I. INTRODUCTION

The automobile industry is making rapid progress both in quantity as well as quality. The number of vehicles produced today is phenomenal. More and more multinational organisations are coming to our country to reap the benefits of the governments liberalisation of economic policies. Thus the total number of vehicles on road is increasing considerably every year. This leads to a problem of providing technical personnel for the servicing repair and maintenance of the vehicles. This is a very important area which offers ample job opportunities for properly trained personnel in servicing, repair and maintenance of automobiles.

Another aspect that has increasingly gained importance is the pollution of atmosphere by the automobiles which are not properly maintained. In big cities particularly the emission of CO has to maintained below certain emission levels prescribed by the transport authorities. This aspect has also been kept in view while developing this vocational curriculum.

This vocational area offers employment opportunities in wage as well as self employment sectors, in organised as well as unorganised sectors, in manufacturing as well as repai and service stations.

This is in the series of competency based vocational curricula developed by state institute of vocational education.

II. Objectives of the Course

1. To know the contructional features and functions of engine, clutch, gear box, propeller shaft, differential and rear axle, brakes, steering and steering linkages, front axle, front suspension, rear suspension, chassis.

2. To know about the use of various hand tools, gauges, instruments and special equipment.

3. To know the constructional features and functions of fuel injection pump and feed pump.

4. To know about the properties and use of lubricating oil and maintenance schedule.

5. To know about servicing, minor engine tune-up and major engine tune-up.

6. To know traffic signs.

III. Skills to be provided

1. Should be able to overhaul the engine, clutch, gear box, propeller shaft, differtial and rear axle, brakes/brake system, steering and steering linkages, front axle, fron tsuspension rear suspension.
2. Should be able to use various hand tools, gauges, instruments and special equipment.
3. Should be able to overhaul fuel injection pump and feed pump, and injectors.
4. Should be able to wash, clean the under chassis and to lubricate the various points wih oil or grease.
5. Should be able to implement the maintenance schedule.
6. Should be able to perform tyre rotation
7. Should be able to set the headlights.
8. Should be able to check the tighten the nuts as per the required torque.
9. Should be able to assemble the engine components, clutch components, gear box, rear axle, front steering gear box and linkages, brakes and suspension members.
10. Should be able to mount the wheels.
11. Should be able to carryout servicing, minor and major engine tune up.
12. Should be able to inspect the engine, clutch, propeller shaft, gear box, rear axle, front axle steering assembly, suspebnsion, brakes.
13. Should be able to perform the chassis dynamometer test.
14. Hard Working
15. Sincerity
16. Dignity of labour
17. Co-operation
18. Punctuality
19. Cleanliness
20. Systematic
21. Cleanliness
22. Acceptance of responsibility
23. Ability to get alongwith others
24. Honesty

IV. JOB OPPORTUNITIES

a) Wage Employment

1. Auto Mechanic
2. Vehicle Service Technician
3. Auto Fitter in Manufacturing Concern in Assembly Shop or Test Shop
4. Mechanic in Auto Manufacturing Industry
5. Dealers service mechanic
6. Driver/Vehicle Operator
7. Spare Parts Sales Assistant / Manufacturers' Representative
8. Insurance Agent and Assistant to Loss Assessor
9. Laboratory Assistant
10. Auto Electrician

b) Self Employment

11. Automobile Mechanic
12. Diesel Fuel System Service Mechanic
13. Vehicle Operator
14. Spare Parts Salesman
15. Spare Parts Dealer

V. ANNUAL SCHEME OF INSTRUCTION AND EXAMINATION FOR VOCATIONAL COURSES 1ST & 2ND YEAR

Part - A	Theory		Practicals		Total	
	Periods	Marks	Periods	Marks	Periods	Marks
1. English	185	75	-	-	185	75
2. GFC	185	75	-	-	185	75
Part - B						
3. Vocational Subjects						
Paper - I	160	50	160	50	320	100
Paper - II	160	50	160	50	320	100
Paper - III	160	50	160	50	320	100
Part - C						
4. On the Job Training	-	-	210	50	210	50
Total	850	300	690	200	1540	500

Scheme of Instruction per week for Vocational Courses

Part - A	Theory	Practicals	Total
1. English	6	-	6
2. G.F.C.	6	-	6
Part - B			
3. Vocational subjects			
Paper - I	5	5	10
Paper - II	5	5	10
Paper - III	5	5	10

VI. SYLLABUS

FIRST YEAR SUBJECTS

THEORY

1. Work Shop Technology
2. Basic Mechinary and Electronic Engineering
3. Auto Power Plant

PRACTICAL

1. Work Shop Practice
2. Engineering Drawing
3. Auto Power Plant & Computer Fundamental Lab

SECOND YEAR SUBJECTS

THEORY

1. Auto Transmission & Electrical Systems
2. Auto Chassis & Body Engineering
3. Auto Service & Maintenance

PRACTICAL

1. Auto Transmission & Electric Systems
2. Auto Chassis & Body Engineering Lab
3. Auto Service & Maintenance Lab

AUTOMOBILE ENGINEERING TECHNICIAN
WORK SHOP TECHNOLOGY
THEORY PAPER- I, FIRST YEAR

Sl. No.	Major Topics	No.of Periods	Weightage Marks
1	Safety Precautions and Details of Engineering Materials	20	08
2	Fitting & Drilling	25	10
3	Sheet Metal Work	15	08
4	Carpentry	20	08
5	Forging and Welding	25	10
6	Foundry	20	08
7	Mechabnical Working of Metals	20	08
8	Lathe and Grinding	15	08
	Total	**160**	**68**

AUTOMOBILE ENGINEERING TECHNICIAN
THEORY PAPER - I I YEAR
WORKSHOP TECHNOLOGY

Chapter 1 : Safety Precautions & Details of Engineering materials.

Contents : Importance of Safety precautions in workshop.

Properties and uses of common Engineering Materials such as Cast Iron, Mild Steel, High Carbon Steel, Alloy Steel, Stainless Steel, Copper, Brass, Tin Zinc, Gunmetal, Bronze, White metal, Aluminum, Non Metals : Wood, Plastic, Rubber.

Chapter 2 : Fitting and Drilling

Contents : Cutting Tools - Chisels, Hacksaws, files, scrapers, Drill Bits, reamers Taps, Dies and Sockets.
Striking tools : Hammers
Holding Devices : Vices
Marking Tools & Miscellaneous tools
Checking & Measuring Insturments Calipers & Dividers
Drilling Machines - Sensitive and Radial
Drilling Machines - Various Fitting and Drilling operations

Chapter 3 : Sheet Metal Work

Contents : Metals used for sheetmetal work, sheet metal hand tools - measuring and cutting tools, stakes.

Sheetmetal operations - Shearing, bending, Drawing, Squeezing

Sheet metal joints - Hem & Seam Joints Fastening Methods - Riveting, soldering, Brazing and spot welding.

Chapter 4 : Carpentry

Contents : Marking & Measuring Tools, Cutting Tools, Saws, Chisels, planes, Boring Tools, striking tools.

Holding Devices & Miscellaneous Tools Carpentry process, carpentry joints wood working Machines

Chapter 5 : Forging & Welding

Contents : Hand Tools, Heating Devices, Smith Operations, Machine Forging, Forging hammers, Forging press

Welding : Arc welding & Gas Welding

Chapter 6 : Foundry

Contents : Advantages and limitations of Casting, foundry equipment - Hand moulding Tools, Moulding Boxes

Types of sands and properties.

Patterns : Classification & Making; Cores & Core making

Casitngs : Green sand and dry sand moulding, Shell Moulding, ceramic moulding, Special castings, Defects in castings.

Chapter 7 : Mechanical Working of Metals

Contents : Hot working process - Rolling, Piercing, Drawing, Spinning, Extrusion.

Cold Working Process : Rolling, Bending, drawing, spinning, Extrusion, squeezing, peening

Advantages and limitations of cold working & Hot working

Chapter 8 : Lathe & Grinding

Contents : Lathe main parts, simple operations Grinding - working principle; Grinding wheel materials, Applications of Grinding.

AUTOMOBILE ENGINEERING TECHNICIAN

PRACTICAL - I PAPER - I I YEAR

WORKSHOP PRACTICE

Sl.No.	Major Topics	No.of Periods
1.	Fitting	40
2.	Carpentary	24
3.	Black Smithy	28
4.	Tin Smithy	24
5.	Welding	28
6.	Plumbing	16
	Total	**160**

AUTOMOBILE ENGINEERING TECHNICIAN

WORKSHOP PRACTICE

PRACTICAL - I PAPER - I I YEAR

Detailed Syllabus:

1. Fitting

1.1. Identification & Usage of tools

1.2. Sawing Practice

1.3. Filing practice

1.4. Chiselling Practice

1.5. Preparation of T, 'L' Sections

1.6. Drilling

1.7. Tapping

2. Carpentry

2.1 Planning practice

2.2 Chiselling practice

2.3. Prepare Tee Lap joint

2.4. Plain Tenon joint

2.5. Mortise & Tenon joint

2.6. Boring Practice

3. Black Smithy

3.1. Practicing of usage of tools

3.2. Making a round bar from a square bar

3.3. Making a ring of given round rod

3.4. Making of crane hook, S-hook, T-bolt, Flat Chisel, Gib head sunk key

4. Tin Smithy

4.1. Make a Rectangular tray

4.2. Make a Rectanguala Scoop, Funnel

4.3. Rivettingpractice

4.4. Soldering the joints

4.5. Elbow

5. Welding : a) Arc welding

5.1. Make a square butt joint

5.2. Making of T joint, lap joint, corner joint

5.3. Identification of welding positions

b) Gas welding

5.4. Identification of Gas welding equipment

5.5. Setting of Gas welding equipment

5.6. Setting of Gas welding flames

5.7. Practicing of Gas welding techniques

6. Plumbing

6.1. Practicing of errection of pipeline

6.2. Threading practice

6.3. Fitting of elbow, bend, collar, flange

6.4. Joining a nipple

6.5. Pipe fittings....'T' joint, reducer, plug arrangement

6.6. Screwed joint

6.7. Fitting of Taps, valves etc.,

BASIC MECHANICAL & ELECTRICAL ENGINEERING
THEORY PAPER - II, FIRST YEAR

Sl.No.	Topics	No.of Periods	Weightage	
			SA	LA
1	Fundamentals of Thermodynamics	8	1	-
2.	Laws of Perfect gases	12	2	6
3.	Laws of Thermodynamics	8	2	6
4.	Thermodynamic Processes	20	2	6
5.	Fuels and Combustion	12	2	6
6.	Thermodynamic Cycles	20	2	6
7.	Introduction to transmission of power	12	2	6
8.	Keys and Couplings	10	2	-
9.	Fasteners	8	2	-
10.	Units of work, power, energy	10	2	6
11.	Electric Current, Ohm's Law, Kirchoff's law	16	2	6
12.	Safety Precautions	8	2	-
13.	Electrical measuring instruments	16	2	6
	Total	**160**	**26**	**54**

BASIC MECHANICAL AND ELECTRICAL ENGINEERING

THEROY - PAPER - II I YEAR

1.0. Fundamentals of Thermodynamics

1.1. Definition for system, boundary, surroundings, working fluid and state of system

1.2. Types of thermodynamic systems, closed, open and isolated systems with examples

1.3. Properties of systems intensive and extensive properties with examples

1.4. Definitions for properties like pressure, volume, temperature, enthalpy, internal energy and their units.

1.5. Definitions for flow of work and specific heat

2.0 Laws of perfect Gases

2.1. Explanation of gas laws, Boyle's law, Charle's law, Avagadros law, Joule's law and Regnaults law.

2.2. Characteristic gas equation, universal gas equation, characteristic gas constant, universal gas consant and their relationship with molecular weight of gas.

2.3. Specific heat at constant pressure and constant volume for a gas. Relation between two specific heats with characteristic gas constant

2.4. Simple problems on gas equations.

3.0 Laws of thermo dynamics

3.1. Zeroth, first, second laws of thermo dynamics, simple problems on conversion of heat into work.

4.0 Thermodynamic processes :

4.1. Types of thermo dynamics processes, Constant volume, Constant pressure, isothermal, Adiabatic, polytropic, equations representing the processes

4.2. Equations for work done during the processes, calculation of change of internal energy.

4.3. Claculation of heat supplied or rejected during the processes

5.0. Fuels

5.1. Definition of fuels, types of fuels, solid, liquid asnd gasious fuels and its uses

5.2. Calorific values (Higher & lower) of fuels

5.3. Fuels used in I.C. Engines

5.4. Qualities of good fuel

5.5. Cetane rating

6.0. Thermo dynamic cycles

6.1. Carnot Cycle

6.2. P-V & T-S diagram

6.3. Working of carnot cycle

6.4. Assumption of carnot cycle

6.5. Efficiency of carnot cycle (without proof)

6.6. Diesel Cycle

6.7. Working

6.8. P.V. and T.S. diagram

6.9. Efficiency formula only

6.10. Otto Cycle

6.11. Working

6.12. P-V and T-S Diagrams

6.13. Efficiency of Otto cycle without proof

6.14. Simple problems

7.0. Introduction to Transmission of Power

7.1. Types of transmission of power in Engineering

7.2. Power transmitting media like belt, Chain, rope and gears

7.3. Expression for velocity ratio for belts (formula only)

7.4. Definition of the slip

7.5. Belt drives, open and cross belt drive

7.6. Tensions in tight and slack sides of a belt

7.7. Rope drive, chain drive, gear drive, simple gear drive and compound gear drive and their applications.

7.8. Belt fastener.

7.9. Uses of Jockey pulley

8.0. Keys and Couplings

8.1. Types of keys with their applicaitons

8.2. Types of couplings with their applications

9.0. Fasteners

9.1. Introduction

9.2. Screws

9.3. Nuts and Bolts

9.4. Rivets and Clamps

10.0. Units of work, power and Energy

10.1. Definition of work, power and energy with S.I. units

10.2. Simple problems on work, power and energy

11.0. Electric Current; Ohm's Law; Kirchoff's laws

11.1. Electric Current

11.2 Conductors, Semi-Conductors, Insulutors

11.3. Conventional, Electric Current Flow Unit

11.4. Idea of Electric Potential unit

11.5. Electrical Resistance Unit

11.6. Specific Resistance Unit

11.7. Calculation of Resistance of conductor

11.8. Simple problems

11.9. Effect of temperature on resistance

11.10. Temperature co-efficient of resistance

11.11. Ohm's law and resistance calculations

11.12. Resistance in series and parallel combinations

11.13. Kirchoff's laws

11.14. Explanation of elements of D.C. network

11.15. Kirchoff's current and voltage law

11.16. Wheatstone bridge

11.17. Simple problems

12.0. Safety Precautions

12.1. Precaution in Handling tools

12.2. Causes of Electric shocks

12.3. Cure of electric shock-first aid, artificial respiration

12.4. Precaution against shock

13.0. Electrical measuring Instruments

13.1. Classification of electrical measuring instruments

13.2. Ammeters and voltmeters and their applications

13.3. Moving coil meters and moving iron

13.4. Method of connecting the Ammeters and Voltmeters

13.5. Wattmeter

13.6. Energy Meter

13.7. Power Factor Meter

13.8. Megger

13.9. Continuity tester

13.10. Measurement of Insulation resistance

ENGINEERING DRAWING
PRACTICAL - PAPER - II I YEAR

Sl.No.	Major Topics	No.of Periods
1.	Introduction	6
2.	Lettering and Dimensioning	10
3.	Geometrical Construction	24
4.	Orthographic Projection	45
5.	Isometric Projection	35
6.	Sections of Solids	20
7.	Development of Surfaces	20
	Total	**160**

Detailed Syllabus

1.0. Introduction

1.1. Scope and objective of the subject

1.2. Importance of engineering drawing as a communication medium

1.3. Drawing instruments and their uses

1.4. Scales : Recommended scales, reduced & enlarged

1.5. Sheet sizes : A0, A1, A2, A3, A4, A5. Layout of drawing sheet sizes of title block and its contents

1.6. Simple exericises on the use of drawing instruments.

2.0. Lettering and Dimensioning

2.1. Types of Lettering

2.2. Guide Lines for lettering

2.3 Recommended sizes of letters and numbers

2.4. Single stroke letters.

2.5. Dimensioning - rules and systems of dimensioning - dimensioning a given drawing

3.0 Geometric Construction

3.1. Bisecting a line - perpendiculars - parallel lines - division of a line

3.2. Angles - bisection, trisection

3.3. Tangent lines touching circles internally and externally

3.4. Polygons - Regular polygons - circumscribed and inscribed in circles.

3.5. Conic sections - Definitions of focus, directrix, eccentricity

(i) Construction of Ellipse by Concentric circles method.

(ii) Construction of parabola by rectangular method.

(iii) Construction of Hyperbola when given the position of point from X-axis and Y-axis.

4.0 Orthographic Projection

4.1. Definition - Planes of Projection - Four quadrants - Reference line.

4.2. First angle projection - Third angle projection

4.3. Projections of points

4.4. Projections of straight lines

4.5. Projections of planes

4.6. Projections of solids

4.7. Conversion of pictorial views into orthographic views

5.0. Isometric Projection

5.1. Definition - Isometric axes, lines and planes

5.2. Isometric Scale - Isometric view

5.3. Drawing of isometric views of plane figures

5.4. Drawing of isometric views of prisms and pyramids

5.5. Drawing of isometric view of cylinders and cones

6.0. Sections of Solids

6.1. Need for drawing sectional views - section planes - sections - true shape of a section

6.2. Sections of prisms and pyramids

6.3. Sections of cones and cylinders.

7.0. Development of Surfaces

7.1. Need for preparing development of surface

7.2. Concept of true length - Principal methods of development

7.3. Development of simple solids like cubes, prisms, cylinders, pyramids, cones.

AUTOMOBILE ENGINEERING TECHNICIAN

AUTOMOBILE POWER PLANTS

THEORY - PAPER - III I YEAR

Sl.No.	Topics	No.of Periods	Weightage	
			SA	LA
1.	Introduction to engines	10	2	2
2.	Petrol Engines	24	2	6
3.	Petrol engine fuel system	14	2	6
4.	Diesel engines	25	2+2	6
5.	Diesel engine fuel system	14	2	6
6.	Lubrication system	20	2	6
7.	Cooling system	18	2	6
8.	Maufflers & Manifolds	15	2	6
9.	Performance of I.C. Engines	20	2	6
	Total	**160**	**20**	**40**

AUTOMOBILE ENGINEERING TECHNICIAN

AUTOMOBILE POWER PLANT

THEORY - PAPER - III I YEAR

1. Introduction to Engines

1.1. What is Engine

1.2. Types of Engines

1.3. Fuction of I.C. Engine

1.4. Classification of I.C. Engines

2. Petrol Engines

2.1. Material used, function and constructional details of Petrol Engine components

2.2. Cylinder arrangement (in line, V-type, opposed-piston, opposed cylinder, radial) of Petrol Engines

2.4. Side valve and over head valve operating mechanism, L,I,F, and T type valve arrangements, valve clearance, timing gears

2.3. Construction and working of 2 stroke and 4 stroke petrol engines

2.5. Comparision between 2 strok and 4 stroke petrol engines

2.6. Valve timing diagram of 2 stroke and 4 stroke petrol engines

2.7. Firing order of multi cylinder engine

2.8. Vibrations and use of vibration dampers

3. Petrol Engine Fuel System

3.1. Line diagram of petrol engine fuel system

3.2. Constructional details of fuel tank, fuel lines

3.3. Construction and working of fuel pumps

3.4. Requirements of an automobile carburettor

3.5. Air fuel ratios for different conditions

3.6. Arrangement of carburettors-down drought, up draught and side draught

3.7. Construction and working of Carter, Zenith, Solex and S.U. carburettors

3.8. Petrol injection system in Modern Vehicles

3.9. Working principle of a super charger, scavenging

4. Diesel Engines

4.1. Working principle of a 2 stroke and 4 stroke diesel engines

4.3. Advantages and limitation of diesel engine over a petrol engine

4.2. Valve timing diagram of 2 stroke and 4 stroke diesel engines

4.4. Types of diesel engine combustion chambers i.e. direct injection chamber, prechanber and turbulence chamber-Relative advantages and disadvantages

5. Diesel Engine Fuel System

5.1. Line diagram of diesel engine fuel system

5.2. Types of diesel fuel feed pump-construction & working

5.3. Requirements of fuel injection system

5.4. Types of fuel injection systems

5.5. Construction working of F.I.P.

5.6. Phasing and caliberation of F.I.P.

5.7. Governing System Function - construction & working of mechanical & pneumatic type governors

5.8. Function of Injectors-Types of injectors and their construction & working.

6. Lubrication System

6.1. Types of lubricants

6.2. Properties of lubricants & SAE number

6.3. Requirements of lubrication for Automobiles

6.4. Construction & working of different types of lubrication systems i.e. Petrol oil (or) mist type, splash type, forced feed type and dry sump type

6.5. Function of Oil Filters

6.6. Types of oil filtering systems i.e. full flow & by pass flow system

6.7. Types of filtering elements, i.e. catridge type, stack type, centrifugal type etc.

6.8. Necessity of crank case ventillation-positive crank case ventillation

6.9. Sludge formation in the lubricating oil-effect of sludge to the lubrications systems

6.10. Grades of lubricants used in engine, gear box, differential, steering gear box in different type of vehicles

7. Cooling System

7.1. Necessity of cooling system in Automobiles

7.2. Disadvantages of over cooling & under cooling

7.3. Constructional details of Air cooling system

7.4. Construction and working of forced feed type with thermostat water cooling system

7.5. Construction & working of wate pump, radiator

7.6. Anti freezing and anti rusting additives

8. Manifolds and Mufflers

8.1. Necessity of inlet and exhaust mani fold

8.2. Considerations for a good manifold design

8.3. Types of manifolds-inlet & exhaust

8.4. Construction and working principle of air cleaner-necessity air cleaner

8.5. Constuction and working principle different types of silencers - function of silencer

9. Performance of IC Engines

9.1. Need for engine performance testing

9.2. Different types of engine powers i.e. BHP, IHP, FHP.

9.3. Different types of engine efficiencies i.e. brake thermal efficiency, indicated thermal efficiency, volumetric efficiency

9.4. Specific fuel consumption, heat balance sheet, performance curves

AUTOMOBILE ENGINEERING TECHNICIAN
AUTOMOBILE POWER PLANT &
COMPUTER FUNDAMENTAL LAB
PRACTICAL - PAPER - III I YEAR

A. Automobile Power Plants Lab — 100 Periods

Study the construction & working of the following components/units with the aid of cut sectional model/computer based animation picture/ electronic stimulation display board

1. 2 Stroke Petrol Engine
2. 4 Stroke Petrol Engine
3. Mechanical Fuel Pump
4. Electrical fuel pump
5. Solex carburettor
6. Carter carburettor
7. S.U. carburettor
8. Petrol fuel injection system
9. 4 stroke diesel engine and different type of diesel engine combustion chambers
10. Fuel injection pump and injector
11. Air Cooling system
12. Water cooling system
13. Splash lubrication system
14. Forced feed lubrication system
15. Inlet & exhaust manifold
16. Different types of Mufflers
17. Model (OJT) test conducted at the institute (3 Periods)

COMPUTER FUNDAMENTAL LAB

PRACTICAL - PAPER - III II YEAR

TIME SCHEDULE :

Sl.No.	Major Topics	No.of Periods
1.	Introduction to Computers	06
2.	MS - Dos	08
3.	MS - Windows	06
4.	MS - Word	06
5.	MS - Excel	08
6.	MS - Power Point	06
7.	Internet	08
8.	Auto - CAD	12
	Total	**60**

Detailed Syllabus :

1.0. Introduction to Computers

1.1. History of Computers - Computer Generations - Classification of Computers

1.2. Basic Computer Architecture - Input and Output devices - identify different peripherals of computer

1.3. Memories - storage media

1.4. Types of Software - Types of Languages - Operating systems

2.0. MS-Dos

2.1. System files - Naming of files - Wild card characters

2.2. Practice on Internal commands

2.3. Practice on External commands

3.0. MS-Windows

3.1. Practice on elements of Windows-98 like My Computer, My Documents, Internet Explorer, Network Neighbourhood, Recycle Bin, My Briefcase, etc.

3.2. Practice on Starting a Program (Application) like Start Menu, Programs Menu, Documents Menu, Find and Help Menu.

3.3. Creating and Editing Text files - Deleting and Restoring files and folders.

3.4. Copying and Moving objects - Drag and Drop feature - using Keyboard - using Standard Tool bar - Right Dragging Method.

3.5. Printing from Windows

4.0. MS-Word

4.1. Creating, Opening and Modifying Documents

4.2. Practice on changing page layout, setting of tab stops, Text block operations

4.3. Practice on Formatting Text - Customizing paragraph formats - changing font styles and size - working with tables and printing documents

5.0. MS-Excel

5.1. Working with Excel Work Sheet - Formatting - entering Formulae - Inserting Rows and Coloums

5.2. Practice on Range and Series - Moving and copying cell contents - creating sumary reports

5.3. Formatting work sheets - Linking Work Sheets - Working with Graphic Data.

6.0. Power Point

6.1. Practice on Power Point Slides

6.2. Creating a Presentation

6.3. Creating ad Graph

7.0. Internet

7.1. Concepts of Computer Networks - LAN, WAN

7.2. Connecting and working on Internet

8.0. Auto - CAD

8.1. Basic Concepts on Starting up Auto CAD - Command window - Drop Down Menus - Tool bars

8.2. Practice on Basic Commands - Line command - Drawing the Boxd - Drawing Units - Drawing Size

8.3. Laying out the walls - creating Doors & Windows

8.4. Drawing the steps and Thresholds - Balcony - Laying out the Kitchen and Bathroom

8.5. Drawing the Roof - Develop the drawing depicting the Reinforcement details of typical elements like column, footing, beams and slabs

8.6. Generating elevations - Drawing the front elevation - Putting the door, step, windows - Finising touches - Hatching the front elevation

8.7. Controlling text in a drawing - Setting up Text styles - Using Single line Text - placing Room Labels in the floor plan - creating a Title Block and Border

8.8. Develop a 3-D drawing of a building and obtain different views - practice on printing on Auto CAD drawing

AUTOMOBILE ENGINEERING TECHNICIAN

THEORY - PAPER - I II YEAR

Total No.of Periods : 160
Periods per week : 05
Max. Marks : 50

TIME SCHEDULE :

Sl.No.	Major Topics	No.of Periods	SA	LA
1.0.	Clutch	13	2	6
2.0.	Gear Box	12	-	6
3.0.	Universal joints and propeller shaft	14	(2+2)	3
4.0.	Differential Unit	12	-	6
5.0.	Front and Real Axles	14	2	3
6.0.	Suspension System	13	-	6
7.0.	Wheels and Tyres	15	2	-
8.0.	Ignition System	12	2	6
9.0.	Charging System	13	2	6
10.0	Starting System	12	2	-
11.0	Lighting, Horn and Wipers	15	2	-
12.0	Battery	15	2	6
	Total	**160**	**20**	**48**

II YEAR

A.T. S.& E.S.

A.T.S. :

1.0. Clutch

1.1. Necessity of clutch in automobiles

1.2. Construction and working of a single plate, multiplate, centrifugal and semi-centrifugal clutch

2.0. Gear Box

2.1. Necessity of gear box in automobiles

2.2. Construction and working of a sliding mesh, constant mesh and synchromeshgear box

3.0. Universal Joints and Propeller Shaft

3.1. Necessity of Universal Joints & Propeller Shaft

3.2. Construction and working of cross or spider, yoke , ball and Trunion and constant velocity type, universal type

3.3. Construction and working of enclosing type and hollow type propeller shaft

3.5. Construction and working of slip joint, hotchkis drive, torque tube drive

4.0. Differential Unit

4.1. Necessity of differential

4.2. Construction and working of a differential

4.3. Differential lock and self locking differential

5.0. Front and Rear Axles

5.1. Necessity of Front & Rear axle

5.2. Construction and working of live and dead axles

5.3. Construction and working of different types of stub axles

5.4. Construction and working of semi floating, three quarter floating and full floating rear axles

6.0. Suspension System

6.1. Function of suspension system in automobiles

6.2. Construction and working of Hydraulic and Telescopic shock absorbers

6.3. Coil spring mountings

7.0. Wheels and Tyres

7.1. Function of wheel & tyres

7.2. Construction and working of Disc and spoked wheel

7.3. Types of rims and their construction

7.4. Construction & properties of tyres

7.5. Different tyre tread pattern

7.6. Specifications of a tyre

7.7. Tyre rotation

7.8. Voulcanizing and Retreading

7.9. Wheel balancing and static balancing

E.S :

8.0. Ignition System

8.1. Introduction

8.2. Study of wiring of Magnet elgnition, Battery Coil Ignition and Electronic Ignition System

9.0. Charging System

9.1. Introduction

9.2. Construction and working of charging dynamo (D.C.Generator)

9.3. Working principle of cut-out

9.4. Voltage regulators-current regulators-construction and working

10.0 Starting System

10.1. State the construction and working of a self starter (D.C.Motor)

10.2. Working principle of bendix drive with a sketch

10.3. Solenoid construction and working

11.0. Lighting, Horn and Wipers

11.1. Introduction

11.2. Working of Head lamp, side or parking light, tail or stop light, dash light, direction signal light

11.3. Adjustments of head lights

11.4. Working of Dipper, Dim light, Door light & Destination board light

11.5. Horn circuit construction and working

11.6. Working of wiper

12.0. Battery

12.1. Introduction

12.2. Parts of lead acid battery and its functions

12.3. Understand the ampere hour and watt-hour efficiency of the battery

12.4. Know the different methods of charging and trickle charging

12.5. Know the different methods of testing of a lead-acid battery for full charged and discharged condition

Reference Books :

Auto Transmission and Electrical Engineering

1. Automobile Engineering, Vol I & II - by Kirpal Singh
2. Automobile Engineering - by R.B.Gupta
3. Automobile Engineering - by G.B.S. Narang
4. Automotive Electrical Equipment - by P.L. Kohli
5. Elements of Technology - by B.L.Theraja

AUTOMOBILE ENGINEERING TECHNICIAN
AUTOMOBILE SERVICING MAINTANANCE
THEORY - PAPER - III II YEAR

Sl.No.	Topics	No.of Periods	Weightage	
			SA.	LA
1.	Introduction of service station and garage	08	2	3
2.	Major Equipment for a service station	16	2	6
3.	Automobile Engine Reconditioning Equipment	18	2	6
4.	Reconditioning brakes	08	2	3
5.	Reconditioning of Diesel Fuel Injection system	10	2	6
6.	Servicing and maintenance	10	2	6
7.	Servicing and maintenance of two wheelers	30	(2+2)	6
8.	Servicing and maintenance of three wheelers	30	2	6
9.	Servicing and maintenance of four wheelers	30	2	6
	Total	**160**	**20**	**48**

1. Introduction

1.1. Garage, Service Station and Specialist repair shop

1.2. Tools and equipment for a garage, service station and specialist repair shop

1.3. Factors to be considered while locating service station

1.4. Layout of a typical garage, service station and specialist repair shop

2. Major equipment for service station

Study the construction and working of the following equipment with aid of charts/original equipment

2.1. Car washing machine

2.2. Vehicle hoist

2.3. Air Compressor

2.4. Lubrication equipment - Grease guns - Hand and compressed air operated - High pressure lubrication

3. Automobile Engine reconditioning equipment

Study the following processes with the help of Charts/Model/ Original Component

3.1. Degreasing Plant

3.2. De Carbonising

3.3. Cylinder ridge removal

3.4. Cylinder Reboring and honning

3.5. Valve seat cutting and grinding

3.6. Valve refacing

3.7. Crank shaft grinding

4. Reconditioning of Brakes

Study the construction and working of the following equipment with aid fo charts/model/original components.

4.1. Brake drum lathe

4.2. Brake shoe rivetting

5. Reconditioning Diesel Fuel injection system

Study the following test procedures with the help of charts/ models/original component

5.1. Fuel injection pump test bench (phasing and calibration tests)

5.2. Fuel injector testing

6. Servicing and Maintenance

6.1. General Procedure for servicing and maintenance of Motor Vehicles

6.2. Types of maintenance - periodic maintenance - break down maintenance - preventive maintenance - operation maintenance

6.3. Types of servicing - cleaning of the motor vehicle and its components - greasing of motor vehicle

7. Servicing and maintenance of two wheelers

7.1. Maintenance and its role in trouble shooting of two wheelers - advantage of good maintenance

7.2. Daily, weekly and monthly maintenance or after every 2000 Km - General and periodical Check up - Servicing

7.3. Adjustment, dismentling, assembling and trouble shooting of Bajaj, Hero Honda, TVS, Yamaha Two Wheelers.

8. Servicing and Maintenance of 3 Wheelers

8.1. General and Periodical maintenance of 3 wheelers

8.2. Adjustment, dismantling, Assembling and Trouble shooting of Bajaj and APE three wheelers

9. Servicing and Maintenance of Four Wheelers

Dismantling, over hauling and reassembling of the following units of the Maruti, Ambassodor, Santro, Tayota Qualis, Indica

9.1. Engine

9.2. Fuel System

9.3. Lubrcation System

9.4. Cooling System

9.5. Transmission System

9.6. Ignition System

9.7. Steering, brakes and suspension system

9.8. Testing the engine with the help of engin analyser

9.9. Alignment of wheels

9.10. Balancing of wheels

Reference books :

Automobile Servicing & Maintenance

1. Automobile Servicing and Maintenance - Asrif Ali
2. Automotive Mechanics - Williom H. Crouse
3. Automobile Engineering - G.B.S. Narang
4. Workshop manuals of - Maruti, Santro, Ambassedar, Tata Sumo, Toyota qualis
5. Practical Auto Engineering - Odhamis

AUTOMOBILE CHASISS AND BODY ENGINEERING

PRACTICAL - PAPER-III II YEAR

Total No.of Periods : 160
Periods per week : 05
Max. Marks : 50

TIME SCHEDULE :

Sl.No.	Major Topics	No.of Periods
1.	Introduction to automobile chassis, Frame and body	20
2.	Steering System	30
3.	Braking System	20
4.	Suspension System	30
5.	Seat, Door and Window Mechanism	10
6.	Air Conditioning of Motor vehicles	20
7.	Painting of Automobiles	10
8.	Automobile Pollution	10
9.	Legal Aspects of Motor Vehicles	10
	Total	**160**

Detailed Syllabus :

1.0. Chassis, Frame and Body

1.1. Introduction of Chassis frame

1.2. Layout of the Chassis and its main components

1.3. Functions of the Chassis frame

1.4. Types of Chassis frames

1.5. Various loads acting on the frame

1.6. State the different bodies used in automobiles

1.7. Explain the requirements of bodies for various types of vehicles viz. private, commercial etc.

2.0. Steering System

2.1. Requirement of the vehicle steering

2.2. Types of Steering gears, systems and power steering

2.3. Steering linkages mechanism under steering, over steering

2.4. Turning radius

2.5. Wheel alignment of Ackerman's & Davis Steering gear, Mechanism

2.6. Steering goemetry - Caster, Camber, King pin inclination, toe in and toe out

2.7. Steering defects - wheel wobble and shimmy

2.8. List out the type of steering system used in various vehicles

3.0. Braking System

3.1. Explain Functions of brakes

3.2. Requirements of automobile brakes

3.3. Explain stopping time and stopping distance

3.4. Types of Braking systems - Disc and Drum braking system

3.5. Construction and workig of Mechanical, hydraulic, and air brakes

3.6. List out the types of brakes used in various vehicles

4.0. Suspension System

4.1. Requirements of a automobile suspension system

4.2. Types of suspension system - conventional and Independent

4.3. Types of springs - Laminated spring, coil spring, helical spring

4.4. Need of Shock absorber - construction and working of different types of shock absorbers

4.5. Stabilizer bar and torsion bar

4.6. List out the type of suspension system used in various vehicles

5.0. Seat, Door and Window mechanism

5.1. Construction and working of door lock mechanism

5.2. Construction and working of manual window regulating mechanism

5.3. Construction and working of power window regulating mechanism

5.4. Construction and working of seat adjusting mechanism

6.0. Air Conditioning of motor vehicles

6.1. Necessity of automobile air conditioning

6.2. Construction and working of passenger car air conditioning

7.0. Painting of automobiles

7.1. Body painting

7.2. Different types of painting - Spray painting - hand painting procedures

8.0. Automobile Pollution

8.1. Effects of automobile pollution on environment and human beings

8.2. Types of automobile emmissions

8.3. Treatment of exhaust gases by using catalytic convertors

8.4. Measurement of percentage of pollutants from Petrol & Diesel vehicles with the help of exhaust gas analizers

9.0. Legal aspects of motor vehicles

9.1. Traffic signs and signals

9.2. Registration requirements

9.3. necessity of permits for commercial vehicles

9.4. Insurance coverage

9.5. Procedure for obtaining driving licences

AUTOMOBILE CHASISS & BODY ENGINEERING

PRACTICAL - PAPER - II II YEAR

Sl.No.	Major Topics	No.of Periods	SA	LA
1	Constrtuctional details of chasiss and body	15	2	6
2.	Construction and working of systems	55	2+2	6
3.	Door lock Mechanism	10	2	6
4.	Manual window mechanism	10	2	6
5.	Power window mechanism	10	2	3
6.	Cas Air Conditioning	25	2	6
7.	Painting procedures	10	2	3
8.	Measurement of pollutents	10	2	6
9.	Legal forms	10	2	6
10.	On the Job Training	05	2	6
	Total	**160**	**20**	**48**

AUTOMOBILE ENGINEERING TECHNICIAN
AUTOMOBILE CHASISS AND BODY ENGINEERING LAB
PRACTICAL - PAPER - II II YEAR

Detailed Syllabus :

1. Study the construction details of the chasiss and body with the aid of model/original component

1.1. 2 wheeler

1.2. 3 wheeler

1.3. 4 weeler

2. Study the construction and working of the following systems with the aid of model/original component

2.1 Different types of steering system

2.2 Different types of Braking system

2.3. Different types of suspension system

3.0. Study the working and repair of door lock mechanisms

4.0. Study the working and repair of manual window mechanism

5.0. Study the working and repair of power window mechanism

6.0. Study the working gas filling and repair of car air conditioning

7.0. Study the painting procedures

8.0. Measurement of percentage of pollutants from petrol and diesel vehicles with the help of exhaust gas Analysers

9.0. Study the various legal forms required for applying driving licence, registration of vehicle, vehicle insurance and permits for commercial vehicles

AUTO TRANSMISSION AND ELECTRICAL SYSTEM LAB (ATESL)

PRACTICAL - PAPER - I II YEAR

Periods per each Practical	**6 x 13 = 78**
OJT Test	**02**
Total Periods	**80**

1.0. A.T.S Lab :

Dismantle and study the construction and working of the following components then reassemble.

1.1. Single plate clutch

1.2. Multiplate clutch

1.3. Centrifugal clutch

1.4. Sliding mesh gearbox

1.5. Constant mesh gearbox

1.6. Synchromesh gearbox

1.7. Differential unit

1.8. Propeller shaft with Universal joints

1.9. Front axle

1.10. Rear axle

1.11. Leaf Springs

1.13. Wheel assembly

1.12. Brake Assembly

2.0 The list of experiments to be conducted in A.E.S. Lab

Periods for each practicle	**5 x 15 = 75**
On the Job Training Test	**05**
Total Periods per year	**80**

2.1. Verification of Ohm's Law

2.2. Verification of Kirchoff's Laws in simple series and parallel circuits

2.3. Study of ammeter, volt meter and watt meter.

2.4. To dismount, dismantle, inspect, repair, service and reassemble an alternator

2.5. To study the working and carry out adjustment of voltage and current regulator.

2.6. To dismount, dismantle, inspect repair, service and reassemble a self starter motor

2.7. To dismount dismantle inspect and reassemble a wiper motor

2.8. To study the circuit diagram of an electric horn and to carry out its adjustments

2.9. To study the wiring diagram of an automobile and to get familiarized with colour code

2.10. To carry out adjustment of head lights

2.11. To study a battery charger and carry out charging

2.12. To study wiring diagram of battery coil ignition system

2.13. To study wiring diagram of electronic ignition system

2.14. Study of temperature guages

2.15. Study of speedo meter and odometer.

AUTOMOBILE ENGINEERING TECHNICIAN
AUTOMOBILE SERVICING & MAINTANCE LAB
PRACTICAL - PAPER - II IIND YEAR

Sl.No.	Major Topics	No.of Periods
1.	Re conditioning of Vehicle components	40
2.	Servicing and Maintainance of two wheelers	30
3.	Servicing and maintenance of 3 wheelers	30
4.	Servicing and maintenance of 4 wheelers	50
	On the Job Training	10
	Total	**160**

AUTOMOBILE ENGINEERING TECHNICIAN
AUTOMOBILE SERVICING AND MAINTANANCE LAB
PRACTICLE - PAPER - II II YEAR

Detailed Syllabus :

1. The following operations to be carried out for reconditioning of vehicle components

1.1. Decarbonisation

1.2. Cylinder Reboring

1.3. Cylinder Honing

1.4. Valve seat cutting, grinding and refacing

1.5. Line-boring

1.6. Brake drum turning

1.7. Brake shoe rivetting

1.8. Brake bleeding

1.9. Wheel alignment - Camber, Caster, King pin inclination, toe-in, toe out - wheel balancing

1.10. FIP phasing and caliboration test

1.11. Fuel injector - pressure test, spray test and leak off test

1.12. Crank shaft grinding

2. Servicing and Maintenance of Two Wheelers

Two wheelers (Bajaj, Hero Honda, TVS, Yamaha, LML) - Repairs, adjustments and servicing of the following units

2.1. Engine

2.2. Clutch

2.3. Gear Box

2.4. Brakes

2.5. Electrical System

3. Servicing and Maintenance of 3 Wheelers

3 Wheelers (Bajaj, APE) - Repair, adjustment and servicing of the following units

3.1. Engine

3.2. Transmission

4. **Servicing and maintenance of four wheelers** passenger cars (Maruti, Ambassador,Tayota qualis, Santro, Tata Sumo) - Repair, adjustment and servicing of the following units.

4.1. Engine

4.2. Transmission System

4.3. Brakes

4.4. Steering

4.5 Suspension

4.6. Cooling, lubrication and fuel supply system

4.7. Electrical system

4.8. Ignition system

VII. LIST OF EQUIPMENT

Measuring Instruments and Inspection Equipment

1.	Out side caliper 6"150 mm	6
2.	Inside caliper 6"/150 mm	6
3.	Vernier caliper 150 mm	6
4.	Depth gauge 150 mm	4
5.	Dial indicator range 5 mm least count .01 mm	2
6.	Try square 100	20
7.	Straight edge 500 mm	1
8.	Steel top 5 mtr.	2
9.	Pair of V. blocks	1
10.	Special gauge for crown wheel and pinion adjustment	1
11.	Surface gauge	2
12.	Magnifying glars 5x	2
13.	Steel almairah	2

Machines

1.	Bench drill medium size	1
2.	Central lathe 6 fot/1.5 meter	2
3.	Pedestal grinder 1.H.P. motor wheel 10"	1
4.	Arc welding set	1
5.	Gas welding set	1
6.	Wire brush	4
7.	Clipping Hammer	2
8.	Cleaning Brush	1
9.	Painting Brush	1
10.	Floor Brush	1

Electrical Items

1.	Heater	1
2.	Soldering Iron	2
3.	Inspection lamp	2
4.	Electrical wire-50 metres	4
5.	Insulation tape	1

6.	Growler	1
7.	Soldering fwx	1
8.	Voltmeter D.C. 25 volt	1
9.	Hydrometer for Battery	1
10.	Ammeter	1

Electrical Items

11.	Battery Charger	1
12.	High rage discharge tester for Battery	1

Hand Tools

1.	Drill twist metric 3mm x 12mm x 1mm	2 sets
2.	Taps and Dies complete set in box	1
3.	B.A., B.S.W., Metric and American HSS hand Reamer Shauk T.5 to 12 mm by 1.5 mm	1 set
4.	HSS hand Reamer Taper pin 7.5 to 12 mm by 1.5 mm	1 set

Safety Equipment

1.	Goggles for Grinders	5
2.	Goggles for werding	5
3.	Wording glass shield/Eye shield	2
4.	Overall	2
5.	Rubber apron	2
6.	Fire extinguisher foam type	2
7.	Sand Bucket	5
8.	Barrier cream 250 gms	1
9.	First Aid Box	2
10.	Stretcher	1
11.	Padlocks	5
12.	Metal Racks	2
13.	Fire Extinguisher	2

VIII. (A) SUGESTED LIST OF COLLABORATING AGENCIES

1. Road transport corporations, workshops, regional workshops/ divisional workshops/depots.
2. Dealers, service station and workshops.
3. Reputed automobile garages.
4. Manufacturing servicing firms like TATA, LEYLAND, AMBASSADOR, PREMIER, MARUTI, STANDARD, KINETIC, BAJAJ, YAMAHA, etc.
5. Small workshops/garages/service stations.
6. Government organisations having auto section.
7. Private organisation garages.
8. Engineering Colleges and Polytechnics.

(b) On the Job Training Centres :

1. All Private and Government Automobile Workshops and Service Stations (Two, Three and Four Wheelers)
2. All authorised Two, Three & Four Wheelers Service Stations
3. All Private and Government Transport Companies

X. TEACHING STAFF & THEIR QUALIFICATIONS

1. Vocational Teacher (Full Time)

Degree in Mechanical Engineering/Automobile Engineering/Diploma in Mechanical Engineering/Automobile Engineering with two years experience

2. Vocational Teacher (Part Time)

Should be person working in industry/service stations/garages.

3. Laboratory Assistant

NCVT Certificate (Allied trade) or 2 years vocational certificate in Auto Engineering Technology with 2 years experience.

XI. VERTICAL MOBILITY

a) Without Bridge Course :

1. Eligible for degree courses, B.Com., & BCA

b) With Bridge Course :

1. Eligible for all degree Courses
   (Except Biology i.e., B.Com., B.Sc, MPC, Comp.Science, etc.)
2. Eligible for direct polytechnic II-Year Mechanical and Automobile Engineering Courses without Entrance Test.

XII. REFERENCE BOOKS :

1. Telugu Academy - Automobile Engineering Technician
2. Automobile Engineering - by G.B.S. Narang
3. Automobile Engineering - by R.B. Gupta
4. Automobile Engineering-Vol - I & II - by Kirpal Singh
5. The Automobile Engineering - by Harban Singh Rayatzz

MODEL QUESTION PAPERS

AUTOMOBILE ENGINEERING TECHNICIAN

BASIC MECHANICAL & ELECTRICAL ENGINEERING

Ist YEAR

Time : 3 Hours **Max. Marks : 50**

Section - A

Note : (i) Answer all the Questions 10 x 2 = 20
(ii) Each Question carries 2 marks

1. Define internal energy and enthalpy
2. State Joules law and Regnaults law
3. State and explain Ist law of themodynamics
4. List various types of thermodynamic processes
5. Define Higher calorific value and lower calorific value
6. Diffrentiate the cross belt drive with open belt drive
7. List various types of keys and their application
8. Draw Square headed bolt with standard speciications
9. Stete Ohm's Law
10. List various causes for electric shock

Section - B

Note : (i) Answer any 5 Questions 5 x 6 = 30
(ii) Each Question carries 6 marks

11. a) Explain intensive properties and extensive properties with examples

    b) Explain IInd law of Thermodynamics
12. Derive the characteristic gas equation
13. 1 Kg mass of gas at a pressure 5 barsd and volume 1 m^3 is expanded to a pressure 1 bar adiabatically with an index value 1.4. Find the Final Volume of the gas and work done during the process
14. a) Write the classification of the fuels

    b) Write the advantages of gear drive over belt drive

15. Explain the working of disel cycle with the help of P-V diagram and T-S diagram
16. Explain work, power and energy with examples
17. Explain wheat stone bridge with neat sketch
18. Explain moving coil galvanometer

AUTOMOBILE POWER PLANT

PAPER-III

Time : 3 Hours **Max. Marks : 50**

Section - A

Note : (i) Answer all the Questions 10 x 2 = 20
(ii) Each Question carries 2 marks

1. What is the function of an I.C.Engine?
2. Write the firing order of 4 and 6 cylinder engine
3. Draw the line diagram of petrol engine fuel system
4. Write the advantages of diesel engines
5. What are the limitations of petrol engines?
6. List the types of fuel injection systems
7. What are the requirements of lubrication system
8. What is the necessity of cooling system?
9. Write the function of silencers
10. Define I.H.P. & BHP

Section - B

Note : (i) Answer any 5 Questions 5 x 6 = 30
(ii) Each Question carries 6 marks

11. Write the comparision between 2-stroke and 4-stroke petrol engines
12. Explain the construction and working of S.U.carburettor with heat sketch
13. Explain the valve timing diagram of 4-stroke petrol engines
14. Write the construction and working of F.I.P.
15. Write the construction and working of pressure lubrication system
16. Write the short notes on
    a) Water Pump b) Radiator c) Thermostat
17. Write the types of silencers and explain any two
18. Define the brake thermal efficiency, volumetric efficiency and indicated thermal efficiency, with their formula

AUTO TRANSMISSION & ELECTRICAL SYSTEM
PAPER-I IIND YEAR

No. of Questions : 18

Time : 3 Hours **Max. Marks : 50**

Section - A

Note : (i) Answer all the Questions 10 x 2 = 20
(ii) Each Question carries 2 marks

1. What is the necessity of clutch in an Automobile vehicle.
2. Write the function of Universal joints and propeller shafts.
3. Explain about hotchkis drive.
4. List the types of axlers.
5. Define volcanizing and retreading.
6. List the types of Ignition systems.
7. Write the working principle of cut-out.
8. List the parts of starting system.
9. Write the adjustments of head lights.
10. What is the necessity of battery in an automobile vehicle.

Section - B

Note : (i) Answer any 5 Questions 5 x 6 = 30
(ii) Each Question carries 6 marks

11. Write the construction and working of a multiple clutch, witha neat diagram.
12. Explain the construction and working of a constant mesh gear box.
13. a) Explain about spider type universal joints.
    b) Explain about three quarter floating rear axles.
14. Write the construction and working of a differenctial.
15. Explain about Hydraulic shock absorber, witha neat sketch.
16. Explain about battery coil ignition system, with a neat diagram.
17. Write short notes on
    a) Voltage regulators b) Current regulators
18. Explain about lead acid battery, with a neat sketch.

AUTOMOBILE ENGINEERING TECHNICIAN
WORK SHOP TECHNOLOGY

Time : 3 Hours **Max. Marks : 50**

Section - A

Note : (i) Answer all the Questions 10 x 2 = 20
(ii) Each Question carries 2 marks

1. What are the Ferrous and Non-Ferrous metals?
2. What are the comon tools used in fitting section?
3. Mention the parts of clisel and hammer?
4. What are the common tools used in smithy?
5. What is meant by extrusion>
6. what are the safety precautions to be followed while practicing are welding?
7. What are the marking and measuring tools used in carpentary?
8. What is the use of Drilling machine and name its parts?
9. What are the materials used for making a grinding wheel?
10. What are the parts of a Lathe?

Section - B

Note : (i) Answer any 5 Questions 5 x 6 = 30
(ii) Each Question carries 6 marks

11. What are the general safety precautions to be taken for preventing accidents?
12. Sketch and explian briefly about any two types of marking tools used in fitting?
13. Write briefly about soldering and brazing work used in sheet metal?
14. Write a short note on smithly forge (or) Hearth and Anvil?
15. Explain briefly about elecric are welding with the help of a neat sketch?
16. Explain briefly any two types of cutting tools used in carperntary?
17. Explain with help of a neat sketch?
18. Explain briefly about oxy-accetylene flames with sketches?

AUTOMOBILE ENGINEERING TECHNICIAN
MECHANICAL TECHNOLOGY

Time : 3 Hours **Max. Marks : 50**

Section - A

Note : (i) Answer all the Questions 10 x 2 = 20
(ii) Each Question carries 2 marks

1. Define Termodynamic System?
2. State Boyles Law?
3. What are the different types of Thermodynamic Processes?
4. What is meant by the term fuel and what are its contituents?
5. Mention the different types of solid, liquid and gaseous fuels?
6. Define Heat Engine?
7. Mention the parts of Diesel engine?
8. What are the functions of a pump?
9. What are the components of a sprinkler?
10. What are the main parts of Reciprocating and submersible pumps?

Section - B

Note : (i) Answer any 5 Questions 5 x 6 = 30
(ii) Each Question carries 6 marks

11. Explain briefly about the types of Thermodynamic Systems?
12. Define the terms Pressure, Atmospheric Pressure, Temperature, and Enthalpy?
13. State Charle's Law, Avagadro's Law and Joule's Law?
14. State Laws of Termodynamics?
15. Derive an expression for the work done during the constant volume jprocess?
16. Give a brief account on different types of solid fuels?
17. Explain the working principle of a four stroke petrol engine?
18. Explain the working of contrigugal pumps with the help of a neat sketch?

AUTOMOBILE ENGINEERING TECHNICIAN
DOMESTIC APPLIANCES

Time : 3 Hours **Max. Marks : 50**

Section - A

Note : (i) Answer all the Questions 10 x 2 = 20
(ii) Each Question carries 2 marks

1. Define Refrigeration?
2. What are the different types of compressors and condensers used in vapour Compression Refrigeration System?
3. Define Dry bulb and wet bulb temperature?
4. Whatr are the parts of a Refrigerator?
5. What are the main parts of an Air Cooler?
6. What are the main parts of a Washing Machine?
7. What are the main parts of Grinder and Mixer?
8. What are the main parts of Gas stove?
9. What are the main parts of petromax light and Gas light?
10. What is the use of handle and brakes in a Bicycle?

Section - B

Note : (i) Answer any 5 Questions 5 x 6 = 30
(ii) Each Question carries 6 marks

11. Explain vapour compression Refrigeration cycle with the help of a neat sketch?
12. Explain briefly about psychrometric properties?
13. Explain briefly about an Air Coler with the help of a sketch?
14. How does washing machine works? Explain with neat sketch?
15. Explain briefly about the parts of wet grinder with the help of a neat sketch?
16. Explain briefly about the parts of a mixy with the help of neat sketch?
17. Write the trouble shooting chart of a gas stove?
18. Explain the construction and working of a bicycle?

AUTOMOBILE SERVICING & MAINTENANCE

Time : 3 Hours **Max. Marks : 50**

Section - A

Note : (i) Answer all the Questions 10 x 2 = 20
(ii) Each Question carries 2 marks

1. State any two factors to be considered while locating service station
2. State the necessity of vehicle hoist while servicing the automobile
3. What is the necessity of reconditioning of Engine components. Mention any two reconditioning equipments.
4. What is the necessity of reconditioning of brakes. Mention any two reconditioning equipments.
5. State any two types of tests can be conduct on F.I.P. test bench
6. State the types of maintenance.
7. State any two advantages of good maintenance.
8. State the necessity of maintenance to automobiles.
9. State any two periodical maintenance to be carried out for 3 wheelers.
10. Define overhauling of 4 wheeler engine.

Section - B

Note : (i) Answer any 5 Questions 5 x 6 = 30
(ii) Each Question carries 6 marks

11. a) Differenciate the Garage and service stateion.
    b) Discribe the function of Brake Shoe revetting machine.
12. Explain the working of carwashing machine with a neat sketch.
13. Explain the degreasing and decarbonising process.
14. Explain the leak test & spray test of fuel injector.
15. Differenciate the preventive maintenance and break down maintenance and state the advantages of preventive maintenance.
16. Explain the periodical maintenance of Bajaj Scooter.
17. Explain the preventive maintenance of APE 3 wheeler.

AUTOMOBILE CHASISS & BODY ENGINEERING LAB

Total No.of Periods : 160
Periods per week : 05
Max. Marks : 50

Section - A

Note : (i) Answer all the Questions 10 x 2 = 20
(ii) Each Question carries 2 marks

1. What are the loads acting the chasiss frame?
2. State types of steering system.
3. List out types of steering gear boxes.
4. What is the necessity of bracking system?
5. What is the use of shockabsorber used in two wheeler.
6. Explain about Door Lock mechanism.
7. Write necessity of Automobile Air Conditioning.
8. Write types of paintings.
9. What are the types of automobile emmissions.
10. Write the requirements of registration of the vehicle.

Section - B

Note : (i) Answer any 5 Questions 5 x 6 = 30
(ii) Each Question carries 6 marks

11. Draw the layout of conventional chasiss frame and indicate the parts.
12. Write about steering geometry and explain in detail.
13. Explain the construction and working of 3 wheeler breaking system.
14. Explain about leaf springs.
15. a) Explain the working of window regulating mechanism.
    b) Explain about body painting.
16. Construction and working of car air conditioning.
17. Explain the exhaust gas measurement with gas analizer in a three wheeler.
18. Write procedure for obtaining of a permanent driving licence of 2-wheeler.
18. Explain the overhauling of Maruti Engine.

XIII. LIST OF PARTICIPANTS

1. M. Sheshagiri Rao
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   JL. in Mechanical Engineering
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5. P. Sambaiah,
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VOCATIONAL CURRICULUM-2005

(With effect from the Academic Year 2005-2006)

CURRICULUM OF INTERMEDIATE VOCATIONAL COURSE IN

AUTOMOBILE ENGINEERING TECHNICIAN

STATE INSTITUTE OF VOCATIONAL EDUCATION &

BOARD OF INTERMEDIATE EDUCATION A.P.

Nampally, Hyderabad

FOREWORD

The National Policy on Education (1986) while proposing educational reorganization, placed high priority on the programme of vocationalisation of education. It emphasized that well planned, systematic and rigorously implemented vocational education will create a distinct stream to prepare students for identified occupations encompassing several areas of activity. The primary aim of vocational courses was to cut across several occupational fields and prepare students with employable skills in organized sectors and self employment. Vocationalisation through re-orientation of educational strategies focused on creating a talent pool of skilled youth who are trained in courses relevant to the market and emerging needs of the various sections of the economy.

Inspired by this vision of the National Policy, the Government of Andhra Pradesh introduced Vocational Education at +2 level with an aim to diversify a sizeable segment of students at the senior secondary stage to the world of work. The State Government aimed at reducing the pressures on higher education through empowering youth by harnessing their capabilities. The requirement of skilled manpower industry is being fulfilled by charting a student's career with right options based on aptitude and talent. An right alternative to medical and engineering courses is envisaged in vocationalisation of education in the State.

In view of the changing needs of the students and growing demand for a spectrum of skill competencies in the economy, the Board of Intermediate Education has reviewed the curriculum of Vocational Courses inorder to re-orient them based on their viability and practicability. The revised curriculum for Vocational Courses at Intermediate Level will come into effect from the Academic Year 2005-06 1st Year and from Academic Year 2006-07 for 2nd Year students.

I am confident that the revised curriculum will attract more and more students into vocational stream and help them train in need-based, productive courses leading to gainful employment.

SHASHANK GOEL

Secretary, BIE

CONTENTS