AUTOMOBILE TECHNOLOGY (62)

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.	6231	Automotive Engine System-1	2	6	4	20	80	50	50	200
2.	6811	Basic Electronics	2	3	3	20	80	25	25	150
3.	6632	Computer Application-II	0	6	2	-	-	50	50	100
4.	5931	Math-III	3	3	4	30	120	50	-	200
5.	5922	Physics-II	3	3	4	30	120	25	25	200
6.	5811	Social Science-1	2	0	2	20	80	-	-	100
7.	5711	Bangla	2	2	3	20	80	50	-	150
		Total	**14**	**23**	**22**	**140**	**560**	**200**	**200**	**1100**

AUTOMOBILE TECHNOLOGY (62)

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.	3731	Engineering Thermodynamics	3	3	4	30	120	25	25	200
2.	6241	Automotive Body Building & Repair	2	3	3	20	80	25	25	150
3.	6243	Fuels & Lubricants	2	3	3	20	80	25	25	150
4.	6242	Vehicle Driving, Estimating & Fitness Test	2	3	3	20	80	25	25	150
5.	6732	General Electricity	3	3	4	30	120	25	25	200
6.	5821	Social Science-2	2	-	2	20	80	-	-	100
7.	5841	Business Organization & Con	2	-	2	20	80	-	-	100
		Total	**16**	**18**	**21**	**160**	**640**	**125**	**125**	**1050**

PT-7131 ENGINEERING THERMODYNAMICS T P C
3 3 4

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of engineering thermodynamics with special emphasis on.

- heat and temperature
- Application of heat
- thermodynamic systems
- thermodynamic laws and processes
- properties of gas, vapor and steam
- thermodynamic cycles
- transmission of heat

SHORT DESCRIPTION

Definition and Scope of thermodynamics; Heat and heat units; Temperature and its scales; Thermodynamic systems; Thermodynamic laws & processes; Properties of gas; vapor and steam; Entropy and enthalpy; Thermodynamic air cycles; Thermodynamic vapor cycles; Refrigeration and heat pumps; Transmission of heat.

theory:

INTRODUCTION

1. Understand the scope of thermodynamics

1.1. Define thermodynamics.
1.2. Outline the importance of thermodynamics in engineering field.
1.3. Identify different applications of thermodynamics in engineering field.

Heat & temperature

2. Understand the basic concept of heat & temperature

2.1. Define heat.
2.2. Mention the units of heat.
2.3. Convert one heat unit to another heat units.
2.4. Define absolute temperature in rankine and kelven scale.
2.5. Relate rankine and kelvin scales of temperature.
2.6. Distinguish between heat and temperature.
2.7 Explain heat is a low grade energy and work is a high grade energy .
2.8 Solve problems on converting heat units and temperature scale. **SPECIFIC**

HEAT OF GASES

3 Understand the concept of specific heat of gases .

3.1 Define specific heat , thermal capacity and water equivalent.

3.2 Describe the terms specific heat at constant pressure (C_p) and specific heat at constant Volume ($C_{v)}$

3.3 Mention Rgnault's law.

3.4 Relate two specific heats (C_p and C_v).

3.5 Explain the ratio of two specific heats (γ)

3.6 Mention the standard value of C_p, C_v, and γ for some common gases.

3.7 Explain the molar specific heats of a gas.

3.8 Solve problems on C_p, C_v, and γ.

LATENT HEAT AND SENSIBLE HEAT

4 Understand the concept of latent heat and sensible heat.

4.1 Define sensible heat and latent heat.

4.2 Explain the terms freeing and boiling point temperature in different scale.

4.3 Explain different types of latent heat.

4.4 List the values of different latent heat for water and Ice in different units.

4.5 Computer the formulae to calculate sensible sensible heat and latent heat.

4.6 Solve problems on sensible heat, latent heat and total heat.

THERMODYNAMIC SYSTEMS

5 Understand the aspects of thermodynamic systems.

5.1 Define thermodynamic system, boundary and surrounding.

5.2 Explain the different system i,e open system, closed system and isolated system with example.

5.3 List the properties of thermodynamic systems.

5.4 Describe the control volume.

5.5 Compare the thermodynamic system and control volume.

LAWS OF THERMODYNAMICS

6 Understand the laws of thermodynamics.

6.1 Sate the laws of thermodynamics.

6.2 Explain the 1st law of thermodynamics.

6.3 Mention the corollaries of 1st law of thermodynamics.

6.4 Explain the 2nd law of thermodynamics.

6.5 Mention the corollaries of 2nd law of thermodynamics.

6.6 Mention the physical significance of 1st and 2nd law of thermodynamics.

6.7 Explain the 3rd law of thermodynamics.

6.8 Explain the Zeroth law if thermodynamic.

6.9 Solve problems on laws of thermodynamics.

LAWS OF PERFECT GASES

7 Understand The laws of perfect gases.

7.1 Dentine perfect gas.
7.2 Explain the variables of perfect gases.
7.3 State boyle's law, Charle's law and Gay-Lussac law, Avogdro's law.
7.4 Explain the general gas equation, characteristic gas equation and universal gas constant or molar constant.
7.5 Solve problems using gas laws and equations.

INTERNAL ENERGY & ENTHALPY

8 Understand the internal energy and enthalpy of gases.

8.1 Define internal energy.
8.2 Define enthalpy.
8.3 Explain the internal energy of gas heated at constant volume and constant pressure.
8.4 Relate between internal energy and enthalpy.
8.5 Explain Joules law.
8.6 Solve problems on change of internal energy.

METHODS OF HEATING AND EXPANDING OF GASES

9. Understand the thermodynamic processes of perfect gases.

9.1 Define thermodynamic process.
9.2 Explain the flow processes and non-flow processes of gases.
9.3 Describe the various non-flow thermodynamic processes with p-v and t-s diagrams.
9.4 Determine the work done by the gases during above process.
9.5 Explain the steady and unsteady flow processes.
9.6 Describe the steady flow energy equations.
9.7 Solve problems on thermodynamic processes.

ENTROPY OF GASES.

10. Understand the entropy of perfect gases.

10.1 Define entropy.
10.2 Mention the importance of entropy.
10.3 Describe the principle of increase of entropy.
10.4 Establish the relation between heat & entropy.
10.5 Explain the general expression for change of entropy of a
10.6 perfect gases during various thermodynamic processes.
10.7 Solve problems on entropy of different thermodynamic processes.

VAPOR AND STEAM

11 Understand the properties of vapor and steam

11.1 Name the three-state of a substance.
11.2 Distinguish between the steam and vapors.
11.3 Discuss the triple point of a substance.
11.4 List the properties of vapors.
11.5 Explain the formation of steam at constant pressure.
11.6 Describe the important terms for steam (wet steam, dry saturated steam, superheated steam, dryness fraction specific volume of steam, etc)
11.7 Explain the method of using steam table.
11.8 Explain the mollier diagram,
11.9 Find out the different properties of steam from steam table at

certain pressure and temperature .

THERMODYNAMIC CYCLES

12 **Understand the aspects of thermodynamic cycles.**

- 12. 1 Define thermodynamic cycle.
- 12. 2 List the assumption in thermodynamic cycles.
- 12. 3 Explain the reversible and irreversible cycles.
- 12. 4 State the meaning of air standard cycle. Gas power cycle and vapor power cycle.

13 Understand the aspects of non-conventional thermodynamic air cycles.

- 13.1 List the non-conventional air cycle .
- 13.2 Describe the cannot cycle with P-V and T-S diagrams.
- 13.3 Describe Stirling and Ericsson cycles with P-V and T- S
- 13.4 Determine air standard efficiencies of carnot cycles.
- 13.5 Solve problems on Carnot cycles.

14 Understand the aspects of conventional air cycles.

- 14.1 List the conventional air cycles.
- 14.2 Describe the conventional air cycles i,e Otto cycle, diesel cycle dual cycle and Brayton cycle with on PV and T-S diagrams.
- 14.3 compare oHo, Diesel and Dual cycles.
- 14.4 Determine the air standard efficiency of Otto & Diesel cycle.
- 14.5 Compare the theoretical Otto and diesel cycles with the actual Otto and Diesel cycles.
- 14. 6 Solve problems on Otto & Diesel cycle

15 Understand the aspects of thermodynamics vapor cycles

- 15.1 Define vapor cycle.
- 15.2 Describe the Rankin cycle with incomplete evaporation and modified Rankine cycle with superheated steam.
- 15.3 Define reheat, regenerative and reheat-regenerative vapor cycles.
- 15.4 Explain the reheat, regenerative and reheat-regenerative vapor cycles with P-V and T-S diagrams.
- 15.5 Compare the reheat, , regenerative and reheat-regenerative vapor cycles.
- 15.6 Describe the binary vapor cycle and topping cycle.

REFRIGERATION AND HEAT PUMPS

16. Understand the features of refrigeration and heat pumps.

- 16.1 State the meaning of heat engine refrigeration and heat pump cycles.
- 16.2 Describe the reverse cannot cycle with P-V and T-S diagrams.
- 16.3 Describe the vapor compression mechanical refrigeration cycle.
- 16.4 Determine the Co-efficient of performance COP (heating & refrigerating)
- 16.5 Describe the capacity of the refrigerating Machine
- 16.6 Describe the vapor absorption refrigeration cycle
- 16.7 Solve problems on COP and TR.

TRANASMISSION OF HEAT

17. Understand the modes of heat transfer.

- 17.1 Define conduction, convection and radiation of heat.
- 17.2 Describe the coefficient of thermal conductivity.
- 17.3 Deduce the formula of the conductive heat flow through flat surface and thick cylinder.

17.4 Deduce the formula of the heat flow by convection through tube.
17.5 Deduce the formula of the radiant heat transmission.
17.6 Solve problem on the three modes of heat transfer.

18. Understand the features of heat exchanges

18.1 Define heat exchanger.
18.2 Mention the classification of the heat exchangers.
18.3 Explain the operation of parallel flow, counter flow and cross flow heat exchangers
18.4 Explain Log mean Temperature Difference (LMTD)
18.5 Explain the operation of direct contract heat exchanger with example.
18.6 Explain the operation of regenerative heat exchanger with example
18.7 Explain the operation of recuperative heat exchanger.

Practical:

1. Verify Boyle's law with Boyle's law test apparatus i.e. $P_1V_1=P_2V_2$……..= constant.
2. Verify Gay – Lussac law by measuring pressure of the refrigeration cylinder in different temperature

i.e. $\frac{p_1}{T_1} = \frac{P_2}{T_2}$ ……..= constant.

3. Observe the 4-stroke Otto Cycle with a model.
4. Observe the 4-stroke diesel Cycle with a model.
5. Observe the 2-stroke diesel Cycle with a model.
6. Determine the mechanical equivalent of heat by Joule's apparatus to verify first law of thermodynamics.
7. Observe the heat transfer modes (Conduction, convention and radiation) with refrigerator or an engine.
8. Observe Rankine cycle with a steam engine model.
9. Observe the refrigeration cycle to verify second law of thermodynamics.
10. Determine the amount of heat exchange by a parallel and counter flow heat exchangers.

Reference Book:-

1. Engineering Thermodynamics - R. S. Khurmi
2. Engineering Thermodynamics - P.K. Nag
3. Heat and Thermodynamics -Brij lal N. Subrahmanyam
4. Thermal Engineering - A.S. Sarao

Publishers:
Mc- GRAW- HILL BOOK COMANY
New York- st, louis San Francisco Dallas Tononto, London Sydney.

6241 AUTOMOTIVE BODY BUILDING & REPAIR

T	P	C
	2	3	3

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of automobile body building and repair with special emphasis on:

- automobile body construction and effect of collision on automobile body
- tools and equipment required for collision damage works and repairing
- welding and soldering process
- automobile body painting.

SHORT DESCRIPTION

Automobile body; Construction of automobile body; Manufacturing process; Effect of collision; Tools and equipment required for auto-body repair; Fasteners; Sheet metal damage repair; Welding process; Fitting methods; Materials for automobile body; Surface preparation; Features of primer; Plastic fillers; Fiber glass repair; Refinishing methods and spray painting equipment.

DETAIL DESCRIPTION

Theory :

1 Understand the features of automobile body.

1.1 Define the automobile frame.
1.2 Name the different types of frame used in automobile.
1.3 Explain the forming of metal frame to provide strength crown, angles and flanges, U-channels and box section rails pillars.
1.4 Explain the process of modern vehicle design.
1.5 Mention the function of an automobile body.

2 Understand the construction of automobile body.

2.1 Describe the method of construction of automobile body, viz: skeleton, sub frame.
2.2 Name the various designs of automobile body.
2.3 Explain various designs of automobile body.
2.4 Describe clearly main components of a automobile body with the help of neat sketch .

3 Understand the types and the manufacturing process of automobile body.

3.1 Name the different types of automobile body.
3.2 Mention the importance of automobile body.
3.3 Describe the method of manufacturing automobile body.
3.4 Explain the effects of overhangs.

4 Understand the effect of collision of the automobile body.

4.1 Mention the effects of collision of the automobile body.
4.2 Define metal bumping & dinging, buckle & roll of sheet metal.
4.3 Explain the low and high spot damage of body.
4.4 Mention the uses of fittings, denting, straightening and alignment of automobile body.

5 Understand the tools and equipment required for collision damage work.

5.1 Identify the hand tools for collision work.
5.2 List some necessary hand bumping tools for the automobile body repair.

5.3 Mention the function of
   a. Hammer
   b. Dolly blocks
   c. Spoons
   d. Files and Files holders
   e. Mechanical and hydraulic jacks

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6 Understand the fasteners used in the assembly of the automobile body.

6.1 Mention the uses of various types of bolts, viz cap screw, carriage bolt, bumper bolt, studs and machine bolt and stove bolt.
6.2 Mention the uses of different types of nuts used with the various fasteners.
6.3 Mention the use of different types of clips and washers.

7 Understand the procedure of sheet metal damage repairing.

7.1 Mention the factors to be considered to determine the types of damage.
7.2 Explain the methods of choosing the right type of hammer.
7.3 Explain the principle of the dolly action.
7.4 Explain the principle of using hammer of dolly method.
7.5 Describe the method of detecting high and low spots.
7.6 Explain the process of body filing.
7.7 Describe the process of picking up the low spots.
7.8 Mention basic use of the disc grinder.
7.9 Describe the repairing procedure of the damage by using mechanical and hydraulic body jacks.
7.10 Describe the repairing procedure of crowned panel.

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8 Understand the welding processes and their application.

8.1 State what is meant by gas welding.
8.2 Mention the use of gas welding.
8.3 Explain the different types of gas flame and their uses.
8.4 Define the different types of welding position and various types of welding joints with sketches.
8.5 Describe the process of sheet metal welding.
8.6 Mention the uses of arc welding.
8.7 Describe the process of striking the arc.
8.8 Describe the process of running beat.
8.9 State the safety Precautions when using welding equipment around automobile.
8.10 Mention the use of spot welding.
8.11 Compare soldering, brazing & welding.

9 Understand the fitting methods of deck lid, hood and door.

9.1 Describe the process of bending or straightening of metallic steel.
9.2 Describe the process of deck lid fitting..
9.3 Describe the process of hood fitting.
9.4 Describe the process of door fitting.
9.5 Describe the process of correcting misarranged door.
9.6 Describe the frame straightening methods.

10 Understand the material required for automotive body making.

10.1 List the materials required for automotive body making.
10.2 Mention the uses of materials in automobile body making.
10.3 Identify the materials used in automobile body making.

10.4 Discuss extensively how the automobile body is protected from rust.

11. Understand the plastic fillers and fiberglass repair.

Mention the purposes of filler.
Mention the use of plastic filler.
Name the types of filler.
Describe the procedure of preparing plastic filler.
Describe the application procedure of filler.
Describe the method of fiber glass repairing.

12. Understand the surface preparation.

Mention the meaning of surface preparation.
Mention the purpose of surface preparation.
Describe the steps of surface preparation.
Mention the use of putties and sealers.
Describe the methods of surface preperation using of abrasibe papers and sanding opertion

13. Understand the features of primer.

State the meaning of term primer.
Mention the use of primer.
Name the different types of primer.
Explain the uses of primer-sealer.
Describe the process of primer application.

14. Understand the refinishing method of automobile body.

Mention the importance of painting.
List the basic ingredients of painting.
Mention the uses of pigment, binder & solvent.
Mention the uses of top coat, under coat and guide coat.
Describe the method of application of synthetic enamel and lacquers.
Explain the uses of thinners and reducers. .
Describe manual painting process.
List the steps of painting a automobile body.
List the safety steps in the paint shop.

15. Understand the spray painting equipment.

List the name of principle parts of a spray gun.
Name the different types of spray gun.
Describe the process of spray gun adjustment.
State the operating principle of spray gun.
Describe the process of painting by using the spray gun.
Describe the method of refinishing the complete automobile.

<u>Practical</u> : (Field trip should be included to relemant workshop).

1 Study the automobile body parts.

1.1 Identify the panels and crown.
1.2 Identify the floor panel assembly and front cowl assembly.
1.3 Identify the quarter panel, roof assembly and front end assembly.
1.4 Identify the radiator, bumper and hood.
1.5 Identify door glass, interior hardware and trim.

1.6 Identify different types of seats of automobile.
1.7 Identify glass and wind shield and rear window glass mountings.

2 Study the hand tools of body bumping of automobile.

2.1 Identify the bumping, dinging and pick hammers.
2.2 Identify dollies, spoons, pry bars, body files, file holders and reveal file handle and file blade set.

3 Study the fasteners of automobile.

3.1 Identify bolts and their types: such as cap screw, carriage bolts, bumper bolts, studs machine bolts and stove bolts.
3.2 Identify the common types of nuts used with the various fasteners viz: castle, acorn, squire, hex, slotted hex, retainer nuts, flanged hex nuts, etc.
3.3 Identify the labeler types speed clips and metal screws.
3.4 Practice the selecting bolt and screw sizes, head and nut sizes.
3.5 Identify the washers and hollow rivets.
3.6 Identify the different types of rivets.
3.7 Practice riveting to build up an automobile body.

4 Practice the oxy-acetylene welding.

4.1 Identify the components of oxy-acetylene welding equipment.
4.2 Turn the welding units.
4.3 Light the welding torch and prepare the three types of flame.
4.4 Shut off the flame.
4.5 Practice the welding work on various welding positions; viz; flat; vertical; overhear and horizontal.
4.6 Practice welding a sheet metal.
4.7 Practice braze welding in vertical and horizontal position.
4.8 Practice oxygen cutting by cutting attachments.
4.9 Practice cutting plate and cutting sheet metal.

5 Perform electric welding.

5.1 Identify the components of electric arc equipment.
5.2 Select the electrodes and their sizes.
5.3 Set the current of the mahcine.
5.4 Practice in striking the Arc.
5.5 Practice on running a beat.
5.6 Practice welding in various position.

6 Perform the sheet metal damage repair.

6.1 Practice the hammering techniques.
6.2 Practice denting with hammer and dolly.
6.3 Apply basic hammer and dolly methods in straightening damage area.
6.4 Apply techniques of body filing cross and x filing.
6.5 Practice in picking up low spots.
6.6 Practice in using disc sander or grinder to remove paint and to provide scratch pattern.

7 Perform straightening typical damage.

7.1 Practice in selecting hinge buckle, roll buckle, direct damage and indirect damage.
7.2 Practice in straightening damage by using jacks.
7.3 Practice in straightening metal without damaging the point.
7.4 Practice repairing a double high crowned area.

7.5 Practice repairing a low crowned area.
7.6 Practice in straightening a reverse crowned areas.

8 Perform soldering.

8.1 Identify the components of soldering unit.
8.2 Practice the process of using solder.
8.3 Apply the solder filling techniques.
8.4 Show tinning steps for using tinning flux.
8.5 Practice the application of soldering puddles.
8.6 Practice the soldering on the surface.

9 Perform fitting methods.

9.1 Practice assembling and disassembling of radiator.
9.2 Practice bumper adjustment.
9.3 Practice wind shield and window glass fitting.
9.4 Practice door fitting, raising and lowering the door, forward and back ward adjustment, misarranged door correction, adjustment of door locks.

10 Perform refinishing.

10.1 Identify the pigment binder and solvent.
10.2 Practice the top coats and under coats.
10.3 Apply synthetic enamel, lacquers, metallic top coats, primary putties, sealers and reducers.
10.4 Use the wax and grease removers, apply polisher application and metal conditioner.

11 Practice surface preparation.

11.1 Use abrasive papers.
11.2 Feather edging, block sanding and masking.
11.3 Perform the refinishing procedure.

12 Study the spray equipment and its use.

12.1 Identify the principal parts of a spray gun.
12.2 Adjust the spray gun.
12.3 Operate the spray gun.
12.4 Reduce the paint.
12.5 Requital the air pressure in using the spray gun.
12.6 Keep the proper distance from the work and the technique of the triggering gun.
12.7 Practice spraying.
12.8 Practice spot spraying.
12.9 Practice waxing, polishing and clearing of the exterior of the automobile.
12.10 Practice interior cleaning of the vehicle.

REFERENCE BOOKS

1. Auto Body Repairing and Repainting
   – Bill Tobledt.

2. Automotive Body Repair and Refinishing
   – W. H Crouse and D. H Anglin.

3. Automobile Engineering
   – J.B.S. Narang

6243	FUELS AND LUBRICANTS	T	P	C	
			2	3	3

AIMS

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

- gaseous fuel
- LPG and CNG fuels
- crude oil and crude oil refining
- gasoline, diesel, kerosene and fuel oil
- solid, semi-solid and liquid lubricants

SHORT DESCRIPTION

Concept of fuels; Solid fuels; Gaseous fuels; LPG fuels; CNG fuel; Crude oil; Refining of crude petroleum; Gasoline fuel; Test and additives of gasoline; Kerosene fuel; Diesel fuel; Fuel oil; Solid lubricants; Grease; Lubricating oil.

DETAIL DESCRIPTION

Theory:

1 Understand the basic concept of fuels.

1.1 State what is meant by fuel.
1.2 Mention the modern concept of fuels.
1.3 Outline the importance of fuels.
1.4 Mention the classification of fuels.
1.5 State the meaning of fossil fuels.
1.6 Explain the future of fossil fuels.

2 Understand the concept of solid fuels.

2.1 State the meaning of solid fuels.
2.2 outline the importance of solid fuels.
2.3 Mention the properties of solid fuels.
2.4 Mention the composition and properties of natural solid fuels.
2.5 Mention the advantages and disadvantages of solid fuels over liquid and gaseous fuel.

3 Understand the concept of gaseous fuels.

3.1 State the meaning of gaseous fuels.
3.2 Mention the classification of gaseous fuels.
3.3 Mention the composition of different gaseous fuels.
3.4 Describe the origin of natural gas.
3.5 Mention the advantages and disadvantages of gaseous fuels.
3.6 Describe storing and handling procedure of gaseous fuels.
3.7 Describe the heating value determination procedures of gaseous fuel.
3.8 Solve problems relating calorific value of gaseous fuel.
3.9 Describe the development of gaseous fuel in Bangladesh.
3.10 Describe the use of gaseous fuel in Bangladesh.
3.11 Mention the present reserve of natural gas in Bangladesh.

4 Understand the concept of LPG fuel.

4.1 State the meaning of LPG fuel.

4.2 Mention the composition of LPG fuel.
4.3 Describe the origin of LPG fuel.
4.4 Mention the characteristics of LPG fuel.
4.5 Mention the uses of LPG fuels.
4.6 Mention the advantages and disadvantages of LPG fuel.

5 Understand the aspect of CNG fuel.

5.1 State the meaning of CNG fuel.
5.2 Explain the reason of CNG fuel used in gasoline engine only.
5.3 Mention the advantages and disadvantages of CNG fuel.
5.4 Describe the conversion Process of CNG fuel.
5.5 Mention the safety precaution of CNG fuel handily.

6 Understand the refining of crude petroleum.

6.1 State the meaning of crude petroleum.
6.2 Describe the origin of crude petroleum.
6.3 Mention the classification of various treatment perform on the crude petroleum to obtain the desire product.
6.4 Describe the separation process of distillation, absorption, adsorption, filtration, solvent extraction.
6.5 Explain the refinery flow chart.

7 Understand the concept of gasoline fuel.

7.1 State the meaning and production of gasoline fuel.
7.2 Mention the uses of gasoline fuel.
7.3 Describe the treatment procedure of gasoline fuel.
7.4 Explain volatility of gasoline fuel and its effect on the engine.
7.5 Explain the effect of gasoline fuel on the engine performance.
7.6 Describe the characteristics of gasoline fuel.
7.7 Explain the abnormal combustion phenomena of gasoline fuel.
7.8 Mention the specification of gasoline fuel.

8 Understand the concept of test and additives of gasoline fuel.

8.1 Describe the distillation test of gasoline fuel.
8.2 State the meaning of octane number.
8.3 Describe the octane number determination procedure with CRF engine and knock meter.
8.4 Mention the knock ratings methods.
8.5 Describe the octane ratings methods.
8.6 Describe the road octane rating method.
8.7 State the meaning of anti knock agents.
8.8 Mention the additives used in gasoline.

9 Understand the concept of kerosene fuel.

9.1 Mention the uses of kerosene.
9.2 Explain the properties of kerosene.
9.3 Mention the specifications of kerosene.

10 Understand the concept of diesel fuel.

10.1 State what is meant by diesel fuel.
10.2 Describe the distillate and residual fuel used for diesel engine.
10.3 Explain important characteristics of diesel fuel.
10.4 State the significance of cetane number.
10.5 Describe the cetane number determination procedure of diesel fuel.
10.6 Explain the significance of diesel fuel viscosity on the engine performance.
10.7 Mention the specification for diesel fuel.

10.8 Describe the flash point and fire point determination procedure of diesel fuel.

11 Understand the concept of Alternative fuel.

11.1 Define Alternative fuel.
11.2 Mention the different type of Alternative fuel used in SI & CI engines.
11.3 Explain the composition different alternative fuels.
11.4 Mention the advantages & disadvantages of alternative fuel.

12 Understand the concept of solid lubricants.

12.1 Define lubricants.
12.2 List the most common solid lubricants.
12.3 Mention the field of application of solid lubricants.

13 Understand the concept of grease.

13.1 State the meaning of grease.
13.2 Mention the classification of grease.
13.3 Explain the properties of grease.
13.4 Explain the constituents of grease.
13.5 Mention the advantages and disadvantages of grease over solid and liquid lubricants.
13.6 Explain the grease additives.

14 Understand the concept of lubricating oil.

14.1 State the meaning and purpose of lubricating oil in the engine.
14.2 Mention the classification of lubricating oil.
14.3 Explain the various properties of lubricating oil.
14.4 Mention the various additives used in lubricating oil.
14.5 Mention the significance of viscosity index.
14.6 Explain the viscosity rating and service rating of lubricating oil.
14.7 State the meaning of synthetic lubricating oil.
14.8 Name some synthetic lubricating oil.

Practical :

1 Study the different types of fuels and lubricants.

1.1 Identify various types of liquid fuel.
1.2 Identify various types of solid lubricants.
1.3 Identify various types of semi solid lubricants.
1.4 Identify various types of liquid lubricants.

2 Study the petroleum refinery flow chart.

2.1 Draw the schematic diagram of a typical modern petroleum refinery showing main units and products.
2.2 Draw a simplified flow diagram for automated refinery showing main quality analysis for process units and blending areas.

3 Determine the heating value of fuels.

3.1 Find the heating value of a sample of diesel fuel by bomb calorimeter.
3.2 Find the heating value of a natural gas by continuous flow gas calorimeter.

4 Perform the test of corrosive impurities of the gasoline.

4.1 Check the corrosiveness of a gas line by the copper's strip corrosion test.
4.2 Determine the sulphur content of gasoline by the doctor test.

5 Determine the viscosity of lubricating oil by a viscometer.

6 Determine the specific gravity of different fuels and lubricants by specific gravity meter.

7 Determine the pour point and cloud point of lubricating oil by pour point test apparatus.

8 Determine the octane number of gasoline by CRF method / Motor method.
9 Determine the cetane number of diesel fuel by the CRF engine.
10 Make a typical soap grease by cold set method.
11 Perform the consistency test of grease by the penetrometer.
12 Determine the drop point of grease by the drop point apparatus.

REFERENCE BOOKS

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Code	VEHICLE DRIVING, ESTIMATING AND FITNESS TEST	T	P	C
6242		2	3	3

OBJECTIVES

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

- driving technique
- traffic signals and acts
- safety and first aid.
- estimation
- fitness test

SHORT DESCRIPTION

Fitness to drive vehicle; Ideal position of driver; Vehicle marching procedure; Technique of gear changing; Braking, stopping, parking and turning; Overtaking & skidding; Emergencies, safety and first aids; Daily maintenance; Traffic signals & acts. Fitness test, Estimation.
Driving regulation; Driving licenses; Vehicle registration; Road permit, fitness certificate, tax-token, insurance certificate.

DETAIL DESCRIPTION

Theory:
1. Understand the fitness to drive vehicle.

1.1. Mention the physical fitness of a driver.
1.2. Mention the mental fitness of a driver.
1.3. Explain color blind, vision error and car sickness.
1.4. Identify the causes of fatigue of a driver.

2. Understand the ideal position of a driver.

2.1. Describe the ideal sitting position of a driver.
2.2. Explain the position of knees, feet, hands, things, arms, head, neck, shoulder, upper back and lower back to avoid aches and pains of a driver.
2.3. Explain the necessity of seat-belt.

3. Understand the vehicle marching procedure.

3.1 Name different types of controlling devices.
3.2. Explain the function of controlling devices during driving.
3.3. Mention the driver's duties & responsibilities before moving.
3.4. Describe the technique of moving vehicle.

4. Understand the technique of gear changing.

4.1. Describe gears and speed ratio, double de-clutching.

4.2. Explain the necessity of clutch operation during gear change.
4.3. Explain the technique of changing gear position by hand in case of floor gears.

5. Understand the braking, stopping, parking and turning.

5.1. Define brake distance.
5.2. Describe braking procedure.
5.3. Explain brake testing before moving off.
5.4 Describe the procedure of car parking.
5.5. Explain parallel parking, angular parking and dead end parking.
5.6. Describe the turning procedure at right turn and left turn.
5.7. Describe the turning procedure at a blind corner.

6. Understand overtaking and skidding.

6.1. Describe the procedure of overtaking.
6.2. Explain overtaking sequences.
6.3. Mention the precaution to be observed during overtaking.
6.4. Explain the save distance.
6.5. Mention the causes of skidding.
6.6. Name different types of skidding.
6.7. Explain the locked wheel.

7. Understand the emergencies, safety and first aid.

7.1. Mention the duties of a driver during brake failure.
7.2. Mention the emergency duties to be perform by a driver during broken wind shield, animal on the road, tire blow off, steering failure, wheel falling off, emergency stop and towing.
7.3. Mention the aid of safety.
7.4. List the emergency aids in the first aid box.
7.5. Describe the common first aid procedure, such as :burning, cutting and breaking of bone.

8. Understand the daily maintenance.

8.1. Describe the need for daily maintenance.
8.2. Mention the items of daily checking.
8.3. Make a daily maintenance chart.
8.4. Mention the checking items before starting the engine.

9. Understand the traffic signals and acts.

9.1. Define traffic signals.
9.2. Mention the type of traffic signals.
9.3. Explain different road signals recommended by BRTA.

9.4. Explain different road markings.
9.5. Explain the road signals shown by the traffic police / signal light.
9.6. Explain the signal shown by the driver for turning, slowing, down, stopping, overtaking, etc.
9.7. Explain the signal and signaling devices fitted to a vehicle.
9.8. Describe the vehicle act no 92, 93, 94, 95, 96 97, 98, 99, 100, 101, 102, 103, 138, 139, 144, 145, 148, 150, 152 & 155.

10. Understand driving regulation.

10.1. List the documents and papers that a driver should have during driving.
10.2. Mention the precautions of driving during night, raining and fogy weather.
10.3. Mention the precautions of driving on hilly, sandy and sleepy road.
10.4. Explain the duties of a driver in case of accident and injury of a person.
10.5. Explain what a driver should do and what should not do during driving a

11. Understand the features of driving license.

11.1. Define driving license.
11.2. Mention the necessity for driving license.
11.3. Name different types of driving license.
11.4. Describe the process of grant of license.
11.5. Explain the process of renewal of license.

12. Understand the features of vehicle registration.

12.1. Define the term registration.
12.2. Mention the purpose of registration.
12.3. Describe the process of registration.
12.4. Describe the process of registration in alternation of a motor vehicle.
12.5. Describe the process of transfer of ownership of a vehicle.
12.6. Mention the causes of cancellation of registration.
12.7. Mention the factor to be considered in issuing a fitness certificate.

13. Understand the fitness of vehicle.

13.1 Define fitness of a vehicle.
13.2 Explain emission control.
13.3 Explain brake performance test.
13.4 Explain Side sleep test and suspension test
13.5 Explain inclination test.
13.1. Define road permit, fitness certificate, tax-token, insurance certificate.
13.2. Mention the necessity of road permit, fitness certificate, tax-token, insurance certificate, PSV badge and conductor's licence.

14. Understand the road permit, tax-token, insurance certificate.

14.1. Define road permit, fitness certificate, tax-token, insurance certificate.
14.2. Mention the necessity of road permit, fitness certificate, tax-token, insurance certificate

15. Understand safely driving estimation

15.1 Define visual performance.
15.2 State Judgments of speed.
15.3 Define Judgments of Relative speed.
15.4 Define Judgments of spacing.
15.5 Explain Overtaking.
15.6 Describe reaction time and braking

16. Understand costing and estimating

16.1 Define cost and estimating.
16.2 Prepare estimating form.
16.3 Mention different factors of estimating.
16.4 Prepare Estimating cost of following items:
1) General servicing.
2) Engine overhauling.
3) Engine overheating.
4) Suspension overhauling.
5) Steering overhauling.
6) Transmission overhauling.
7) A/C overhauling.
8) Brake overhauling.

Practical:

1. Practice the idle sitting before driving.

1.1. Adjust the seat.
1.2. Set the seat belt.
1.3. Set the eye, body, head, leg at ideal position.

2. Perform the pre-inspection of vehicle before starting the engine.

2.1. Check the parking brake.
2.2. Check the neutral condition of gear.
2.3. Check the side mirror position.

3. Practice on marching the vehicle.

3.1. Start the engine.
3.2. Press the clutch pedal.
3.3. Engage 1st gear.
3.4. Release the clutch pedal.
3.5. Press the accelerator pedal & control starting.

4. Practice on changing the gear.
4.1. Press the clutch pedal.
4.2. Chang the gear to next low gear.
4.3. Release the clutch pedal.

5. Practice the turning of vehicle towards left or right.

5.1. Decrease the speed of vehicle.
5.2. Give the turning signals.
5.3. Observe the road condition and make turning.

6. Practice to stop the movement of vehicle.

6.1. Press the clutch pedal.
6.2. Press the brake pedal.
6.3. Neutralize the gear.

7. Practice the overtaking a vehicle.

7.1. Give the signal for turning.
7.2. Increase the speed and complete overtaking.
7.3. Turn the vehicle to left side or the right side.

8. Practice the parking of vehicle.

8.1. Set the back gear.
8.2. Release the clutch and press accelerator pedal.
8.3. See the view on side mirror.
8.4. Control the steering wheel.
8.5. Complete the parking.

9. Practical driving with auto gear.

9.1 Select proper shifting lever of auto gear.
9.2 Drive using O/D.

10. Draw the compulsory traffic signs.

11. Draw the alerting traffic signs.

12. Draw the informating traffic signs.

6732 GENERAL ELECTRICITY

T	P	C
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AIMS

- To provide the concepts of basic network theorem.
- To provide understanding and skill on single phase AC circuits.
- To provide understanding and skill on poly phase system.
- To provide understanding of power & power factor in AC circuits.
- To develop understanding and skill on DC machines.
- To develop understanding and skill on AC machines.
- To develop understanding and skill on electrical measurements and measuring instruments.

SHORT DESCRIPTION

Network theorems – Kirchhoffs law, Thevinins theorem, Nortons theorem; super position theorem; AC fundamentals; Alternating quantities; Single phase AC circuits; RLC series & parallel circuit, Power and power factor in AC circuit; Poly phase system; Star/delta connection; Power and energy; DC Generator; DC Motor; Alternator; Transformer; Induction motor; Electrical measuring instruments and measurements.

DETAIL DESCRIPTION

Theory:

Network Theorem's (DC only)

1. Apply the principle of circuit theorems

Explain kirchhoffs current and voltage law.
Solve problems on KCL and KVL
Explain thevinins theorem.
Solve problems related to thevinins theorem.
Explain Nortons theorem.
Solve problems related to Nortons theorems.
Explain superposition theorem.

AC fundamentals

2. Understand the AC fundamentals.

Explain the generation of AC voltage.
Express the deduction of the equation, $e=E_{max}\,Sinwt$.
Define cycle, frequency and time period.
Show the relation, $f=\frac{NP}{120}$.
Explain the phase and phase difference with diagram.
Solve problems relating to AC generation.

3. Understand the concept of alternating quantities.

Define instantaneous, maximum, average and rms values of alternating quantities.
Define form factor and peak factor.
Solve problems relating to instantaneous, average and rms values.
Define Ohmic resistance and skin effect.
Compare ohmic & effective resistance.
Distinguish between AC and fluctuating DC.

AC CIRCUIT

4. Understand the parameters of alternating current circuits.

Explain the resistance, inductance and capacitance.
Distinguissh between inductive and capacitive effect.
State the formulae of inductive and capacitive reactance.
Solve problems on inductive and capacitive reactance.
Describe pure resistive, inductive and capacitive circuits.
Explain the term waveform, phase angle and phasor diagram.
Show the relationship between current and voltage of pure resistive, inductiive and capacitive circuits by waveform.
Draw the phasor diagram of pure resistive, inductive and capacitive circuits.
Solve problems on pure resistive, inductive and capacitive circuit.

5. Understand the concept of AC series/parallel circuit containing RL and RC.

Sketch a circuit containing resistance and inductance in series/parallel.
Explain the vector & phasor diagram of RL series/parallel circuit.
Find the impedance, current and voltage drop in RL series/parallel circuits.
Draw the impedance triangle of RL series/parallel circuits.
Sketch a RL series/parallel circuits.
Explain the vector & phasor diagram of RC series/parallel circuit.
Find the impedance, current and voltage drop in RC series/parallel circuits.
Draw the impedance triangle of RC series/parallel circuits.
Solve problems relating to RL & RC circuit.

6. Understand the concept of RLC series/parallel circuit.

Sketch a circuit containing resistance, inductance, and capacitance in series/parallel.
Explain the vector & phasor diagram of RLC series/parallel circuit.
Draw the impedance triangle of RLC series/parallel circuits.
Calculate the inductive reactance, capacitive reactance, total impedence, current & voltage drops in RLC circuit.
Describe the resonance and resonance frequency in RLC circuit.
Solve problems relating to RLC circuit.

7. Understand the concept of power & power factor in AC circuit.

Define power, power factor, active and reactive power.
Calculate the power and power factor of resistive and reactive circuits.
Calculate the power and power factor, active & reactive power of RL, RC and RLC circuit.

8. Understand the concept of poly phase power system.

State the meaning of the term AC poly phase power system.
Mention the advantage of poly phase system over 1-phase system.
State the generation of poly phase emf.
State the sequence of poly phase power system.

9. Understand the features of 3-phase star connected power system.

9.1 Sketch a 3-phase 3-wire & 3-phase 4-wire star connected system.
9.2 Draw the phasor diagram of a 3-phase 3-wire star connected system.
9.3 Express the formulae, $I_L = I_p$ and $V_L = \sqrt{3} V_p$
9.4 Identify neutral wire in a 3-phase star connected system.
9.5 Solve problems on 3-phase star connected power system.

10. Understand the features of 3-phase delta connected system.

10.1 Sketch the circuit diagram of a 3-phase delta connected system.
10.2 Sketch the phasor diagram of a 3-phase delta connected system.
10.3 Explain the formulae $V_L = Vp$ and $I_L = \sqrt{3}\ I_p$
10.4 Solve problems on delta connected balanced load system.
10.5 Compare the advantages of star connection system with those of delta connection system.

DC GENERATOR

11. Understand the features of DC Generator.

- 11.1 State the principle of operation of a simple DC generator.
- 11.2 Identify different types of DC generators.
- 11.3 Interpret the nameplate information of a DC generator.
- 11.4 Identify the different parts of DC generators.
- 11.5 Identify armature, pole, brush, field coil, commutator and yoke of DC generator.
- 11.6 Describe the principle of operation of DC generators.
- 11.7 Describe the emf equation of DC generators.
- 11.8 Explain the building up voltage of DC shunt generators.

DC MOTOR

12. Understand the features of operation of DC motor

- 12.1 Explain the working principle of DC motor.
- 12.2 Identify different parts of DC motor.
- 12.3 Explain the principle of operation of DC motors.
- 12.4 Draw connection diagrams of DC series, shunt and compound motor.
- 12.5 Explain the term back emf of DC motor.
- 12.6 Express the formula of the mechanical power developed in DC motor.
- 12.7 List at least five uses of DC motor.

ALTERNATOR

13. Understand the features of AC generator/alternator.

- 13.1 Explain the working principle of AC generator/alternator.
- 13.2 Identify different types of alternator.
- 13.3 Express the deduction of the emf equation of an alternator.
- 13.4 Explain the efficiency and regulation of alternator.
- 13.5 Describe different losses of alternator.

TRANSFORMER

14. Understand the principle of operation of transformer.

- 14.1 Explain the working principle of transformer.
- 14.2 Explain the transformer action.
- 14.3 Express the derivation of the emf equation of transformer.
- 14.4 Define transformation ratio.
- 14.5 Solve problems related to transformation ratio and emf equation of transformer.
- 14.6 Interpret the nameplate data of a transformer.

INDUCTION MOTOR

15. Understand the features of 3-phase induction motor.

- 15.1 State the meaning of induction motor.
- 15.2 Identify different types of 3-phase induction motor.
- 15.3 Identify different parts of 3-phase induction motor.
- 15.4 Explain the working principle of 3-phase induction motor.
- 15.5 State the necessity of starter for starting 3-phase induction motor.
- 15.6 State different methods of starting squirrel-case and slip-ring induction motor.
- 15.7 Interpret the nameplate data of a 3-phase induction motor.

16. Understand the features of 1-phase induction motor.

16.1 Explain the working principle of a capacitor type 1-phase induction motor.
16.2 Identify different parts of capacitor type 1-phase induction motor.
16.3 Name different types of 1-phase induction motor.
16.4 Explain the working principle of a Universal motor.
16.5 Uses of different types of 1-phase induction motor.

MEASURING INSTRUMENT

17. Understand the features of electrical measuring instruments.

17.1 State electrical measuring instruments.
17.2 Identify different types of electrical measuring instruments.
17.3 Describe the working principle of indicating instrument (Permanent magnet moving coil ammeter, voltmeter)
17.4 Differentiate between indicating, integrating and recording instruments.
17.5 List the practical applications of different types of measuring instruments.
17.6 Sketch connection diagram of Ammeter, Voltmeter, Wattmeter and Energy meter in an electric circuit.
17.7 Describe the construction and working principle of Megger.
17.8 State the uses of Megger.

Practical

1. Show skill in verifying Kirchhoffs laws.

1.1 Select experiment circuit, components, meters and necessary materials.
1.2 Construct a series-parallel circuit.
1.3 Select the series section of the circuit.
1.4 Verify Kirchhoffs voltage law.
1.5 Select the parallel section of the circuit.
1.6 Verify Kirchhoffs current law.

2. Find the maximum and rms values of current, voltage and frequency by oscilloscope.

Identify the control & function knobs of oscilloscope.
Prepare the oscilloscope to measure the values.
Check all connections.
Observe the AC signal and meaasure the maximum value, rms values and frequency.
Note down the observations.

3. Draw the vector diagram of a RLC series circuit determining the value of resistance, inductance capacitance and power factor.

3.1 Sketch the circuit diagram for determining resistance, capacitance and inductance of RLC series circuit.
3.2 Select equipments, tools & materials required for the experiment.
3.3 Connect the circuit according to the circuit diagram using proper equipment.
3.4 Check all the connection points before energizing the circuit.
3.5 Apply the proper voltage & record readings from the meters.
3.6 Find the value of resistance & phase angle from relevant data.
3.7 Sketch the vector diagram with the relevant data as obtained.

4. Draw the vector diagram of a RLC parallel circuit determining the value of resistance, inductance and capacitance

4.1 Sketch the circuit diagram of a RLC parallel circuit.
4.2 Select the equipment, tools & materials for the experiment.
4.3 Connect the circuit according to the circuit diagram.
4.4 Check all the connection points before energizing the circuit.

4.5 Connect the power supply to the circuit and record the readings from the meter.
4.6 Determine the values of resistance, inductance, capacitance and phase angle from the relevant data.
4.7 Sketch the vector diagram with the help of relevant data as obtained.

5. Measure line and phase voltage & current in a 3-phase star/delta connected load.

Sketch the circuit diagram for a 3-phase star/delta connected load.
Select the instrument, tools and materials required for the experiment.
Connect the circuit according to the circuit diagram.
Check all the connection points before energizing the circuit.
Record the readings of the instruments.
Compare the recorded values with calculated values.
Note down the observations.

6. Construct vector diagram measuring current, voltage and power in a balanced 3-phase delta connected inductive load.

6.1 Sketch the circuit diagram for measuring current, voltage and power of a 3-phase delta connected load.
6.2 Select the necessary equipment, tools and materials.
6.3 Connect the circuit according to the circuit diagram.
6.4 Check all the connections before energizing the circuit.
6.5 Record the readings from the meters used in the circuit.
6.6 Draw the vector diagram for the circuit.

7. Construct vector diagram measuring current, voltage and power in a balanced 3- phase star connected inductive load.

7.1 Sketch the circuit of a star connected power system for measuring current. voltage and power of the circuit.
7.2 Select the instrument, tools and materials required for the circuit.
7.3 Connect the circuit components as per diagram.
7.4 Check all the connection points before energizing the circuit.
7.5 Record the readings from the meters used in the circuit.
7.6 Draw the vector diagram.
7.7 Note down the observations.

8 Start a DC shunt motor by 3-point starter.

8.1 Sketch the circuit diagram.
8.2 Select the instrument, tools and materials required for the job.
8.3 Connect the motor starter according to the circuit diagram.
8.4 Apply proper supply voltage to the circuit.
8.5 Manipulate the starter to have the desired speed.
8.6 Note down the observations.

9. Draw the no-load characteristic curve (relationship between excitation current and generated voltage) of an alternator.

9.1 Sketch the circuit diagram for the experiment.
9.2 Select the equipment, tools and materials required for the experiment.
9.3 Connect the equipment/machine according to the diagram.
9.4 Apply the proper supply voltage to the circuit.
9.5 Record the values of the excitation current and corresponding generated voltage.
9.6 Plot the characteristic curve from the recorded data.
9.7 Note down the observations.

10. Verify the turn ratio of a transformer.

10.1 Sketch the circuit diagram for the experiment.
10.2. Select the machine, instrument and tools required for the experiment.

10.3 Connect the circuit according to the circuit diagram.
10.4 Apply the voltage to primary side of the transformer.
10.5 Record the values of voltage and currents on both sides of the transformer.
10.6 Calculate the voltage and current ratio.
10.7 Note down the observations.

11. Disassemble and assemble a 3-phase induction motor.

11.1 Select the necessary tools and a 3- phase inductor motor.
11.2 Dismantle the parts of the motor.
11.3 Identify the parts of the motor.
11.4 Sketch the main parts of the motor.
11.5 Fix the parts of the motor at original position.
11.6 Note down the observations.

12. Start a 3-phase induction motor using star-Delta Starter.

12.1 Sketch the circuit diagram.
12.2 Select the tools, necessary materials and a 3-Phase induction motor.
12.3 Connect the motor according to the circuit diagram.
12.4 Apply the voltage to the motor starter.
12.5 Start the motor operating the motor starter.
12.6 Observe the operation.

13. Study the construction of ammeter and voltmeter.

13.1 Select the tools and materials for disassembling meters.
13.2 Select ammeter and voltmeter.
13.3 Disassemble the parts of the instruments.
13.4 Identify the controlling and damping system.
13.5 Identify different parts.
13.6 Identify the types of the meter.
13.7 Note down the observations.

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- B.L. Theraja

2. Introduction to Electrical Engineering.
- V. K Mehta.

3. AC Machine
-Siskind

4. Electrical Measurements
- Goldings

5821	SOCIAL SCIENCE – II (BANGLADESH : HISTORY & CULTURE)	T	P	C
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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 শাঞ্জীর 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 ফেব্রুয়ারির 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 গুরুত্ব ব্যাখ্যা করা।
১০.৫ গ্রামীণ পেশাজীবিদের (কামার, কুমার, তাঁতী, জেলে, ছুতার, ইত্যাদি) সাংস্কৃতিক গুরুত্ব 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।

সহায়ক পুস্তক

রহিম, চৌধুরী, মাহমুদ ও ইসলাম, "বাংলাদেশের ইতিহাস (পরিবর্ধিত ও পরিমার্জিত)" ; নওরোজ কিতাবিস্তান, আগস্ট, ১৯৯৯।
কে, আলী "বাংলাদেশের ইতিহাস"; আজিজিয়া বুক ডিপো, ২০০১।
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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.