Mechanical Technology (70)

3rd Semester

Sl. No	Subject code	Name of the subject	T	P	C	MARKS				
						Theory		Practical		Total
						Cont. assess	Final exam.	Cont. assess	Final exam.	
1.	3044	Machine Shop Practice-2	2	6	4	20	80	50	50	200
2.	7032	Mechanical Engineering Drawing-2	1	6	3	10	40	50	50	150
3.	6632	Computer Application -2	0	6	2	-	-	50	50	100
4.	5931	Math-3	3	3	4	30	120	50	-	200
5.	5922	Physics-2	3	3	4	30	120	25	25	200
6.	5722	English-II	2	2	3	20	80	50	-	150
7.	5811	Social Science-1	2	0	2	20	80	-	-	100
	Total		**13**	**26**	**22**	**130**	**520**	**225**	**225**	**1100**

Mechanical Technology (70)

4th Semester

Sl. No	Subject code	Name of the subject	T	P	C	MARKS				
						Theory		Practical		Total
						Cont. assess	Final exam.	Cont. assess	Final exam.	
1.	7041	Applied Mechanic-1	3	3	4	30	120	25	25	200
2.	8031	Metallurgy	2	0	2	20	80	-	-	100
3.	7045	Machine Shop Practice-3	2	6	4	20	80	50	50	200
4.	7046	Hyd & Hyd Machinery	3	3	4	30	120	25	25	200
5.	6811	Basic Electronics	2	3	3	20	80	25	25	150
6.	5841	Business Organization & Con	2	0	2	20	80	-	-	100
7.	5821	Social Science-2	2	0	2	20	80	-	-	100
	Total		**16**	**15**	**21**	**160**	**640**	**125**	**125**	**1050**

7041	APPLIED MECHANICS – I	T	P	C
		2	3	3

AIMS

- To facilitate understanding the fundamental of units and their conversions.
- To enable to understand the vector operators and the application in applied mechanics.
- To provide the understanding of force, effect of the force, composition and resolution of forces and computing the resultant force.
- To provide the understanding of parallel forces, couple and ability to computing the moment of inertia.
- To provide understanding the centroid and enable to computing the centre of gravity.

SHORT DESCRIPTION

Fundamental of mechanics and unit conversion, vector operators and their applications. Composition and resolution of forces. Moment and their applications. Equilibrium of force. Parallel forces, couples, centre of gravity and moment of inertia.

DETAIL DESCRIPTION

Theory :

1. Understand Fundamental of Mechanics.

1.1. Define mechanics.
1.2. Classify applied mechanics.
1.3. Describe fundamental units.
1.4. Discuss system of units.
1.5. Importance of units in the engineering field.
1.6. Discuss the conversion of units.
1.7. Illustrate the fundamental mathematics (algebra, trigonometry & calculus) used in mechanics.

2. Understand the force vector.

2.1. Define sealer and vector quantities.
2.2. Describe vector operators.
2.3. Express vector addition and subtraction of forces.
2.4. Express vector addition and subtraction of a system of coplanar forces.
2.5. Explain Cartesian vector.

3. Understand the application of vector operators.

3.1. Define position vector.
3.2. Express addition and subtraction of position vector.
3.3. Describe force vector directed along a straight line.
3.4. Define dot product and cross product.
3.5. Solve problems related to above specific objects.

4. Understand the composition and resolution of forces.

4.1. State the effect of forces.
4.2. Mention the characteristics of a force.
4.3. Define resultant force and composition of forces.

4.4. Find the resultant force graphically and analytically.
4.5. Mention the laws of forces.
4.6. Define resolution of a force.
4.7. State the principle of resolution of force.

5. Understand the principles of resultant force.

5.1. Express the deduction of the formula for finding the resolved part of a component.
5.2. Find the magnitude and position of the resultant force graphically and analytically.
5.3. Solve problems related to resultant force.

6. Understand the aspects of moment of forces.

6.1. Define moment of force.
6.2. Represent the moment of a force geometrically.
6.3. Mention the units of moment.
6.4. Identify the clockwise and anticlockwise moment.
6.5. State the Varignon's principle of moments.
6.6. State the laws of moments.
6.7. State what is meant by the lever.
6.8. Identify the types of lever.
6.9. Solve problems related to moment of forces.

7. Understand the aspects of equilibrium of forces.

7.1. Mention different system of forces.
7.2. State the principles of equilibrium of forces.
7.3. State the Lami's theorem.
7.4. Express the derivation of Lami's theorem.
7.5. Describe different methods of the equilibrium of coplanar forces and non-coplanar forces.
7.6. Explain the conditions of equilibrium.
7.7. Mention the various types of equilibrium of forces.
7.8. Solve problems related to equilibrium of forces.

8. Parallel forces and couples.

8.1. Classify parallel forces.
8.2. Describe like parallel forces and unlike parallel force.
8.3. Explain the resultant of like parallel forces and unlike parallel forces.
8.4. Define couple.
8.5. Classify couple.
8.6. Narrate the characteristics of a couple.
8.7. Solve the problems related to couple.

9. Understand the concept of center of gravity.

9.1. Define center of gravity and centroid.
9.2. Distinguish between center of gravity and centroid.
9.3. Explain the methods of finding out center of gravity of simple geometrical figure.
9.4. Determine the center of gravity of simple geometrical figure geometrically and by integration.
9.5. Identify the axis of reference and axis of symmetry.
9.6. Determine the center of gravity of plain geometrical figure by principle of first moments.
9.7. Calculate the center of gravity of compound geometrical figure or areas by moments.
9.8. Calculate the center of gravity of solid bodies.

10. Understand the application of moment of inertia.

10.1. Explain the term moment of inertia.
10.2. Mention the units of moment of inertia.
10.3. Express the derivation of the formulae for moment of inertia of an area.
10.4. Describe the methods for finding out the moment of inertia.
10.5. Find the moment of inertia of simple areas by the method of integration.
10.6. State the theorem of perpendicular axis as applied to moment of inertia.
10.7. Show the proof of the theorem of perpendicular as applied to moment of inertia.
10.8. State the parallel axis theorem in the determination of moment of inertia of areas.
10.9. Explain the radius of gyration and section modulus.
10.10. Calculate the moment of inertia and section modulus of composite sections and simple solid bodies.

<u>Practical</u> :

1 Determine the resultant force by using force board.

1.1 Set up the force board.
1.2 Set up the accessories on the force board.
1.3 Find the resultant force.
1.4 Calculate the magnitude of resultant force.
1.5 Compare the calculated values with experimental values.

2 Determine the compression load using crane boom.

2.1 Set up the crane boom.
2.2 Set up the accessories on the crane boom.
2.3 Find the compression load on the jib.
2.4 Calculate the compression analytically.
2.5 Compare the experimental values with analytical values.

3 Determine the equilibrium force by using Kennon force table.

3.1 Set up the Kennon force table.
3.2 Set up the accessories on the Kennon force table.
3.3 Find the magnitude and direction of a force establishing equilibrium.
3.4 Calculate the magnitude and direction of equilibrium force.
3.5 Compare the calculated values with experimental values.

4 Determine the center of a triangular lamina.

4.1 Select a triangular lamina and a plumb bob.
4.2 Set up the plumb bob.
4.3 Find the center point of the triangular lamina.

5 Determine the center of gravity of solid body.

5.1 Select solid bodies such as solid rod, step rod and body with cut out holes.
5.2 Select a fulcrum.
5.3 Set up the fulcrum.
5.4 Find the center point.
5.5 Compare the analytical values with experimental values.

REFERENCE BOOKS

1	Applied Mechanics	–	R. S. Khurmi
2	Applied Mechanics	–	R. K. Jain
3	Applied Mechanics	–	Fairries
4	Analytical Mechanics	–	Faires & Nash
5	Mechanics of Materials	–	Morgan

8031 METALLURGY

T	P	C
2	3	3

AIMS

• To be able to identify and classify the materials used for metallurgical engineering field.
• To be able to recognize the sources of various Metals.
• To be able to understand the characteristics of various ferrous and non-ferrous metals.
• To be able to understand the uses of different alloy.

SHORT DESCRIPTION

Concept and Scope of Metallurgy; Uses of Metallic Ore; Production of Pig Iron; Production of Wrought Iron; Bessemer Processes of Making Steel; Open Hearth Process for Making Steel; Process of making Steel by Electric Furnace; Crucible Process of making Steel; Plain Carbon Steel; Aspect of non-ferrous metals; Feature of Alloy of Metals; Aspect of Alloy Steel; Feature of Cast Iron and Application of Powder Metallurgy in Engineering Production

DETAIL DESCRIPTION

1 Understand the Concept and Scope of Metallurgy.
- 1.1 Define metallurgy
- 1.2 Mention the classification of metallurgy as applied to manufacturing engineering and production
- 1.3 Mention the use of metallurgical investigation in industry
- 1.4 Mention the physical and mechanical properties of metals

2 Understand the Uses of Metallic Ore
- 2.1 Define ores of metals.
- 2.2 Mention the classification of ores of metals.
- 2.3 Describe the processing of ores before melting.
- 2.4 Name the metallic ores available in Bangladesh.
- 2.5 Define refractory materials

3 Understand the Production of Pig Iron
- 3.1 Define pig iron.
- 3.2 Describe the importance of blast furnace
- 3.3 Mention the construction of blast furnace
- 3.4 Explain the operation of blast furnace
- 3.5 Describe the chemical reaction caused in the blast furnace for pig iron production
- 3.6 Describe the elements of slag use in of blast furnace

4 Understand the Wrought Iron and its uses.
- 4.1 Mention the meaning of wrought iron
- 4.2 Describe the properties of wrought iron
- 4.3 Mention the use of wrought iron

5 Understand the Bessemer Processes of Making Steel.
- 5.1 Describe the construction of Bessemer converter
- 5.2 Distinguish between the basic Bessemer process and acid Bessemer process of making steel

6 Understand the Open Hearth Process for Making Steel
- 6.1 Describe the construction of open hearth furnace
- 6.2 Describe the steel production using open hearth furnace

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7 Understand the Process of making Steel by Electric Furnace

7.1 Explain the construction of electric furnace
7.2 Mention the classification of electric furnace
7.3 Mention the process of making steel by direct arc electric furnace
7.4 Describe the process of making steel by induction electric furnace
7.5 Mention the reason for superiority of electric furnace steel than others

8 Understand the Plain Carbon Steel
8.1 Name the types of plain carbon steel.
8.2 Explain the composition of plain carbon steel
8.3 List the use of different plain carbon steel
8.4 Mention the process of making steel adapted in Bangladesh.

9 Understand the Crucible Process of making Steel.
9.1 Mention the construction of crucible
9.2 Mention the crucible process of making steel
9.3 Explain the advantage of making steel by crucible process
9.4 State the reason of adopting the duplexing and triplexing process of making steel

10 Understand the Aspect of Alloy Steel
10.1 Mention the classification of alloy steel.
10.2 Explain the difference between alloy steel and plain carbon steel
10.3 Describe the manufacturing process of stainless steel, high speed steel and nickel steel .
10.4 Describe the composition of stainless steel, high speed steel, tungsten steel, molybdenum steel, chromium steel, nickel steel and silicon steel.
10.5 Describe the effect of manganese, tungsten, molybdenum, chromium, nickel, vanadium, copper, sulphur, phosphorous and silicon on the mechanical properties of alloy steel.
10.6 Describe the domestic and industrial uses of stainless steel, high speed steel, tungsten steel, molybdenum steel, chromium steel, nickel steel and silicon steel.

11. Understand the Aspect of non-ferrous metals
11.1 Describe the extraction process of Aluminium and Copper,
11.2 Mention the importance properties of Aluminium and Copper,
11.3 Describe the uses of Aluminium, Copper, Zinc, Tin and Lead

12 Understand the Feature of Alloy of Metals
12.1 Define alloy of metals
12.2 Describe the process of making alloys of Aluminium, Copper, Zinc, Tin, Lead, Antimony and Nickel.
12.3 List the important alloys of Aluminium, Copper, Zinc, Tin, Lead, Antimony and Nickel.
12.4 Describe the composition of important alloys of Aluminium, Copper, Zinc, Tin, Lead, Antimony and Nickel.
12.5 Describe the properties of important alloys of Aluminium, Copper, Zinc, Tin , Lead, Antimony and Nickel.
12.6 Mention the industrial uses of important alloys of Aluminium, Copper, Zinc, Tin, Lead , Antimony and Nickel.

13 Understand the Feature of Cast Iron
13.1 Define cast iron

13.2 Mention the manufacturing process of cast iron
13.3 List the types of cast iron.
13.4 Explain the composition of various cast iron
13.5 Mention the properties of various cast iron
13.6 Mention the effect of sulphur, phosphorous, aluminium and silicon on the properties of cast iron.
13.7 Explain the domestic and industrial uses of cast iron

14 Understand the Application of Powder Metallurgy in Engineering Production
14.1 Define powder metallurgy
14.2 List the importance of powder metallurgy
14.3 Explain the methods of producing metal powder
14.4 Mention the production method of metal powder components
14.5 Describe the special properties of metal powder products
14.6 Explain the advantages of metal powder products
14.7 List the major applications of metal powder products

PRACTICAL:

1. Show skill in identifying various types of metals
1.1. Selected different type of metals in the laboratory.
1.2. Sketch different type of metals on the basis of formation.

2. Show skill in workshop test of metals
2.1. Perform Rockwell hardness test.
2.2. Perform Brinell hardness number using standard specimen

3 Show skill in identifying various ferrous and non ferrous metal

4. Perform torsion test of various types of ore sometimes applied to materials in wire and rod form

5 Identify different alloy steel

6 Identify iron alloy

7. Show skill in conducting laboratory test of metals
7.1. Perform Tensile test using standard specimen.
7.2. Perform compression test using standard specimen.

8 Determine the internal structure of standard specimen using metallurgical microscope
(a) Select the specimen
(b) Preparation of specimen(grinding/polishing/etching)
(c) Perform final setting time
(d) Observe microstructure

9 Identify mild steel, cast iron, copper, and aluminum, tin by physical observation.

10. Show the construction and operation of electric furnace process of making steel

REFERENCE BOOKS

1 Metallurgy - Johnson

2 Emergency Metallurgy - Frier
3 Metallurgy - Jain
4. Metallurgy - R S Khurmi

7045 MACHINE SHOP PRACTICE-3	T	P	C
	2	6	4

OBJECTIVES

- To enable recognize commonly used machine tools.
- To provide understanding the functions of commonly used machine tools.
- To develop skills in setting up and operating of machine tools.
- To provide concept of using Coolant in machining.
- To provide ability to set and operate commonly used allied tools and accessories.
- To provide understanding the operation of numerical controlled Machine.

SHORT DESCRIPTION

Machine tools: cutting fluids; Grinding machine; jig borers machine; Shaper; Planer: numerical controlled Machine; engraving machine; Measuring techniques.

DETAIL DESCRIPTION

Theory :

1 Understand the concept of safely precaution of machine shop.

1.1. Explain principle of stopping and starting a machine tools.
1.2. State general safety precautions(man and machine)
1.3. State safety precaution during Planer, Shaper operation.
1.4. State safety precaution during Grinding machine; jig borers machine operation.
1.5. State safety precaution during working on a numerical controlled machine.

2 Understand the concept of machine tools.

2.1 State grinding machine; jig borers machine; Shaper; Planer machine etc.
2.2 Classify commonly used Grinding machine; jig borers machine; Shaper; Planer machine etc.
2.3 List essential features of commonly used machine tools.

3 Understand the application of cutting fluids for machining operation.

3.1 Define cutting fluid used in grinding machine; jig borers machine, planer machine.
3.2 Explain the necessity of cutting fluid.
3.3 Identify different types of cutting fluid.
3.4 Identify cutting fluid used for cutting various metals.
3.5 Explain the making process of different types of cutting fluid.

4. Tool and cutter grinder.

4.1 State the bonding materials of grinding wheel.
4.2 Principle of tools cutter grinding machine.
4.3 Main parts of tool and cutter grinder.
4.4 Component, attachment and accessories for tools and cutter grinder.
4.5 Uses of the various standard cutter grinder.
4.6 List the various attachments of the cutter grinding wheel.
4.7 General methods of sharpening cutting tools.

5. The jig borers and jig grinder.

5.1 General description of jig borers and jig grinder.
5.2 Component and accessories of jig borers and jig grinder.
5.3 Work holding devices in jig borers and jig grinder.
5.4 Methods of locating an coordinate system.
5.5 Measurement and inspection.
5.6 Types and setting of grinding wheels.

6. Understand the application of shaper.

6.1 Define the shaping machines.
6.2 Identify different components of shaping machine and their uses.
6.3 Describe the quick return mechanism ram, stock length cutting speed adjustments.
6.4 Set a work piece on the machine table of shaper.
6.5 Identify typical operations for shaper.
6.6 State safety precautions during working on the shaper.

7. Understand the application of planer.

7.1 Identify the planer machines.
7.2 Identify major components of planer machine.
7.3 Explain how to set a work piece on the machine table of planer.
7.4 Identify typical operations for planer.
7.5 State safety precautions during working on the planer.
7.6 Distinguish between shaper and planer.

8. Numerical controlled machine tools.

8.1 Definition of numerical control machine tools.
8.2 Functions of control system different types of analogue and digital controls.
8.3 Programming and Programming procedure.
8.4 State point-to-point and contouring machine.
8.5 Function of M.E.U.
8.6 Function of control tool unit C.L.V.
8.7 Data processing unit (D.P.U)
8.8 Classification of N/E system.

8.9 Explain analogue and digital control.

9. Understand the engraving machine.

9.1 Define of engraving machine.
9.2 Functions of engraving machine.
9.3 Components and accessories of engraving machine.
9.4 Uses of the various engraving machine.

Practical:

1. Perform the precision grinding.

1.1 Mount and balancing the grinding wheel.
1.2 Perform grinding on a flat surface.
1.3 Perform grinding on a cylindrically surface.
1.4 Perform grinding on a flat positions.
1.5 Perform grinding on a single point cutting tools and twist drill bit and milling cutter.
1.6 Observe workshop safety precautions.

2. Demonstrate the setting and operating of shaping machine.

2.1. Perform simple setting up of machine, mounting work piece, tool bit, speed and feeds, ram position and stroke.
2.2. Carry out machining operation for parallel shaping and vertical face shaping.
2.3. Produce a simple job to an engineering drawing specification.
2.4. Observe workshop safety precautions.

3. Jig and borers machine.

3.1 Perform simple setting up of machine work piece, jig and jig grinder, speeds and feeds.
3.2 Measurement and inspection of holes.
3.3 Observe workshop safety precautions.

4. Numerical controlled machine tools.

4.1 Set up tools on numerical controlled lathe machine.
4.2 Programming and Programming procedure of numerical controlled lathe machine.
4.3 Curry out machining operations for facing parallel turning, center drill on numerical controlled lathe machine.
4.4 Produce a job to an engineering drawing specification.

B. REFERENCE BOOKS

1	Basic Machine Shop Practice I & II	—	V. K. Tejwani
2	Workshop Technology I, II & III	—	W. A. J Chapman
3	Machine Shop Practice I & II	—	Berghardt
4	Machine Shop Practice	—	Somenath De

7046 HYDRAULICS AND HYDRAULIC MACHINERY	T	P	C
	2	3	3

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of hydraulics and hydraulic machinery with special emphasis on :

- properties of fluids
- fluid pressure measurement
- Bernoulli's equation
- orifice and mouthpieces
- impact of jet
- water pumps & turbines
- hydraulic devices

SHORT DESCRIPTION

Properties of fluid; Fluid pressure measurement; Flow of fluids through pipes; Bernoulli's equation; Flow through orifices; Flow through mouthpieces; Viscous flow; Impact of jets; Water turbine; Reciprocating pumps; Centrifugal pumps; Rotary pumps; Hydraulic devices.

DETAIL DESCRIPTION

Theory :

1 Understand the scope of hydraulics.

1.1 Define hydraulics and hydraulic machines.
1.2 Outline the importance of hydraulics and hydraulic machines.
1.3 Mention the branches of hydraulics.
1.4 Identify different application of hydraulics and hydraulic machines in engineering field.

C. PROPERTIES OF FLUIDS

2 Understand the fluid properties and fluid pressure.

2.1 Define fluid.
2.2 Name the types of fluids.
2.3 Compare the liquid, vapor and gas.
2.4 List the properties of fluids.
2.5 Define density, specific weight ,surface tension, capillary, viscosity and fluid pressure.
2.6 State Pascal's law of fluid pressure.
2.7 Show the proof of the Pascal's law of fluid pressure.
2.8 Define atmospheric pressure, gage pressure and absolute pressure.
2.9 Mention the relation among atmospheric pressure, gage pressure and absolute pressure.
2.10 Express the derivation of the formulae for finding total pressure on immerged surface at horizontal, inclined and vertical position.
2.11 Solve problem on static fluid pressure.

3. Buoyancy

3.1 Define buoyancy and center of buoyancy.
3.2 State the meaning metacentre and metacentric height.
3.3 Mention the conditions of equilibrium of a floating body.

4 Understand the features of fluid pressure gages.

4.1 State the meaning of pressure gage.
4.2 Mention the classification of pressure gages.
4.3 Define manometer.
4.4 Distinguish between simple manometer and differential manometer.
4.5 Mention the working principle of different types of pressure gages.
4.6 Mention the specific application of different pressure gages.
4.7 Solve problems relating to measurement of fluid pressure by different manometer.

D. FLOW OF FLUID THROUGH PIPES AND BERNOULLIS EQUATION

5 Understand the concept of fluid flow through pipes and Bernoulli's equation.

5.1 State the equation of continuity of flow.
5.2 State flow rate or discharge.
5.3 Compute the formula of flow rate.
5.4 State the equation of continuity of flow.
5.5 Define head, pressure head, velocity head, datum head and total head.
5.6 State the Bernoulli's equation for flowing liquid.
5.7 Show the proof of Bernoulli's equation.
5.8 Mention the limitation of Bernoulli's equation.
5.9 Mention the function of venturimeter, orificemeter and pitot tube.
5.10 Describe the construction and operation of venturimeter, orificemeter and pitot tube.
5.11 Express the derivation of formula to measure the quantity of liquid flowing through venturimeter.
5.12 Express the derivation of formula to measure the quantity of liquid flowing through orificemeter.
5.13 Express the derivation of formula to measure the velocity of flowing liquid by the pitot tube.
5.14 Solve the problems on fluid through pipe, Bernoulli's equation and venturimeter, orificemeter and pitot tube.

E. FLOW THROUGH ORIFICES

6 Understand the concept of flow through orifices.

6.1 Define orifice.
6.2 Mention the classification of orifices.
6.3 State hydraulic coefficients.
6.4 Define jet of water, vena contracta, coefficient of contraction (C_C), coefficient of velocity (C_v), coefficient of discharge (C_d) and coefficient of resistance.

6.5 Relate the C_C, C_v and C_d.
6.6 Calculate different hydraulic coefficients.
6.7 Express the deduction of formulae for finding out the discharge of liquid through various orifices
6.8 Solve problems relating orifices.

F. FLOW THROUGH MOUTHPIECES AND NOTCHES

7 Understand the concept of flow through mouthpieces.

7.1 State mouthpiece.
7.2 Mention the classification of mouthpieces.
7.3 Express the deduction of formulae to calculate discharge through different types of mouthpieces.
7.4 State head losses of flowing liquid in a pipe.
7.5 List the causes of head loss of flowing liquid.
7.6 Express the deduction of formulae to calculate loss of head due to friction ,sudden enlargement, sudden contraction and obstruction in pipe.
7.7 Express the deduction of formulae to calculate loss of head due to friction (Darcy's and Cheay's formulae).
7.8 Solve problems relating head losses and discharge through mouthpieces.
7.9 Define notches.
7.10 Identify different types of notches with sketches such as rectangular notch v-notch trapezoidal notch.
7.11 Outline the importance of using notches.

VISCOUS FLOW

8 Understand the concept of viscous flow.

8.1 Define viscosity.
8.2 Mention the units of viscosity.
8.3 Define ideal fluid, real fluid, Newtonian fluid and non-Newtonian fluids.
8.4 Distinguish between the laminar flow and turbulent flow.
8.5 State Reynold's number.
8.6 Solve problems relating to viscosity.

G. IMPACT OF JETS

9 Understand the aspect of impact of jets.

9.1 State impact of jet.
9.2 Express the deduction of formula to calculate the force of a jet impinging on a flat fixed vertical plate , inclined plate and hinged plate.
9.3 Solve problems on impact of jets relating to flat fixed plate, inclined fixed plate and hinged plate .

H. WATER TURBINES

10 Understand the features of water turbines.

10.1 State the meaning of water turbine.
10.2 Mention the classification of water turbine.
10.3 Describe the principle of impulse water turbine.
10.4 Describe the principle of reaction water turbine.
10.5 Compare the impulse and reaction turbines.
10.6 Describe the construction of Pelton, Kaplan and Francis water turbine.
10.7 Describe the operation of Pelton, Kaplan and Francis water turbine.
10.8 State specific speed of turbine.
10.9 Describe the governing system of impulse and reaction turbines.
10.10 Define draft tube and its classification.

RECIPROCATING PUMPS

11 Understand the features of reciprocating pumps.

11.1 State the meaning of reciprocating pump.
11.2 Mention the classification of reciprocating pumps.
11.3 Describe the construction of various reciprocating pumps.
11.4 Describe the operation of different types of reciprocating pumps.
11.5 State the meaning of slip of reciprocating pumps.
11.6 Mention the function of air vessel in single acting reciprocating pump.
11.7 Describe the operation of suction side and discharge side air vessel in a single acting reciprocating pump.
11.8 Express the deduction of formula to calculate the discharge of reciprocating pumps.

CENTRIFUGAL PUMPS

12 Understand the features of centrifugal pumps.

12.1 State the meaning of centrifugal pump.
12.2 Mention the classification of centrifugal pumps.
12.3 Compare the centrifugal and reciprocating pumps.
12.4 Describe the construction of various centrifugal pumps.
12.5 Describe the operation of different types of centrifugal pumps.
12.6 State the meaning of cavitation of centrifugal pumps.
12.7 Express the deduction of formula to calculate discharge of centrifugal pumps.
12.8 Power required to drive a centrifugal pumps.
12.9 Mention the efficiencies of centrifugal pump.

ROTARY PUMPS

13 Understand the features of rotary pumps.

13.1 State what is meant by rotary pump.
13.2 Mention the classification of rotary pumps.
13.3 Describe the construction of various rotary pumps.
13.4 Describe the operation of different types of rotary pumps.
13.5 List the advantages and disadvantage of rotary pumps over centrifugal and reciprocating pumps.
13.6 Mention the application of rotary pumps.

I. HYDRAULIC DEVICES

14 Understand the features of hydraulic devices.

14.1 State hydraulic devices.
14.2 Identify the hydraulic devices.
14.3 Mention the function of hydraulic devices viz. hydraulic press, hydraulic accumulator, hydraulic intensifier, hydraulic crane, hydraulic lift, etc.
14.4 Describe the construction of various hydraulic devices.
14.5 Describe the operation of different types of hydraulic devices.

Practical :

1. Calibrate a bourdon tube pressure gage with a dead weight gage.
2. Verify Bernoulli's equation by Bernoulli's apparatus equipped with hydraulic test bench.
3. Determine C_C, C_V, and C_d by orifice apparatus equipped with hydraulic test bench.
4. Determine the discharge through a pipe by the venturimeter or orifice meter equipped with hydraulic test bench.
5. Determine the loss of head due to sudden enlargement of pipe by the manometer.
6. Determine the loss of head due to friction by fluid friction apparatus.
7. Determine the fluid energy loss through various fittings (elbows, bends and valves)..
8. Determine the moment force of a jet of water striking turgets of different shape with the impact of jet apparatus.
9. Test the performance of a reciprocating pump with the reciprocating pump test rig.
10. Test the performance of a centrifugal pump with the centrifugal pump test rig.
11. Test the performance of an impulse turbine with the impulse (Pelton wheel) turbine test rig.
12. Test the performance of a Francis turbine with the Francis turbine test rig.

REFERENCE BOOKS

1 Hydraulics and Hydraulic Machinery
   – Kings
2 Hydraulics and Hydraulic Machinery
   – Luiss
3 A Text Book of Hydraulics, Fluid Mechanics and Hydraulic Machines
   – R. S. Khurmi

4 Fluid Mechanics Hydraulics and Hydraulic Machines
   – K. R. Arora
5 Hydraulics, Fluid Mechanics, and Fluid Machines
   – S. Ramamrutham
6 Fluid Mechanics including Hydraulics Machines
   – K. Subramanya

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OBJECTIVES

- To provide understanding soldering technique and color code.
- To provide understanding and skill on the basic concept of semiconductor and to identify physically a range of semiconductor diodes.
- To develop comprehensive knowledge and skill on special diodes and devices.
- To develop the abilities to construct different rectifier circuits.
- To provide understanding of the basic concept and principle of transistor and to identify physically a range of transistor.
- To provide understanding and skill on the basic concept of logic gates.
- To provide the understanding skill on using Electronic measuring and testing equipment.

SHORT DESCRIPTION

Color code and soldering; Semiconductor; P-N junction diode; Special diodes and devices; Power supply; Transistor; Transistor amplifier; Logic gates Electronic measuring and test equipment.

DETAIL DESCRIPTION

Theory:

1 Understand the Concept of soldering and Color Code.

1.1 Define soldering.
1.2 Describe the different types of solder.
1.3 List the things needed in soldering.
1.4 Mention the properties of a good soldered joint.
1.5 Describe the functions and construction of (i) Single sided, (ii). Double sided & (III) Multi layered Printed circuit board.
1.6 Mention the function of resistor, capacitor and inductor in electronic circuits.
1.7 Describe the procedure of determining the value of Capacitor, & Resistor using numeric and color code.

2 Understand the Concept of Semiconductor.

2.1 Define Conductor, Semiconductor and Insulator.
2.2 Describe Semiconductor with atomic structure.
2.3 Describe the effect of temperature on conductivity of Semiconductor.
2.4 Explain the energy band diagram of Conductor, Semiconductor and Insulator.
2.5 Classify Semiconductor.
2.6 Describe the generation & recombination of hole and electron in Intrinsic Semiconductor.
2.7 Define doping, P-type & N-Type material, covalent bond, majority & minority charge carrier.
2.8 Explain the characteristics of Carbon, Gallium Arsenide/Phosphide.

3 Understand the Concept of P-N Junction Diode

3.1 Define PN junction diode
3.2 Describe the formation of depletion layer in PN junction.
3.3 Discuss potential barrier, drift & diffusion current and their physical significance.
3.4 Mention the behavior of PN junction under forward and reverse bias.

3.5 Explain the forward & reverse current voltage (IV) characteristics of PN junction diode.
3.6 Explain the effect of temperature Si & Ge diode characteristics
3.7 Define (i) static resistance (II) Dynamic resistance, (III forward breakdown voltage and (II) Reverse break down voltage.
3.8 Draw the equivalent circuit of PN junction diode.
3.9 Describe the specification of diode.

4 Understand the DC power supplies.

4.1 Define dc power supply.
4.2 Mention the importance of dc power supply.
4.3 Define rectification and rectifier.
4.4 Explain the operation of Half wave, Full wave and Bridge rectifier.
4.5 Discuss ripple factor & efficiency and TUF of Half wave, Full wave and Bridge rectifier.
4.6 Explain the operation of different types filter circuits with wave shape.
4.7 Define regulated and unregulated power supply.
4.8 Describe the block diagram of a typical regulated dc power supply.

5 Understand the Concepts of Special diode.

5.1 Define Zener break down.
5.2 Describe the operation of Zener diode.
5.3 Explain IV characteristics of Zener diode.
5.4 Describe the application of Zener diode in (i) voltage stabilization, (ii) meter protection and (II) peck clipper circuits.
5.5 Describe the construction operation and application of (I) Tunnel diode (II) varactor diode (III) Schottky diode (iv) Step-Recovery diode (v) PIN diode, (vi) LED (vii) LCD (viii) photo diode (ix) Solar cell.
5.6 Describe the construction operation and application of (i) DIAC (ii) TRIAC and (iii) SCR.

6 Understand the construction and operation of Bipolar Junction Transistor (BJT)

6.1 Define Transistor.
6.2 Describe the construction PNP and NPN Transistor.
6.3 State the biasing rules of BJT.
6.4 Explain the mechanism of current flow of PNP and NPN Transistor.
6.5 Establish the relation among Base, Emitter and Collector current ($I_E = I_C + I_B$)
6.6 Draw the three basic transistor configuration circuits (CB, CC, CE).
6.7 Describe current amplification factor α , β and γ.
6.8 Establish the relation among α , β and γ.
6.9 Solve problem related to I_E, I_C, I_B, α , β and γ.

7 Understand the concept of BJT Amplifier

7.1 Define (i) Amplifier (ii) Amplification and (III) Gain
7.2 Mention the classification of Amplifier.
7.3 Describe the principle of operation of a common emitter (CE) Amplifier.
7.4 Draw DC & AC equivalent circuits of the CE amplifier circuit.
7.5 Mention the formula of (i) input resistance (ii) Output Resistance (iii) Current gain (iv) Voltage gain and (v) power gain.
7.6 Solve problem related to different gain resistance.

8 Understand the main feature of digital electronics

8.1 Describe the difference between analog and digital signal.
8.2 State the advantage of digital system.
8.3 Define logic gate.

8.4 Describe the basic operation of logic gates AND, OR, NOT NAND, NOR, XOR & XNOR.

8.5 Prepare truth table of logic gates AND, OR, NOT NAND, NOR, XOR & XNOR.

9 Understand the Electronic measuring and testing equipment

9.1 Define AVO meter.

9.2 Describe the procedure of measuring current, voltage and resistance using AVO meter.

9.3 List the control knobs of Oscilloscope.

9.4 Explain the procedure of measuring frequency and voltage using Oscilloscope.

9.5 Mention the function of (i) Function Generator (ii) Logic Probe (iii) Semiconductor Tester.

Practical :

1 Show skill in identifying the electronic components.

Observe the electronic components board and read the manuals.

Identify the different types of resistors with their values, tolerance and wattage.

Identify the different types of potentiometers with their values, & wattage.

Identify the different types of capacitors with their values, dc working voltages and types.

Identify the different types of diodes & rectifiers with the numbers and specifications.

Identify the different types of transistors and thyristors with their number and specifications.

Identify the different types of LED's, IC's and miniature relays with their number & specification.

Identify different types of transformer with their specification.

Identify different inductors with their values & current ratings.

Study the printed circuit boards.

Sketch the symbols of components used in electronic circuits.

Describe the basic function of each component.

Write a report on above activities.

2 Show skill in electrical measurement.

Perform simple voltage and current measurements on basic series and parallel resistor circuits using the following instruments.

a) Voltmeters and ammeters

b) AVO meters

c) Digital multimeter

d) Basic CRO

3 Show skill for determining the values of different resistors and capacitors with the help of color code.

Select color code resistors & capacitors of different values.

Identify the colors and their numerical numbers.

Determine the value of resistors with tolerance.

Determine the value of capacitors and dc working voltage.

Write a report on above activities.

4 Show skill in performing soldering.

Select wires (single strand and multi strand) and cut wires to required length.

Select soldering iron, soldering tag and soldering lead.

Remove wire insulation to required length.

Clean and tin both iron and work piece.

Use a tinned iron in order to transfer adequate heat to the joint.

Joint two singles stranded wires mechanically and solder.

Joint two multi-strand wires mechanically and solder.
Perform soldering exercise for making three dimensional wire frame.
Sketch and write a report on the job.

5 Show skill in soldering & desoldering of electronic components and wires to the other components and circuit boards.

Select electronic components, wires and PCB.
Determine the rating of the soldering iron suitable for the work piece.
Clean and tin both iron & work piece.
Feed new soldering materials to the tinned and heated joint, in order to produce a correctly soldering.
Check the quality of soldering.
Clean and tin iron and de-solder the joint and components.
Use solder suckers and solder braid for de-soldering.
Write a report on the Job.

Show skill in checking the semi-conductor diode.

Collect a range of semi-conductor diodes and manufactures literature.
Select the digital multimeter and set the selector switch to ohm range.
Determine the specification of semi-conductor diode.
Compare the determined specification with that of manufactures literature.
Measure forward & reverse resistances of the diode.
Identify p and p side of the diode.
Determine the condition of the diode.

6 Show skill in sketching forward and reverse characteristics curves of a semiconductor diode.

Select meter, power supply, components and materials.
Complete circuit according to circuit diagram for forward bias.
Check all connections.
Measure forward bias and corresponding forward current.
Record results in tabular form.
Connect circuit according to circuit diagram of reverse bias.
Measure reverse bias and corresponding reverse current.
Record results in tabular form.
Sketch the curves form data.

7 Show skill in sketching waves of half wave rectifier circuit.

Select meter, component, oscilloscope and materials.
Complete circuit of a half wave rectifier according to circuit diagram.
Check the circuit before operation.
Measure the input and output voltage and observe wave shapes in the oscilloscope.
Sketch the output voltage wave shape.

8 Show skill in sketching waves of full wave center tapped rectifier circuit.

Select meter, component, oscilloscope and materials.
Complete a full wave rectifier circuit according to circuit diagram.
Check the circuit supply & polarity of supply.
Measure the input & output voltages and observe wave shapes in the oscilloscope.
Sketch the output voltage wave shape.
Compare the result with half-wave rectifier circuit.

9 Show skill in constructing full wave bridge rectifier.

Select meter, component, oscilloscope and materials.

Build the circuit according to the circuit diagram.
Check the circuit.
Measure the input and output voltage.
Observe wave shape.
Compare the result with other rectifiers.

10 Show skill in identifying the bipolar junction transistor.

Select pnp & npn bipolar junction transistors.
Take DMM and manufacture's literature of transistor.
Identify transistor legs.
Measure base-emitter, base-collector, forward and reverse resistance.
Determine the specifications with help of manufacturer's literatures.
Identify pnp & npn transistor.

11 Show skill in determining input and output characteristics of a transistor in common emitter connection.

Select component, AVO meters, circuit board and required materials.
Construct the circuit.
Adjust the biasing voltage to appropriate point.
Record input and output voltage and current.
Plot the curve with recorded data.

12 Show skill in testing special diodes.

Select different types of special diodes.
Set the AVO meter in the ohm scale.
Measure resistances for each of two terminals.
Determine the condition (good and bad).
Determine the different terminals.

13 Verify the truth tables of different types of logic gates.

Select the specific gate.
Prepare the experimental circuit.
Adjust the power supply.
Verify the truth table.

REFERENCE BOOKS :

1. A Text Book of Applied Electronics - R.S. SEDHA
2. Principles of Electronics - V. K. Mehta
3. Basic Electronics (Solid Stater) - B. L. Theraja
4. Electronic Devices and Circuit Theory - ROBERT BOYLESTAD
   - LOUIS NASHELSKY

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উদ্দেশ্য

- পদ্মা-মেঘনা-যমুনা বদ্বীপ অধ্যুষিত ভৌগোলিক অঞ্চলে বাঙ্গালী সমাজ গঠন এবং নানা ঐতিহাসিক বিবর্তনের পর্যায় পেরিয়ে গঠিত আধুনিক বাংলাদেশ সম্পর্কে শিক্ষার্থীদের যথার্থ অবগত করানো এবং তাদের সঠিক বোধ সৃষ্টিকরণ।
- প্রাকৃতিক ও অর্থনৈতিক কাঠামোর পরিমন্ডলে বাংলাদেশের সাংস্কৃতিক বিকাশের সাথে শিক্ষার্থীদের উজ্জীবিত করে বাংলাদেশের যোগ্য ও পরিশীলিত নাগরিক হিসাবে যথার্থ বিকশিতকরণ।

সংক্ষিপ্ত বিবরণী

ইতিহাস

- ইতিহাসের সংজ্ঞা।
- বাংলাদেশের আবহাওয়া ও অধিবাসী।
- প্রাগৈতিহাসিক ও প্রাচীনকালে বাংলাদেশ ।
- বাংলায় মুসলমানদের আগমন, প্রতিষ্ঠালাভ ও শাসন – খলজী ও তুর্কী শাসনে বাংলায় স্বাধীন সুলতানী প্রতিষ্ঠা; বাংলাদেশে শাহী আমল, আফগান ও মোঘল আমলে বাংলার শাসন।
- বাংলায় ইউরোপীয় বণিকদের আগমন; নবাবী আমলে বাংলার শাসন ব্যবস্থা; বাংলায় ইংরেজ শাসন ক্ষমতা লাভ ও প্রতিষ্ঠা।
- ব্রিটিশ বিরোধী সশস্ত্র প্রতিরোধ আন্দোলন; সংস্কার আন্দোলন ও জাতীয়তাবাদের বিকাশ এবং বাংলার নবজাগরণ; বঙ্গভঙ্গ ও বঙ্গভঙ্গ উত্তরকালে বাংলার রাজনীতি ও দেশ বিভাগ।
- পাকিস্তান আমলে বাংলাদেশ এবং বাংলাদেশের মুক্তি সংগ্রাম ও যুদ্ধ।

সংস্কৃতি

সংস্কৃতির সংজ্ঞা, আদিযুগে বাংলার সমাজ-সংস্কৃতির রূপরেখা, সুলতানী, মোঘল ও নবাবী আমলের বাংলার সমাজ সংস্কৃতি; ইংরেজ আমলে বাংলার সমাজ ও সংস্কৃতি।
রবীন্দ্র ও নজর"ল যুগ এবং রবীন্দ্র ও নজর"ল উত্তর বাংলার সমাজ ও সংস্কৃতি; পাকিস্তান আমলে বাংলাদেশের সাংস্কৃতিক রূপরেখা; স্বাধীনতাউত্তর বাংলাদেশের সংস্কৃতি।

বিশদ বিবরণী

ইতিহাস

১. ইতিহাসের সংজ্ঞা, প্রাগৈতিহাসিক আমলের বাংলাদেশ এবং বাংলাদেশের আবহাওয়া ও অধিবাসী সম্পর্কে অবগত হওয়া।

১.১ ইতিহাসের সংজ্ঞা প্রদান।
১.২ বাংলাদেশের প্রাচীন জনপদ উলে- খ করা।
১.৩ বঙ্গ বা বাংলা নামের উৎপত্তি ব্যাখ্যা করা।
১.৪ বঙ্গের সীমারেখা চিহ্নিত করা।
১.৫ বাংলার আবহাওয়া ও এর অধিবাসীদের চরিত্রে আবহাওয়ার প্রভাব বিবৃত করা।
১.৬ প্রাগৈতিহাসিক ও প্রাচীন বাংলার আর্থসামাজিক ব্যবস্থা বর্ণনা করা।

২. বাংলাদেশে গুপ্ত, রাজা শশাঙ্ক, পাল ও মুসলিম শাসন সম্পর্কে অবগত হওয়া।

২.১ গুপ্ত শাসন আমলে বাংলার শাসনব্যবস্থা বর্ণনা করা।
২.২ রাজা শশাঙ্কের রাজ্য বিজয় ও শাসন বর্ণনা করা।
২.৩ বাংলার অরাজকতা ও হিউয়েনসাং এর আমলে বাংলার অবস্থা বর্ণনা করা।
২.৪ গোপাল কর্তৃক অরাজকতার অবসান ঘটানোর কৃতিত্বের বর্ণনা করা।
২.৫ বাংলাদেশে মুসলমানদের আগমন ও বখতিয়ার খলজীর বাংলা বিজয় বর্ণনা করা।
২.৬ বাংলাদেশে স্বাধীন সুলতানী শাসন প্রতিষ্ঠায় শামছুদ্দিন ইলিয়াশ শাঞ্চীর কৃতিত্ব বর্ণনা করা।
২.৭ বাংলায় মোঘল শাসনের ইতিবৃত্ত ব্যাখ্যা করা।
২.৮ ১৭৫৭ সালের পলাশীর যুদ্ধের কারণ, ঘটনা ও ফলাফল বর্ণনা করা।

৩. পলাশীযুদ্ধ পরবর্তী অবস্থায় ইস্ট ইন্ডিয়া কোম্পানীর আধিপত্য বিস্তার সম্পর্কে জ্ঞাত হওয়া।

৩.১ দেওয়ানী, দ্বৈতশাসন ও বাংলার দুর্ভিক্ষ বর্ণনা করা।
৩.২ ইংরেজদের চিরস্থায়ী বন্দোবস্ত এবং এর ফলাফল বর্ণনা করা।

৩.৩ বাংলাদেশে জমিদার, প্রজাব্যবস্থা প্রতিষ্ঠা এবং আর্থ-সামাজিক ব্যবস্থায় জমিদারদের ভূমিকা ও প্রজাকুলের সার্বিক অবস্থা উলে- খ করা।

৩.৪ ১৯০৫ সালের বঙ্গভঙ্গ আন্দোলন ও ফলাফল ব্যখ্যা করা।

৩.৫ হাজী শরীয়ত উল- াহর ফরায়েজী আন্দোলন ও এর ফলাফল ব্যখ্যা করা।

৪. বঙ্গভঙ্গউত্তর রাজনীতি ও দেশ বিভাগ সম্পর্কে অবহিত হওয়া।

৪.১ ১৯৩৭ এর নির্বাচন ও এর বৈশিষ্ট্য উলে- খ করা।

৪.২ লাহোর প্রস্তাব ব্যক্ত করা।

৪.৩ ১৯৪৩ এর বাংলার দুর্ভিক্ষের কারণ ও এর পূর্বাপর অবস্থা উলে- খ করা।

৪.৪ পাকিস্তানের পূর্বাঞ্চল হিসাবে ১৯৪৭ সালে পূর্ব পাকিস্তানের প্রতিষ্ঠা ব্যাখ্যা করা।

৫. পাকিস্তান আমলে বাংলাদেশের (তৎকালীন পূর্ব পাকিস্তান) রাজনীতি, অর্থনীতি ও সামাজিক অবস্থা সম্পর্কে অবগত হওয়া।

৫.১ ভাষা আন্দোলন ও সমকালীন রাজনৈতিক ও সামাজিক প্রেক্ষিত ব্যক্ত করা।

৫.২ আওয়ামীলীগ প্রতিষ্ঠা, যুক্তফ্রন্ট ও ২১ দফা দাবীর ভিত্তিতে নির্বাচন অনুষ্ঠান এবং যুক্তফ্রন্টের মন্ত্রিসভা গঠন ও বাতিল আলোচনা করা।

৫.৩ পাকিস্তানের সামরিক অভ্যুত্থান, আইয়ুব বিরোধী আন্দোলন ও ৬ দফা দাবী, আগরতলা ষড়যন্ত্র মামলার ইতিবৃত্ত বর্ণনা করা এবং পূর্ব-পশ্চিম পাকিস্তানের অর্থনৈতিক বৈষম্যের খতিয়ান উলে- খ করা।

৫.৪ ১৯৬৯ সালের গণঅভ্যুত্থান এবং এর ধারাবাহিকতায় বাংলাদেশের মুক্তিযুদ্ধ ও স্বাধীন সার্বভৌম বাংলাদেশ প্রতিষ্ঠা করার পটভূমি ও ঘটনা প্রবাহ বর্ণনা করা।

৫.৫ ১৯৭১ সালের ঐতিহাসিক মুক্তিযুদ্ধ এবং স্বাধীন সার্বভৌম বাংলাদেশের অভ্যুদয় বর্ণনা করা।

৬. স্বাধীন সার্বভৌম বাংলাদেশের রাজনীতি ও আর্থ-সামাজিক অবস্থা সম্পর্কে অবগত হওয়া।

৬.১ যুদ্ধোত্তর স্বাধীন সার্বভৌম বাংলাদেশের আর্থ-সামাজিক পুনর্গঠন কর্মতৎপরতা বর্ণনা করা।

৬.২ ১৯৭৩ সালের নির্বাচন এবং ১৯৭৪ সালে সংবিধানের ৪র্থ সংশোধনীর মাধ্যমে সরকার পদ্ধতির পরিবর্তন ব্যক্ত করা।

৬.৩ ১৯৭৫ সালের ১৫ আগস্ট জাতির জনক বঙ্গবন্ধু শেখ মুজিবুর রহমান -এর শাহাদাত বরণ এবং রাজনৈতিক পটপরিবর্তন।

৬.৪ ১৯৮১ সালে রাষ্ট্রপতি জিয়াউর রহমানের শাহাদাত বরণ, ১৯৮২ সালের সামরিক অভ্যুত্থান এবং রাজনৈতিক পটভূমি পরিবর্তন।

৬.৫ ১৯৯০ সালে এরশাদ সরকারের পতন এবং তত্ত্বাবধায়ক সরকার পদ্ধতি অনুসংগে ১৯৯১ সনের নির্বাচন এবং গণতান্ত্রিক অনুশীলনের সূচনা।

সংস্কৃতি

৭. সংস্কৃতির সংজ্ঞা এবং প্রাচীন ও মধ্যযুগীয় বাংলার সংস্কৃতি ও সাহিত্য চর্চা সম্পর্কে অবগত হওয়া।

৭.১ সংস্কৃতির সংজ্ঞা দান।

৭.২ প্রাচীন বাংলার ভাষা সাহিত্য ও সংস্কৃতির রূপরেখা বর্ণনা করা।

৭.৩ বাঙ্গালী সংস্কৃতি নির্মাণে মর্সিয়া ও পুঁথি সাহিত্যের প্রভাব বর্ণনা করা।

৮. আধুনিক যুগে বাংলাদেশের সংস্কৃতি ও বাংলাভাষার আধুনিক রূপলাভ সম্পর্কে অবগত হওয়া।

৮.১ ইংরেজ শাসন আমলে সামাজিক কুসংস্কার দূরীকরণে (স্যার সৈয়দ আহমদ, সৈয়দ আমীর আলী ও রাজা রামমোহন রায়) এর আবির্ভাব এবং তাদের কর্মতৎপরতা ব্যাখ্যা করা।

৮.২ ক্যারি সাহেব এবং ফোর্ট উইলিয়াম কলেজ/সংস্কৃত কলেজ স্থাপনের মাধ্যমে বাংলার নতুন সংস্কৃতির রূপলাভ বর্ণনা করা।

৮.৩ ইংরেজদের শিক্ষানীতি প্রবর্তন ব্যাখ্যা করা এবং কলিকাতা বিশ্ববিদ্যালয় ও ইসলামিয়া মাদ্রাসা স্থাপনের মাধ্যমে বাংলার সংস্কৃতির বিকাশ ব্যক্ত করা ।

৮.৪ ঢাকা বিশ্ববিদ্যালয় প্রতিষ্ঠার ইতিবৃত্ত ব্যাখ্যা করা।

৯. ১৯৪৭ এর দেশ বিভাগ ও সাংস্কৃতিক অবস্থার পরিবর্তন সম্পর্কে অবগত হওয়া।

৯.১ তৎকালীন পূর্ব পাকিস্তানের তমুদ্দুন মজলিসের ভূমিকা উলে- খ করা।

৯.২ ১৯৫২ সালের ভাষা আন্দোলনের সাংস্কৃতিক গুর"ত্ব উলে- খ করা।

৯.৩ ঢাকা কেন্দ্রিক শিল্পী-সাহিত্যিকদের বাংগালী সংস্কৃতি বিনির্মাণের ভূমিকা পালন উলে- খ করা।

৯.৪ '৬৯ এর গণ আন্দোলনে সাংস্কৃতিক কর্মীদের ভূমিকা উলে- খ করা।

৯.৫ বাঙলা একাডেমীর প্রতিষ্ঠা এবং বাংলা ভাষা ও সাহিত্যে এর ভূমিকা উলে- খ করা।

৯.৬ আন্তর্জাতিক মাতৃভাষা দিবস হিসেবে ২১ ফেব্র"য়ারির তাৎপর্য ব্যক্ত করা।

৯.৭ ভাষা, শিল্প সাহিত্য চর্চায় সংবাদপত্র ও ইলেকট্রনিক মিডিয়ার ভূমিকা উলে- খ করা।

১০. সংস্কৃতির উপর গ্রামীণ অর্থনীতির প্রভাব অবগত হওয়া।

১০.১ তাঁত শিল্প ও মসলিন উৎপাদনের ইতিবৃত্ত ব্যাখ্যা করা।

১০.২ পাট চাষের অর্থনৈতিক প্রভাব ব্যক্ত করা।

১০.৩ বাঙ্গালী সংস্কৃতির অংশ হিসেবে দুগ্ধজাত মিষ্টান্ন সামগ্রীর (মিষ্টি, মাখন, দধি, পিঠা-পুলি প্রভৃতি) প্রভাব ব্যক্ত করা।

১০.৪ দেশীয় মেলা ও পার্বনের সাংস্কৃতিক গুর"ত্ব ব্যাখ্যা করা।

১০.৫ গ্রামীণ পেশাজীবিদের (কামার, কুমার, তাঁতী, জেলে, ছুতার, ইত্যাদি) সাংস্কৃতিক গুর"ত্ব ব্যাখ্যা করা।

১১. বাংলাদেশের সংস্কৃতিতে আদিবাসী সংস্কৃতি ও প্রত্ন তাত্ত্বিক নিদর্শনের অবদান সম্পর্কে অবগত হওয়া।

১১.১ বাংলাদেশের আদিবাসী সম্পর্কে উলে- খ করা।

১১.২ বাংলাদেশের সংস্কৃতিতে গাড়ো, রাখাইন, সাওতাল, চাকমা আদিবাসীদের সংস্কৃতিক অবদান ব্যখ্যা করা।

১১.৩ বাংলাদেশের প্রাচীন সংস্কৃতির ঐতিহ্য হিসাবে মহাস্থানগড়, ময়নামতি ও পাহাড়পুরের প্রত্নতাত্ত্বিক নিদর্শনের বর্ণনা দান।

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5841 BUSINESS ORGANIZATION & COMMUNICATION

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AIMS

- To be able to understand the basic concepts and principles of business organization.
- To be able to understand the banking system.

- To be able to understand the trade system and stock exchange activities in Bangladesh.
- To be able to understand the basic concepts of communication and its types, methods.
- to be able to perform in writing , application for job, complain letter & tender notice.

SHORT DESCRIPTION

Principles and objects of business organization; Formation of business organization; Banking system and its operation; Negotiable instrument; Stock Exchange; Home trade and foreign trade. Basic concepts of communication Communication model& feedback; Types of communication; Methods of communication; Formal & informal communication; Essentials of communication; Report writing; Office management; Communication through correspondence; Official and semi-official letters.

DETAIL DESCRIPTION

1 **Understand business organization.**
- 1.1 Define business.
- 1.2 Mention the objects of business.
- 1.3 Define business organization.
- 1.4 State the function of business organization.

2 Understand the formation of business organization.
- 2.1 Define sole proprietorship, partnership, joint stock company. and co-operative
- 2.2 Describe the formation of sole proprietorship, partnership , joint stock company, & co operative.
- 2.3 Mention the advantages and disadvantages of proprietorship, partnership and joint stock company.
- 2.4 State the principles of Co operative & various types of Co operative.
- 2.5 Discuss the role of co-operative society in Bangladesh.

3 Understand the banking system and negotiable instrument.
- 3.1 Define bank.
- 3.2 State the service rendered by bank.
- 3.3 Describe the classification of bank in Bangladesh.
- 3.4 State the functions of Bangladesh Bank in controlling money market.
- 3.5 State the functions of commercial Bank in Bangladesh
- 3.6 Mention different types of account operated in a bank.
- 3.7 Mention how different types of bank accounts are opened and operated.
- 3.8 Define negotiable instrument.
- 3.9 Discuss various types of negotiable instrument.
- 3.10 Describe different types of cheque.
- 3.11 Define letter of credit.

4 Understand the home & foreign trade
- 4.1 Define home trade & foreign trade.
- 4.2 Describe types of home trade.
- 4.3 Differentiate between whole sale trade and retail trade.
- 4.4 Define foreign trade.
- 4.5 Mention the advantages and disadvantages of foreign trade.
- 4.6 Mention the classification of foreign trade.
- 4.7 Discuss the import procedure & exporting procedure.
- 4.8 Discuss the importance of foreign trade in the economy of Bangladesh.

5 Understand the basic concepts of communication

5.1 Define communication & business communication.
5.2 Describe the scope of business communication.
5.3 State the objectives of business communication.
5.4 Discuss the essential elements of communication process.

6 Understand the communication model and feedback.

6.1 Define communication model.
6.2 State the business functions of communication model.
6.3 Define feedback .
6.4 State the basic principles of effective feedback.
6.5 Explain the essential feedback to complete communication process.

7 Understand the types of communication.

7.1 Explain the different types of communication.
7.2 Distinguish between upward and downward communication.
7.3 Define two-way communication.
7.4 Describe the advantages and disadvantages of two-way communication.
7.5 Define formal & informal communication.
7.6 Describe the advantages and disadvantages of formal & informal communication.
7.7 Distinguish between formal and informal communication.

8 Understand the methods of communication.

8.1 Define communication method.
8.2 Discuss the various methods of communication.
8.3 Describe the advantages and disadvantages of oral communication.
8.4 Describe the advantages and disadvantages of written communication.
8.5 Distinguish between oral and written communication.

9 Understand the essentials of communication.

9.1 Discuss the essential feature of good communication.
9.2 Describe the barriers of communication.
9.3 Discuss the means for overcoming barriers to good communication.

10 Understand the report writing.

10.1 Define report , business report & technical report.
10.2 State the essential qualities of a good report.
10.3 Describe the factors to be considered while drafting a report.
10.4 Explain the components of a technical report.
10.5 Distinguish between a technical report and general report.
10.6 Prepare a technical report.

11 Understand the office management.

11.1 Define office and office work.
11.2 State the characteristics of office work.
11.3 Define filing and indexing.
11.4 Discuss the methods of filing.
11.5 Discuss the methods of indexing.
11.6 Distinguish between filing and indexing.

12 Understand the official and semi-official letters.

12.1 State the types of correspondence.
12.2 State the different parts of a commercial letter.
12.3 Define official letter and semi-official letter.
12.4 Distinguish between official letter and semi-official letters.

12.5 Prepare the following letters: Interview letter, appointment letter, joining letter and application for recruitment. Complain letters, tender notice.