধতি।
 - ২.২ শ্রেণী ও পেশাগত ভাষা : প্রকৌশল ও প্রকৌশলীর ভাষা, ভাষা ব্যবহারে আপেক্ষিক ভিন্নতা।
 - ২.৩ অভিধান পাঠ : বাংলা অভিধান পাঠের রীতি পদ্ধতি।
- ৩ গদ্য
 - ৩.১ হৈমন্তী- রবীন্দ্রনাথ ঠাকুর।
 - ৩.২ বিলাসী- শরৎচন্দ্র চট্টোপাধ্যায়।
 - ৩.৩ অর্ধাঙ্গী-বেগম রোকেয়া সাখাওয়াত হোসেন।
 - ৩.৪ যৌবনের গান-কাজী নজরুল ইসলাম।
 - ৩.৫ একুশের গল্প-জহির রায়হান।
- পদ্য
 - ৩.৬ বঙ্গভাষা-মাইকেল মধুসূদন দত্ত।
 - ৩.৭ কবর- জসীম উদ্দীন।
 - ৩.৮ আমার পূর্ব বাংলা- সৈয়দ আলী আহসান।
 - ৩.৯ মানুষ- কাজী নজরুল ইসলাম।
 - ৩.১০ দুই বিঘা জমি- রবীন্দ্রনাথ ঠাকুর।
- ৪ জীবনী- ডাঃ মোহাম্মদ ইব্রাহীম।

SS 222

ENGLISH –II

T P C
2 0 2***AIMS*****This subject is intended to provide the students with opportunity to**

- Reinforce the previously learnt skills through appropriate teaching-learning activities.
- Emphasize reading comprehension.
- Extend skills in guided writing and free composition to the fields of science and technology.

DETAIL DESCRIPTION**Theory :*****FREE COMPOSITION***

1. **Demonstrate the ability to write free composition on a variety of topics-scientific, technological and other non-fictional.**
 - 1.1 Write planned paragraphs to :
 - a. define and classify.
 - b. compare the contrast contents.
 - c. describe objects and processes.
 - d. argue, agree and disagree
 - e. specify and exemplify.
 - 1.2 Write composition on transformation processes taking place in institutions and world of work.
 - 1.3 Compose paragraphs on the inputs for and outcomes of scientific and technological processes, their utility, availability and acceptability in society.

- 1.4 Undertake projects to gather data and information on matters related to topics listed in contexts and situations and prepare reports (not exceeding 300 words).

CONTEXTS AND SITUATIONS :

Production processes in small factories

Industrial hazards

Power generation in Bangladesh

Use of natural gas in Bangladesh

Taming rivers of Bangladesh

Use of computers in industries

PROSE PASSAGES

2. **Understand prose passage of varying styles and difficulties (mainly scientific and technological).**
 - 2.1 Ask and answer questions on facts and information presented in the text (scanning).
 - 2.2 Read a text understand the gist and overall idea (skimming).
 - 2.3 Make inferences and draw conclusion using points in a text (inferencing).
 - 2.4 Guess intelligently at the meaning of new words using clues in context and situation.
 - 2.5 Identify the main points in a text and summarize it.

NOTE TAKING

3. **Demonstrate note taking ability.**
 - 3.1 Take appropriate and relevant notes both from spoken and written texts.
 - 3.2 Transcribe the notes into useful and effective reports.

INFORMATION TRANSFER

4. Demonstrate the ability to transfer information form on language to another.

4.1 Read a text in English and summarize the content in Bangla.

4.2 Read a text in Bangla and summarize the content in English.

READING SKILLS

Scanning, skimming, identifying main points, understanding explicitly stated information, making inferences, guessing meaning of words.

WRITING SKILLS

Describing objects and processes, narrative events, summarizing, expressing an opinion agreeing/disagreeing, transferring information, writing reports.

LANGUAGE

Passive voice

Reported speech

Clauses of all types

Complex sentences

Conditional sentences

SS 233 SOCIAL SCIENCE-I
(CIVICS & ECONOMICS)

T P C
3 0 3

OBJECTIVES

To provide opportunity to acquire knowledge and understanding on :

- importance of civics and its relationship with other social sciences
- the relationship of an individual with other individuals in a society
- social organizations, state and government
- rule of law, public opinion and political parties
- UNO and its roles
- war of liberation and corporate patriotism for securing a position of dignity in the community of nations.
- the basic concepts and principles of economics and human endeavor in the economic system.
- the realities of Bangladesh economy and the current problems confronting the country.
- the role of Diploma Engineers in industries.
- occupations and career planning for Diploma Engineers.
- Engineering Team.

SHORT DESCRIPTION

Civics and Social sciences; Individual and Society; Nation and Nationality; Citizenship; State and Government; Law; Constitution; Government and its organs; Public Opinion; Political party; UNO and its organs; War of Liberation-Bangladesh.

Nature, scope and importance of Economics; Basic concept of Economics-utility, wealth, consumption, income and savings, Production-meaning, nature, factors and laws, Demand and Supply; Scale of production and organization; Division of Labor, Current economic problems of Bangladesh; Role of Diploma Engineers in the economic development of Bangladesh; Occupations and career planning; Engineering team.

DETAIL DESCRIPTION

CIVICS AND SOCIAL SCIENCES

- 1. Understand the meaning and scope of Civics.**
 - 1.1 State the meaning and scope of Civics
 - 1.2 State the major disciplines belonging to social sciences and their scopes.
 - 1.3 Explain the importance of Civics in the personal and social life of an individual.

- 2. Understand the relationship of civics with the major disciplines of Social Sciences.**
 - 2.1 State the relationship of civics with Political Science.
 - 2.2 State the relationship of Civics with Economics.
 - 2.3 Explain the relationship of Civics with Sociology.
 - 2.4 Discuss the relationship of Civics with Ethics.

INDIVIDUAL AND SOCIETY

- 3. Appreciate the relationship of the individual with the society.**
 - 3.1 Identify the position of an individual in his/her family and immediate community.
 - 3.2 State the mode of formation of a society with individuals and their social and economic activities.
 - 3.3 Define society as an essential institution of human survival.
 - 3.4 State the relationship among the individuals in the society.

NATION AND NATIONALITY

- 4. Appreciate the concepts of nationality and nation.**
 - 4.1 Discuss the term, "nation".
 - 4.2 Explain the meaning of nationality.
 - 4.3 Differentiate between nation and nationality.
 - 4.4 Name the elements of nationality.
 - 4.5 Explain the criteria of Bangladesh nationalism.

CITIZENSHIP

5. Understand the rights and duties of a citizen.

- 5.1 Describe the meaning of citizenship.
- 5.2 Differentiate between a citizen and an alien.

- 5.3 Discuss the methods of acquiring citizenship.
- 5.4 State the causes of losing citizenship.
- 5.5 Describe the rights of citizen.
- 5.6 State the need for developing good citizenship.

STATE AND GOVERNMENT

6. Appreciate the relationship between the state and government.

- 6.1 Explain the meaning of state.
- 6.2 Discuss the elements of state.
- 6.3 Define government.
- 6.4 Differentiate between state and government.
- 6.5 Discuss the relationship between state and government.

RULE OF LAW

7. Understand the concept of rule of law.

- 7.1 Define law

- 7.2 Discuss the rule of law.
- 7.3 State the sources of law.

CONSTITUTION

8. Understand the classification of constitution.

- 8.1 Explain the different forms of constitution.
- 8.2 Explain the merits and demerits of different forms of constitution.
- 8.3 State the salient features of Bangladesh constitution.

FORMS OF GOVERNMENT**9. Understand the forms and organs of government.**

- 9.1 Discuss the modern classification of the forms of government.
- 9.2 Explain the democratic form of government.
- 9.3 Distinguish between cabinet form of government and presidential form of government.
- 9.4 Differentiate between unitary form of government and federal form of government.
- 9.5 Describe the main organs of government.
- 9.6 State the functions of legislature, executive and judiciary.

PUBLIC OPINION AND POLITICAL PARTIES**10. Understand the importance of the formation of public opinion.**

- 10.1 Define public opinion.
- 10.2 Explain the importance of public opinion in the modern democratic society.
- 10.3 Discuss the role of different media informing public opinion.

11. Understand the role of political parties in the affairs of state and government.

- 11.1 Define a political party.
- 11.2 Discuss the importance of political parties in democracy.
- 11.3 Describe the functions of political parties.
- 11.4 Enumerate the merits and demerits of party system.

UNITED NATIONS ORGANIZATION (UNO)

12. Understand the role of UNO in maintaining world peace.

- 12.1 Explain the major functions of UNO.
- 12.2 State the composition and functions of General Assembly.

- 12.3 Describe the composition and functions of Security Council.
- 12.4 Discuss the functions of other organization and specialized agencies of UNO.
- 12.5 Discuss the role of Bangladesh in the UNO.

WAR OF LIBERATION-BANGLADESH

13. Appreciate the events of the war of liberation of Bangladesh and the roles of martyrs and freedom fighters.

- 13.1 Describe '52 Language Movement in the background of prevailing social, cultural and political conditions.
- 13.2 State the major events leading to movement of autonomy for East Pakistan.
- 13.3 Describe the major events leading to holding for general election in 1970.
- 13.4 Describe the events leading to war of liberation and achievement of independence of Bangladesh.
- 13.5 Discuss the need for patriotism for upholding the ideals of martyrs and the spirit of nationalism.

ECONOMICS

14. Understand the importance of the study of Economics.

- 14.1 Discuss the definitions of Economics as given by eminent economists.

14.2 Describe the scope of Economics.

14.3 Discuss the relation of Economics with other Social Sciences.

BASIC CONCEPTS OF ECONOMICS

15. Understand fundamental concepts of Economics

15.1 Define commodity.

15.2 Define utility.

15.3 Differentiate between value in use and value in exchange.

15.4 Explain wealth with its characteristics.

15.5 Discuss the term, "consumption".

15.6 Define income.

15.7 Explain the term, "savings".

PRODUCTION : MEANING, NATURE AND LAWS

16. Understand the process of production.

16.1 Discuss production mode and process.

16.2 Explain the nature of different factors of production.

16.3 Describe the relative importance of factors of production.

17. Understand the concept of the law of diminishing returns in the production process.

17.1 Discuss the law of diminishing returns.

17.2 State the application and limitations of the law of diminishing returns.

17.3 Discuss the law of increasing returns.

17.4 Define the law of constant returns.

17.5 Draw the curve of diminishing returns.

18. Appreciate the importance of the concept of elasticity of demena.

- 18.1 Illustrate the law of diminishing utility.
- 18.2 Define marginal utility and explain the law of diminishing marginal utility.
- 18.3** Define the term, "demand".
- 18.4 Describe elasticity of demand and factors which determine the elasticity of demand.
- 18.5 Describe elasticity of supply with the help of supply cureve.

SCALE AND ORGANIZATION OF PRODUCTION**19. Distinguish between small scale and large scale production.**

- 19.1 Describe the factors which determine the scale of production.
- 19.2 Discuss the large scale production with its advantages and disadvantages.
- 19.3 Describe the domain of small scale production with its advantages and disadvantages in the context of Bangladesh.
- 19.4 Distinguish between a large scale industry and a small scale industry.

DEMAND AND SUPPLY***DIVISION OF LABOR*****20. Understand Utility of Division of Labor.**

- 20.1 Define division of Labor.
- 20.2 Describe the kinds of division of labor.
- 20.3 Explain the advantages and disadvantages of division of labor.

NATIONAL INCOME AND POPULATION CONTROL**21. Understand national income and population control.**

- 21.1 Explain national income.
- 21.2 Discuss GDP and GNP.
- 21.3 Discuss growth rates.
- 21.4 Explain features of Bangladesh population.
- 21.5 State measures to be undertaken to arrest high growth rate of population.

CURRENT ECONOMIC ISSUES OF BANGLADESH

22. Understand the current economic issues of Bangladesh.

- 22.1 Identify major problems of rural economy.
- 22.2 Identify the major problems of urban economy.
- 22.3 Explain income distribution in alleviating poverty, inequality and discrimination.
- 22.4 Explain the migration of rural population to urban areas.

23. Understand the availability and use of natural resource in the economic development of Bangladesh.

- 23.1 List the natural resources of Bangladesh and classify them according to sources of availability.
- 23.2 Explain the importance of the various resources and their potential uses.
- 23.3 Discuss the need for conservation of forests for economic development and as a measure to preservation of environmental balance.
- 23.4 Discuss use water resources.
- 23.5 Discuss use of resources and sustainable development.

ROLE OF DIPLOMA ENGINEERS

24. Understand the role of a Diploma Engineer in the development of Bangladesh economy.

- 24.1 State the general job description of a Diploma Engineer.
- 24.2 Explain the relation of Diploma Engineers with other professionals.
- 24.3 Discuss the role of a Diploma Engineer in the industries.
- 24.4 Identify the role of a Diploma Engineer in the overall economic development of Bangladesh.

OCCUPATIONS AND CARRIER PLANNING

25. **Appreciate the career prospects for Diploma Engineers in different production/service engineering organizations.**
 - 25.1 Explain the employment opportunities for Diploma Engineers in different sectors and sub-sectors of economy.
 - 25.2 List the different organization, sector and sub-sectors providing employment to Diploma Engineer.
 - 25.3 Discuss positions of Diploma Engineers in different engineering firms.
 - 25.4 Discuss the avenues of mobility (vertical and horizontal) for Diploma Engineers in different organization.
 - 25.5 Explain socio-economic status of a Diploma Engineer .

ENGINEERING TEAM

26. **Understand the diversity of the roles played by Diploma Engineers.**
 - 26.1 Explain the concept of the term, "Engineering Team".
 - 26.2 Identify the functions of Engineers, Diploma Engineers and Craftsmen forming the engineering team.
 - 26.3 Explain the need for coordinating the functions of different members of the engineering team.
