

VOCATIONAL CURRICULUM - 2020

AUTOMOBILE ENGINEERING TECHNICIAN



State Institute of Vocational Education

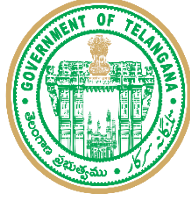
**O/o the Commissioner of Intermediate Education,
Telangana State, Hyderabad**

&

Board of Intermediate Education

Telangana State, Hyderabad

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COMMISSIONER
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Fore word

In any developing society with a booming population, Vocational Education occupies an important position for generating large scale employment opportunities. Viewed in this context the importance of Vocational Education for our country cannot be over emphasized. Vocationalization of Secondary Education was introduced in 1988 at the Intermediate level. Recently, the Government of India has developed a National Skills Qualification Framework for establishing a clear path for vocational education from the school level to the highest level. The Department of Intermediate Education has recently framed a new curriculum to bring greater value to the system of vocational education. The primary aim of this reform is to prepare the students with employable skills for absorption in organized sectors and in few cases, even for self-employment.

State Institute of vocational education and Board of Intermediate Education, Telangana have reviewed the curriculum of vocational courses in order to reorient them for their practical approach. Greater emphasis is now being placed on Laboratory work and on the job training.

Simultaneously, The State Institute of Vocational Education and the department of Intermediate Education are presently making efforts to upgrade the quality of infrastructure in the colleges to meet the challenges of the changed curriculum. I am confident that the revised curriculum and the new text books would prove to be beneficial to the students in the vocational stream and help them train in need based productive courses leading to gainful employment.


Commissioner of Intermediate Education
Government of Telangana

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Introduction

Automobile Industry is one of the most important and rapidly growing industries in the world. In India, it is bound to become one of the major industries. Day by day the number of vehicles are increasing on the road as per the public need. More and latest luxurious vehicles are being introduced by the multinational companies to our country. In India there are quite a number of companies producing different motor vehicles both light and heavy, two, three and four wheeler. Hence a large number of persons apart from automobile engineers are responsible for the design, planning, production and sale of vehicles. Craftsmen as well as a large number of middle level technicians are required on the shop floor. Hence there is dire need of middle level technicians to the rapidly growing automobile industry for servicing, repair and maintenance of the automobile. So this gap can be fulfilled through the vocational education at +2 level by training the youth in this course. And also the growing importance for good maintenance and timely servicing of vehicle leads to cut in carbon emission and to keep the vehicle pollution levels within the prescribed limits set by the Transport Authorities. The skill and techniques acquired during the course develops the required competency in performing the job effectively whether one is placed in a waged or self-employment.

This is the reason behind the competency based vocational curriculum developed by State Institute of Vocational Education, O/o the Commissioner of Intermediate Education, Telangana, Hyderabad & Board of Intermediate Education, Telangana, Hyderabad.

II. Objectives of the Course

1. To know about the use of various hand tools, gauges, instruments and special equipment.
2. To know the constructional 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.
3. To know the constructional features and functions of fuel injection pumps 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 use various hand tools, gauges, instruments and Special equipment.
2. Should be able to wash, clean the under chassis and to lubricate the various points.
3. Should be able to implement the maintenance schedule.
4. Should be able to check the tightening of nuts as per the required torque
5. Should be able to overhaul the engine, clutch, propeller shaft, gearbox, rear axle, front axle steering assembly, suspension, braking system [Petrol & Diesel vehicles]
6. Should be able to overhaul fuel injection pump, feed pump, and injectors.
8. Should be able to perform tyre rotation and repair.
9. Should be able to repair electrical system.
10. Should be able to mount the wheels.
11. Should be able to carry out servicing, minor and major engine tune up.
12. Should be able to test the engine on dynamometer

IV. JOB OPPORTUNITIES

a) Wage Employment

1. Auto Mechanic
2. Vehicle Service Technician
3. Auto Fitter in Manufacturing Concern in Assembly Shop or
4. Spare Parts Sales Assistant / Manufacturers' Representative
5. Insurance Agent and Assistant to Loss Assessor
6. Laboratory Assistant
7. Auto Electrician

b) Self Employment

1. Automobile Mechanic
2. Diesel Fuel System Service Mechanic
3. Vehicle Operator
4. Spare Parts Salesman
5. Spare Parts Dealer

V. **SCHEME OF INSTRUCTION AND EXAMINATION**
ANNUAL SCHEME OF INSTRUCTION AND EXAMINATION
AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR

Part-A		Theory		Practicals		Total	
		Periods	Marks	Periods	Marks	Periods	Marks
1.	English	150	50	0	0	150	50
2.	General Foundation course	150	50	0	0	150	50
Part-B							
3.	Paper-I Work Shop Technology	135	50	135	50	270	100
4.	Paper-II Basic Mechanical and Electrical Engineering.	135	50	135	50	270	100
5.	Paper-III Auto Power Plant	135	50	135	50	270	100
6.	Part-C OJT	0	0	365	100	365	100
Total		705	250	770	250	1475	500

*on the Job Training for 1st year from 1st November to 31st December

SECOND YEAR

Part-A		Theory		Practicals		Total	
		Periods	Marks	Periods	Marks	Periods	Marks
1.	English	150	50	0	0	150	50
2.	General Foundation course	150	50	0	0	150	50
Part-B							
3.	Paper-I Auto Transmission & Electrical Systems.	110	50	115	50	225	100
4.	Paper-II Auto Chassis and Body Engineering.	110	50	115	50	225	100
5.	Paper-III Auto Servicing & Maintenance.	110	50	115	50	225	100
Part-C							
6.	OJT	-	-	450	100	450	100
Total		630	250	795	250	1425	500
TOTAL FIRST YEAR AND SECOND YEAR MARKS 1000							

*OJT Programme for 2nd year students from 1st August to 31st October.

EVALUATION OF ON THE JOB TRAINING:

The “On the Job Training” shall carry 100 marks for each year and pass marks is 50. During on the job training the candidate shall put in a minimum of 90 % of attendance.

The evaluation shall be done in the last week of January.

Marks allotted for evaluation:

S.No	Name of the activity	Max. Marks allotted for each activity
1	Attendance and punctuality	30
2	Familiarity with technical terms	05
3	Familiarity with tools and material	05
4	Manual skills	05
5	Application of knowledge	10
6	Problem solving skills	10
7	Comprehension and observation	10
8	Human relations	05
9	Ability to communicate	10
10	Maintenance of dairy	10
	Total	100

NOTE: The On the Job Training mentioned is tentative. The spirit of On the Job training is to be maintained. The colleges are at liberty to conduct on the job training according to their local feasibility of institutions & industries. They may conduct the entire on the job training periods of (365) First year and (450) Second year **either by conducting classes in morning session and send the students for OJT in afternoon session or two days in week or weekly or monthly or by any mode which is feasible for both the college and the institution.** However, the total assigned periods for on the job training should be completed. The institutions are at liberty to conduct On the Job training during summer also, however there will not be any financial commitment to the department.

SCHEME OF INSTRUCTION PER WEEK

	Part-A	Theory	Practicals	Total
1.	English	4	-	4
2.	General Foundation Course	4	-	4
	Part-B			
3.	Paper -I	4	4	8
4.	Paper-II	4	4	8
5.	Paper-III	4	4	8
6.	Total	20	12	32

**SYLLABUS
FIRST YEAR SUBJECTS**

THEORY

- 1 WORK SHOP TECHNOLOGY
- 2 BASIC MECHANICAL AND ELECTRICAL ENGINEERING
- 3 AUTOPOWER PLANT

PRACTICAL

- 1 WORKSHOP PRACTICE
- 2 ENGINEERING DRAWING AND AUTO-CAD
- 3 AUTOMOBILE ENGINE LAB

ON THE JOB TRAINING

SECOND YEAR SUBJECTS

THEORY

- 1 AUTO TRANSMISSION AND ELECTRICAL SYSTEMS
- 2 AUTO CHASSIS AND BODY ENGINEERING
- 3 AUTO SERVICING AND MAINTENANCE

PRACTICAL

- 1 AUTO TRANSMISSION AND ELECTRICAL SYSTEMS LAB
- 2 AUTO CHASSIS AND BODY ENGINEERING LAB
- 3 AUTO SERVICING AND MAINTENANCE LAB

**AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR
PAPER I: WORK SHOP TECHNOLOGY
TIME SCHEDULE**

Sl.No.	Major Unit	No. of Periods	Weightage	Short Questions	Long Questions
1	Engineering Materials & Safety Precautions	15	8	1	1
2	Fitting&Drilling	30	16	2	2
3	Sheet Metal Work	20	10	2	1
4	carpentry	20	08	1	1
5	Forging &Welding	20	10	2	1
6	Mechanical Working of Metals	15	8	1	1
7	Lathe Machine And Grinding	15	8	1	1
	Total	135	68	10	8

Detailed Syllabus:

S. No	SYLLABUS
1.	Engineering Materials. Contents : 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, Aluminium. Non Metals: Wood, Plastic, Rubber. Importance of safety Precautions in Workshop
2.	Fitting and Drilling Contents: Cutting Tools - Chisels, Hacksaws, files, scrapers, DrillBits, reamers Taps, Dies and Sockets. Striking tools : Hammers, Holding Devices : Vices, Marking Tools & Miscellaneous tools; Checking & Measuring Instruments Calipers & Dividers Drilling Machines - Sensitive and Radial Drilling Machines Various Fitting and Drilling operations
3.	Sheet Metal Work Contents : Metals used for sheet metal work, sheet metal hand tools- measuring and cutting tools, stakes, Sheet metal operations - Shearing, bending, Drawing, Squeezing Sheet metal joints - Hem & Seam Joints, Fastening Methods - Riveting, soldering, Brazing and spot welding.
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
5.	Forging & Welding Contents : Hand Tools, Heating Devices, Smith Operations, Machine Forging, Forging hammers, Forging press, Welding : Arc welding & Gas Welding ,MIG and TIG Welding
6.	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
7.	Lathe & Grinding Machine Contents : Lathe main parts, simple operations, Grinding – working principle; Grinding wheel materials, Applications of Grinding

**AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR
PAPER – I: WORKSHOP PRACTICE(PRACTICAL)
TIME SCHEDULE**

Sl.No.	Major Unit	No. of Periods
1	Fitting	45
2	Sheet Metal Work	25
3	Carpentry	20
4	Black Smith	20
5	Welding	25
	Total	135

Detailed Syllabus:

1. Fitting:

- 1.1. Identification & Usage of tools
- 1.2. Sawing Practice
- 1.3. Filing practice
- 1.4. Chiseling Practice
- 1.5. Preparation of T, 'L' Sections
- 1.6. Drilling
- 1.7. Tapping

2. Tin Smithy

- 2.1. Make a Rectangular tray
- 2.2. Make a Rectangular Scoop, Funnel
- 2.3. Riveting practice
- 2.4. Soldering the joints
- 2.5. Elbow

3. Carpentry

- 3.1 Planning practice
- 3.2 Chiseling practice
- 3.3. Prepare Tee Lap joint
- 3.4. Plain Tenon joint
- 3.5. Mortise & Tenon joint
- 3.6. Boring Practice

4. Black Smithy

- 4.1. Practicing of usage of tools
- 4.2. Making a round bar from a square bar
- 4.3. Making a ring of given round rod
- 4.4. Making of crane hook, S-hook, T-bolt, Flat Chisel, Gib head, sunk key

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

**AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR
PAPER II: BASIC MECHANICAL & ELECTRICAL ENGINEERING (THEORY)
TIME SCHEDULE**

Sl.No.	Major Unit	No. of Periods	Weightage	Short Questions	Long Questions
1	Fundamentals of Thermodynamics	8	2	1	--
2	Laws of Perfect gases	10	8	1	1
3	Laws of Thermodynamics	6	2	1	--
4	Thermodynamic Processes	20	8	1	1
5	Fuels	12	6	--	1
6	Thermodynamic Cycles	20	8	1	1
7	Introduction to transmission of power	10	2	1	0
8	Fasteners	4	2	1	--
9	Units of Mechanical work, power, energy	10	8	1	1
10	Safety Precautions	4	8	1	1
11	Voltage, Electric current, Ohms Law, Kirchhoff's Laws	12	8	1	1
12	Electrical measuring instruments	19	6	--	1
	Total	135	68	10	8

Detailed Syllabus:

1. 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 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. Laws of perfect Gases

- 2.1. Explanation of gas laws, Boyle's law, Charles's law, Avogadro's law, Joule's law and Renaults law.
- 2.2. Characteristic gas equation, universal gas equation, characteristic gas constant, universal gas constant.
- 2.3. Specific heat at constant pressure and constant volume for gas. Relation between two specific heats with characteristic gas constant
- 2.4. Simple problems on gas equations.

3. Laws of thermo dynamics:

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

4. 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. Calculation of heat supplied or rejected during the processes

5. Fuels

- 5.1. Definition of fuels, types of fuels, solid, liquid and gaseous fuels and its uses
- 5.2. Calorific values (Higher & lower) of fuels
- 5.3. Fuels used in I.C. Engines
- 5.4. Requirements of good fuel
- 5.5. Octane number - Recardo Octane Number, Motor Octane Number
- 5.6. Cetane number
- 5.7. Alternative fuels– C N G, LPG and Electrical Energy

6. Thermodynamic cycles

- 6.1. Carnot Cycle
- 6.2. P-V & T-S diagram
- 6.3. Working of carnot cycle
- 6.4. Assumption made in carnot cycle
- 6.5. Efficiency of carnot cycle (without proof)
- 6.6. Otto cycle
- 6.7. Working.
- 6.8. P-V and T-S Diagrams
- 6.9. Efficiency of Otto cycle without proof
- 6.10. Diesel cycle
- 6.11. Working
- 6.12. P-V and T-S Diagrams
- 6.13. Efficiency of Diesel cycle without proof
- 6.14. Simple problems limited to efficiency

7. 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, Compound gear drive and their applications.
- 7.8. Belt fastener.
- 7.9. Uses of Jockey pulley

8. Fasteners

- 8.1. Introduction
- 8.2. Screws
- 8.3. Nuts and Bolts
- 8.4. Rivets and Clamps

9. Units of Mechanical work, power and Energy

- 9.1. Definition of work, power and energy with S.I. units
- 9.2. Simple problems on work, power and energy

Electrical System**10. Safety Precautions**

- 10.1. Precaution in handling tools
- 10.2. Causes of Electric shocks
- 10.3. Cure of electric shock-first aid, artificial respiration
- 10.4. Precaution against shock

11. Electric Current; Ohm's Law; Kirchhoff's laws

- 11.1. Electric Current, Voltage
- 11.2. Conductors, Semi-Conductors, Insulators
- 11.3. Conventional, Electric Current Flow Unit
- 11.4. Idea of Electric Potential unit
- 11.5. Definition Electrical Resistance Unit
- 11.6. Definition 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. Kirchhoff's laws
- 11.14. Kirchhoff's current & voltage laws
- 11.15. Electrical work, power & energy

12. Electrical measuring Instruments

- 12.1. Classification of electrical measuring instruments
- 12.2. Ammeters and voltmeters and their applications
- 12.3. Moving coil meters and moving iron
- 12.4. Method of connecting the Ammeters and Voltmeters
- 12.5. Multi Meter
- 12.6. Continuity tester
- 12.7. Measurement of Insulation resistance

Additions: 5.6. Cetane Number: RON & MON, 5.7. Alternative Fuels: CNG, LPG & Electrical Energy, 12.5; Multi Meter
Deletions: 12.5:Wattmeter,12.6: Energy meter,12.7: Power factor meter,12.8:Megger.

**AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR
PAPER II: ENGINEERING DRAWING (PRACTICAL)
TIME SCHEDULE**

Sl.No.	Major Units	No. of Periods
1	Introduction	8
2	Lettering and Dimensioning	6
3	Geometrical Construction	21
4	Orthographic Projection	39
5	Isometric Projection	32
6	Sections of Solids	18
7	Auto –CAD	11
	Total	135

Detailed Syllabus:

1. 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 exercises on the use of drawing instruments.

2. 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. 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. 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\Projections of solids
- 4.6. Conversion of pictorial views into orthographic views

5. 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. Sections of Solids

- 6.1. Need for drawing sectional views - section planes - true shape of a section
- 6.2. Sections of prisms and pyramids
- 6.3. Sections of cones and cylinders.

7. Auto –CAD

- 7.1. Study of Auto-CAD screen, toolbars, menus and various commands
- 7.2. Exercise on mirror imaging, rotate, array and move commands
- 7.3. Exercise on dimensioning and hatching
- 7.4. Exercise on 2D drawings
- 7.5. Study the 3D solids and solid tool bar options
- 7.6. Draw bolt and nut in 3D drawings

**AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR
PAPER III: AUTO POWER PLANT (THEORY)
TIME SCHEDULE**

Sl.No.	Major Unit	No. of Periods	Weightage	Short Questions	Long Questions
1	Introduction to engines	7	2	1	---
2	Petrol Engines	21	8	1	1
3	Petrol engine fuel system	11	8	1	1
4	Diesel engines	22	10	2	1
5	Diesel engine fuel system	13	8	1	1
6	Lubrication system	17	8	1	1
7	Cooling system	15	8	1	1
8	Manifolds & Mufflers	12	8	1	1
9	Performance of I.C. Engines	17	8	1	1
	Total	135	68	10	8

Detailed Syllabus:

1. Introduction to Engines

- 1.1. Definition of Engine
- 1.2. Types of Engines
- 1.3. Function of I.C. Engines
- 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
- 2.3. Side valve and overhead valve operating mechanism, L,I,F, and T type valve arrangements, valve clearance, timing gears
- 2.4. Construction and working of 2 stroke and 4 stroke petrol engines
- 2.5. Comparison between 2 stroke 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

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 carburetor
- 3.5. Air fuel ratios for different conditions
- 3.6. Arrangement of carburetors-down draught, up draught and side draught
- 3.7. Construction and working of Carter, Zenith, Solex and S.U. Carburetors
- 3.8. Petrol injection system in Modern Vehicles
- 3.9. Scavenging in Two stroke petrol engine

4. Diesel Engines

- 4.1. Working principle of a 2 stroke and 4 stroke diesel engines
- 4.2. Advantages and limitation of diesel engine over a petrol engine
- 4.3. Valve timing diagram of 2 stroke and 4 stroke diesel engines
- 4.4. Types of diesel engine combustion chambers i.e. direct injection Chamber, pre combustion chamber 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-Common Rail, Individual System
- 5.5. Construction & working of F.I.P.
- 5.6. Governing System Function - construction & working of Mechanical & pneumatic type governors
- 5.7. Function of Injectors-Types of injectors and their construction & working.-Single hole, Multihole, & Pintlehole
- 5.8. Super charger and Turbo charger

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. Petroil (or) mist type, splash type, forced feed 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. cartridge type, stack type, centrifugal type Etc.,
- 6.8. Sludge formation in the lubricating oil-effect of sludge to the Lubrications systems
- 6.9. 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. Working of Air cooling system
- 7.4. Construction and working of forced feed type with thermostat water cooling system
- 7.5. Construction & working of water pump, radiator and their types
- 7.6. Anti freezing and anti rusting additives
- 7.7. Viscous fan

8. Manifolds and Mufflers

- 8.1. Necessity of inlet and exhaust manifold
- 8.2. Considerations for a good manifold design
- 8.3. Types of manifolds-inlet & exhaust types
- 8.4. Necessity air cleaner& filters, Types of air Cleaners, Construction and working principle of air cleaner
- 8.5. Function of silencer, Construction and working principle of different types of silencers

9.0 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. break thermal efficiency, indicated thermal efficiency, volumetric efficiency
- 9.4. Specific fuel consumption, heat balance sheet, performance Curves

Additions: 5.8:Super Charger and Turbo Charger

Deletions: 6.4: Dry sump lubrication, 6.8: Necessarily of Crank case ventilation – Positive Ventilation.

**AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR
PAPER III: AUTOMOBILE ENGINE LAB (PRACTICAL)
TIME SCHEDULE**

Overhauling of the following Components /Units

Sl.No.	Major Unit	No. of Periods
1	2 Stroke Petrol Engine	21
2	4 Stroke Petrol Engine	21
3	Mechanical Fuel Pump	6
4	Electrical fuel pump	6
5	Petrol fuel injection system	4
6	Solex carburetor, Carter carburetor& S.U. carburetor	6
7	4 stroke diesel engine and different type of diesel engine combustion chambers	24
8	Fuel Pump	6
9	Air Cooling system& Water cooling system	14
10	Splash lubrication system	4
11	Forced feed lubrication system	8
12	Inlet & exhaust manifold	8
13	Different types of Mufflers	7
	Total	135

**AUTOMOBILE ENGINEERING TECHNICIAN
SECOND YEAR
PAPER I: AUTO TRANSMISSION & ELECTRICAL SYSTEMS (THEORY)
TIME SCHEDULE**

Sl.No	Major Unit	No. of Periods	Weightage	Short Questions	Long Questions
1	Clutch	8	8	1	1
2	Gear Box	8	8	1	1
3	Universal joints and propeller shaft	6	8	1	1
4	Differential Unit	6	6	-	1
5	Front and Rear Axles	12	8	1	1
6	Wheels and Tires	10	2	1	-
7	Ignition System	10	6	0	1
8	Charging System	8	8	1	1
9	Starting System	10	8	1	1
10	Lighting, Horn and Wipers	12	2	1	-
11	Battery	12	2	1	0
12	Introduction to Basics of Automobile Electronics	8	2	1	0
	Total	110	68	10	8

Detailed Syllabus:

S.No	Syllabus
1.	Clutch 1.1. Necessity of clutch in automobiles 1.2. Construction and working of a single plate diaphragm clutch, multiplate, centrifugal and semi-centrifugal clutch
2.	Gear Box 2.1. Necessity of gear box in automobiles 2.2. Construction and working of a sliding mesh, constant mesh and synchromesh gear box
3.	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, Hotchkiss drive, torque tube drive
4.	Differential Unit 4.1. Necessity of differential 4.2. Construction and working of a differential 4.3. Differential lock and self-locking differential
5	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 fully floating rear axles

6.	Wheels and Tyres 6.1. Function of wheel & tyres 6.2. Construction and working of Disc and spoke wheel 6.3. Types of rims and their construction 6.4. Construction & properties of tyres 6.5. Different tyre tread pattern 6.6. Specifications of a tyre 6.7. Tyre rotation 6.8. Vulcanizing and Retreading
ELECTRICAL SYSTEMS	
7.	Ignition System 7.1. Introduction 7.2. Study of wiring of Magneto ignition, Battery Coil Ignition and Electronic Ignition System
8.	Charging System 8.1. Introduction 8.2. Construction and working of charging dynamo (D.C.Generator) 8.3. Working principle of cut-out 8.4. Voltage regulators-current regulators-construction and working 8.5. Construction & working of Alternator
9.	Starting System 9.1. State the construction and working of a self starter (D.C.Motor) 9.2. Working principle of bendix drive with a sketch, folo through and sliding armature drive free wheel unit 9.3. Solenoid construction and working
10.	Lighting, Horn and Wipers 10.1. Introduction 10.2. Working of Head lamp, side or parking light, tail or stop light, dash light, direction signal light 10.3. Adjustments of head lights 10.4. Working of Dipper, Dim light, Door light & Destination board light 10.5. Horn circuit construction and working 10.6. Working of wiper 10.7 Dash Board Instruments a) Fuel guage b) Temperature Guage c) Pressure Guage
11.	Battery 11.1. Introduction 11.2 Types of Batteries:-Primary &Secondary Batteries 11.3. Parts of lead acid battery, alkaline Battery, and its functions 11.4 Electrolyte ratio- by weight & Volume 11.5 Chemical Reaction during discharge and charging battery. 11.5. Understand the ampere hour and watt-hour efficiency of the battery 11.6 Know the different methods of charging and trickle charging 11.7 Know the different methods of specific gravity test and voltage test, and testing of a lead-acid battery forfull charged and discharged condition 11.8 Cell damage testing:- sulphation, desulphation
12.	Introduction to Basics of Automobile Electronics 12.1 Define of Diode 12.2 P and N Type 12.3 Different types of sensors used in Automobile (Engine Sensors and Chassis Sensors)

**AUTOMOBILE ENGINEERING TECHNICIAN
SECOND YEAR
PAPER I: AUTO TRANSMISSION AND ELECTRICAL SYSTEM LAB
(PRACTICAL)**

Dismantle, Inspect&then reassemble the following components

Sl.No.	Major Units	No. of Periods
1	Single plate clutch diaphragm, Multiplate clutch& Centrifugal clutch	9
2	Sliding mesh gearbox, Constant mesh gearbox& Synchromesh gearbox , different types of Automatic transmission	9
3	Differential unit,Propeller shaft with Universal joints	6
4	Front axle,&Rear axle	6
5	Wheel assembly	5
6	To dismount, dismantle, inspect, repair, service and reassemblean alternator	8
7	To Inspect the working and carry out adjustment of voltage andcurrent regulator	8
8	To dismount, dismantle, inspect repair, service and reassemblea self-starter motor	8
9	To dismount ,dismantle, inspect and reassemble a wiper motor	6
10	To Check the circuit diagram of an electric horn and to carry outits adjustments	6
11	To carry out adjustment of head lights	3
12	To Check a battery charger and carry out charging	6
13	To check wiring diagram of battery coil ignition system	8
14	To Check wiring diagram of electronic ignition system	5
15	Study of Speedo meter and odometer	5
16	To check the Working of Engine & Chassis Sensors	5
	Total	115

**AUTOMOBILE ENGINEERING TECHNICIAN
SECOND YEAR
PAPER II: AUTOMOBILE CHASSIS AND BODY ENGINEERING (THEORY)
TIME SCHEDULE**

S.No.	Major Unit	No. of Periods	Weight age	Short Questions	Long Questions
1	Introduction to automobile chassis, Frame and body	12	8	1	1
2	Steering System	18	10	2	1
3	Braking System	17	8	1	1
4	Suspension System	18	8	1	1
5	Seat, Door and Window Mechanism	7	8	1	1
6	Air Conditioning of Motor vehicles	10	6	0	1
7	Painting of Automobiles	8	8	1	1
8	Automobile Pollution	5	2	1	0
9	Legal Aspects of Motor Vehicles	5	8	1	1
10	Vehicle Safety Systems	10	2	1	-
	Total	110	68	10	8

Detailed Syllabus:

1.	<p>Chassis, Frame and Body</p> <p>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.</p>
2.	<p>Steering System</p> <p>2.1. Requirement of the vehicle steering System 2.2. Types of steering gearboxes, 2.3 Types of Steering Systems and Power Steering 2.4. Steering linkages 2.5 Under steering, over steering, & Turning radius 2.6. Ackerman's & Davis Steering gear Mechanism 2.7. Steering geometry - Caster, Camber, King pin inclination, toe in and toe out 2.8 Wheel alignment, Wheel balancing. 1. Static 2. Dynamic 2.9. Steering defects - wheel wobble and shimmy 2.10. List out the type of steering system used in various vehicles</p>
3.	<p>Braking System</p> <p>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 working of Mechanical, hydraulic, and air brakes,- Bleeding of brakes in Hydraulic brakes 3.6. List out the types of brakes used in various vehicles</p>

4.	<p>Suspension System</p> <p>4.1. Requirements of a automobile suspension system</p> <p>4.2. Types of suspension system - conventional and Independent. Types: Wishbone and McPherson</p> <p>4.3. Types of springs - Laminated spring, coil spring, helical spring</p> <p>4.4. Need of Shock absorber - construction and working of different types of shock absorbers</p> <p>4.5. Stabilizer bar and torsion bar</p> <p>4.6. List out the type of suspension system used in various vehicles</p>
5.	<p>Seat, Door and Window mechanism</p> <p>5.1. Construction and working of door lock mechanism</p> <p>5.2. Construction and working of manual window regulating mechanism</p> <p>5.3. Construction and working of power window regulating mechanism</p> <p>5.4. Construction and working of seat adjusting mechanism</p>
6.	<p>Air Conditioning of motor vehicles</p> <p>6.1. Necessity of automobile air conditioning</p> <p>6.2. Construction and working of passenger car air conditioning</p>
7.	<p>Painting of automobiles</p> <p>7.1 Constituents of paints</p> <p>7.2 Methods of painting</p> <p>7.3 Painting Procedure</p> <p>7.4 Reasons for failure of paint</p>
8.	<p>Automobile Pollution</p> <p>8.1. Effects of automobile pollution on environment and human beings</p> <p>8.2. Types of automobile emissions</p> <p>8.3. Treatment of exhaust gases by using catalytic convertors, EGR valve.</p> <p>8.4. Measurement of percentage of pollutants from Petrol & Diesel vehicles with the help of exhaust gas analysers</p> <p>8.5. Necessity of crank case ventilation-positive crank case ventilation</p>
9.	<p>Legal aspects of motor vehicles</p> <p>9.1. Traffic signs and signals</p> <p>9.2. Registration requirements</p> <p>9.3. Necessity of permits for commercial vehicles</p> <p>9.4. Insurance coverage</p> <p>9.5. Procedure for obtaining driving licenses</p>
10.	<p>Vehicle Safety Systems</p> <p>10.1 Airbags- Types and their Purpose</p> <p>10.2 Anti-lock Braking System - Importance</p> <p>10.3 Seat belt – Necessity.</p>

**AUTOMOBILE ENGINEERING TECHNICIAN
SECOND YEAR
PAPER II: AUTOMOBILE CHASSIS & BODY ENGINEERING (PRACTICAL)**

Dismantle, Inspect& then reassemble the following components

Sl.No	Major Units	No. of Periods
1	Different types of steering system	14
2	Different types of Braking system	21
3	Different types of suspension system	12
4	Inspect&repair of door lock mechanisms	8
5	Inspect&repair of manual window mechanism	8
6	Inspect&repair of power window mechanism	8
7	Inspect, repair&gas filling of car airconditioning	8
8	Practicing of painting procedures	14
9	Measurement of percentage of pollutants from petrol anddiesel vehicles with the help of exhaust gas Analysers	14
10	Study the various legal forms required for applying drivinglicense, registration of vehicle, vehicle insurance andpermits for commercial vehicles	4
11	Location of Airbags	4
	Total	115

**AUTOMOBILE ENGINEERING TECHNICIAN
SECOND YEAR
PAPER III: AUTOMOBILE SERVICING AND MAINTENANCE (THEORY)
TIME SCHEDULE**

Sl. No	Major Units	No. of Periods	Weightage	Short Questions	Long Questions
1	Introduction of service station and garage	8	2	1	0
2	Major Equipment for a service station	12	8	1	1
3	Automobile Engine Reconditioning Equipment	12	8	1	1
4	Reconditioning of brakes	8	8	1	1
5	Reconditioning of Diesel Fuel Injection system	8	8	1	1
6	Servicing and maintenance	8	8	1	1
7	Servicing and maintenance of two wheelers	18	8	1	1
8	Servicing and maintenance of three wheelers	18	8	1	1
9	Servicing and maintenance of four wheelers	18	10	2	1
	Total	110	68	10	8

Detailed Syllabus:

1.	<p>Introduction</p> <p>1.1. Garage, Service Station and Specialist repair shop</p> <p>1.2. Tools and equipment for a garage, service station and special list repair shop & Power tools</p> <p>1.3 Layout of a typical garage, service station and specialist repair shop</p>
2.	<p>Major equipment for service station</p> <p>Study the construction and working of the following equipment with aid of charts/original equipment</p> <p>2.1. Car washing machine & Automatic Washing</p> <p>2.2. Vehicle hoist</p> <p>2.3. Air Compressor</p> <p>2.4. Lubrication equipment - Grease guns - Hand and compressed air operated - High pressure lubrication</p>
3.	<p>3.0Automobile Engine reconditioning equipment</p> <p>Study the following processes with the help of Charts/Model/ Original Component</p> <p>3.1. Degreasing Plant</p> <p>3.2. De Carbonizing</p> <p>3.3. Cylinder ridge removal</p> <p>3.4. Cylinder Reboring and honning</p> <p>3.5. Valve seat cutting and grinding</p> <p>3.6. Valve refacing</p> <p>3.7. Crank shaft grinding</p>

4.	Reconditioning of Brakes Study the construction and working of the following equipment with aid of charts/model/original components. 4.1. Brake drum lathe 4.2. Brake shoe riveting
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 6.3 Maintenance and its role in trouble shooting of –Automobile, advantage of good maintenance
7.	Servicing and maintenance of two wheelers 7.1 Daily, weekly and monthly maintenance or after every 2000 Km- General and periodical Check-up - Servicing 7.2. Adjustment, dismantling, assembling and troubleshooting of 2 Wheelers
8.	Servicing and Maintenance of 3 Wheelers 8.1. General and Periodical maintenance of 3 wheelers 8.2. Adjustment, dismantling, assembling and troubleshooting of three wheelers
9.	Servicing and Maintenance of Four Wheelers Dismantling, over hauling and reassembling of the four wheeler 9.1. Engine 9.2. Fuel System 9.3. Lubrication 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 engine analyser 9.9. Alignment of wheels 9.10. Balancing of wheels

**AUTOMOBILE ENGINEERING TECHNICIAN
SECOND YEAR
PAPER III: AUTOMOBILE SERVICING & MAINTANCE LAB (PRACTICAL)**

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

Sl. No.	Major Units	No. of Periods
1	Decarburization	5
2	Cylinder Reboring	6
3	Cylinder Honing	6
4	Valve seat cutting, grinding and refacing	6
5	Brake drum turning,, Brake shoe riveting,&. Brake bleeding	8
6	Wheel alignment - Camber, Caster, King pin inclination, toe-in, toe out - wheel balancing	14
7	FIP phasing and calibration test	8
8	Fuel injector - pressure test, spray test and leak off test	6
9	Crank shaft grinding	8
10	Servicing and Maintenance of Two Wheeler-1. Engine, Clutch Gear Box,. Brakes,& Electrical System	12
11	Servicing and Maintenance of 3 Wheeler- Engine, Transmission, Clutch,. Gear Box,. Brakes,& Electrical System	14
12	Servicing and maintenance of four wheeler- Engine, Transmission System, Brakes, Steering, Suspension, Cooling, lubrication and fuel supply system, Electrical system& Ignition system	22
	Total	115

On The Job Training Programme Schedule For I year

Sl. No.	Name Of The Topic To Be covered		Duration
1	Engine	Overhauling: Dismantling, Cleaning, Inspection, repair or replacement and assembling.	197 periods
2	Cooling System	Servicing and repair	42 periods
3	Lubrication System	Servicing	42 periods
4.	Fuel Supply System	Servicing & Overhauling	84 periods
	Total		365 periods

On The Job Training Programme Schedule For II year

Sl. No.	Name Of The Topic To be covered	Description	Duration
1	Clutch	Servicing	25 periods
2	Gear Box All types	Servicing	42 periods
3	Universal Joint and Propeller Shaft	Servicing	7 Periods
4	Differential	Servicing	25 Periods
5	Wheels and tyres	Servicing	25 periods
6	Ignition System	Servicing	25 Periods
7	Alternator And D.C Generator	Servicing	40 Periods
8	Lighting System	Servicing	14 Periods
9.	Battery	Servicing	25 Periods
10	Brakes	Servicing	90 Perioda
11	Suspension System	Servicing	25 Periods
12.	Car A/C	Servicing	25 Periods
13	Painting	Servicing	25 Periods
14	Seat, Door and window	Servicing	25 Periods
15	Pollution Check	Servicing	16 Periods
16	Steering System	Servicing	16 Periods
	Total		450 periods

Note: O.J.T. Log Book has to be maintained day wise schedule for the work done. It is advised to conduct O.J.T. programme during the September to December of every academic year. However the colleges are at their liberty to conduct O.J.T. according to their need of feasibility of institution and industries.

MODEL QUESTION PAPERS
AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR
PAPER I: WORK SHOP TECHNOLOGY (THEORY)

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. What are the uses of copper?
2. Name the different type of vices.
3. Name types of drilling machines.
4. What is brazing.
5. Name different type of saws.
6. Define forging
7. Define Welding
8. What is meant by peening?
9. Define knurling.
10. What is purpose of grinding?

SECTION –B

Note: i) Answer all questions

5 x 6 = 30

ii) Each question carries six marks

11. What are the Important Safety precautions to be taken in work shop?
12. Draw a neat sketch of a sensitive drilling machine.
13. Explain different sheet metal joints insheet metal work.
14. Explain different cutting tools used in carpentry.
15. Explain about different types of smithy operations.
16. Explain MIG Welding?
17. Write any about four hot working processes.
18. Draw the neat sketch of lathe and label its parts.

**MODEL QUESTION PAPERS
AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR**

PAPER II: BASIC MECHANICAL & ELECTRICAL ENGINEERING (THEORY)

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. Define Boundary
2. State Renaults Law
3. Define First Law of thermodynamics.
4. Draw the P-V diagram of constant pressure process
5. Define Carnot cycle
6. What is slip?
7. What is the purpose of rivet?
8. State first aid process against electric shock
9. Define voltage
10. Write the units of work.

SECTION –B

Note: i) Answer all questions

5 x 6 = 30

ii) Each question carries six marks

11. Derive the relation between two specific heats
12. Explain Otto cycle with P-V diagram
13. Classify fuels in details
14. Explain about adiabatic process P-V diagram
15. Explain chain drive and belt drive
16. Explain about Kirchhoff's Laws
17. Define power and energy along with its units
18. Explain about Multimeter with neat sketch

MODEL QUESTION PAPERS
AUTOMOBILE ENGINEERING TECHNICIAN
FIRST YEAR
PAPER III: AUTOMOBILE POWER PLANT (THEORY)

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. What is an engine?
2. What is the purpose of piston?
3. Explain the working principal scavenging.
4. Define bore.
5. Name different stroke in 4stroke diesel engine.
6. What are the types of oil filter?
7. What is the purpose cooling system?
8. Write types of manifolds.
9. Define B H P.
10. Name different types of lubrications systems.

SECTION –B

Note: i) Answer all questions

5 x 6 = 30

ii) Each question carries six marks

11. Explain the construction and working of 4-stroke petrol engine
12. Explain about zenith carburetor
13. Write about construction and working of fuel injector
14. Explain about forced feed Lubrication system
15. Explain about any one oil filter with neat sketch
16. Explain about thermosyphone cooling system
17. Explain about different type of silencers with neat sketch
18. Explain about the different types of efficiencies.

MODEL QUESTION PAPERS
AUTOMOBILE ENGINEERING TECHNICIAN
SECOND YEAR
PAPER I: AUTO TRANSMISSION & ELECTRICAL SYSTEM

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. What is the purpose of clutch?
2. Name different type of gear boxes.
3. Mention various components of propeller shaft?
4. What is the function of front axle?
5. What is the purpose of suspension system?
6. Name types of wheels
7. What is the function of condenser?
8. What is the purpose of solenoid?
9. What is the purpose of wiper
10. What is primary battery?

SECTION –B

Note: i) Answer all questions

5 x 6 = 30

ii) Each question carries six marks

11. Explain about single plate clutch with neat sketch
12. Explain about synchromesh gear box.
13. Explain about Hitchkiss drive.
14. Explain the construction and working of a differential.
15. Explain about dead axle.
16. Write about battery coil ignition system.
17. Explain the construction of DC generator.
18. Explain about lead-acid battery.

**MODEL QUESTION PAPERS
AUTOMOBILE ENGINEERING TECHNICIAN
SECOND YEAR**

PAPER II: AUTOMOBILE CHASSIS & BODY ENGINEERING LAB (THEORY)

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. Define chassis
2. What is meant by wheel wobble?
3. What is under steering?
4. Define stopping distance.
5. Write types of springs.
6. What is the use of window regulating mechanism?
7. What is the purpose of compressor clutch?
8. Name the different methods of painting.
9. What are different types of pollutions?
10. Draw any two traffic signs.

SECTION –B

Note: i) Answer all questions

5 x 6 = 30

ii) Each question carries six marks

11. What are the loads acting on the frame?
12. Explain about air brakes with neat sketch.
13. Explain about telescopic type shock absorber.
14. Explain the construction and working of seat adjusting mechanism.
15. Explain about car AC.
16. What are the reasons for the failure of paint?
17. What short notes about the following.
 - a) Different types of auto emissions.
 - b) Spray painting.
18. Write the procedure for obtaining driving license.

MODEL QUESTION PAPERS
AUTOMOBILE ENGINEERING TECHNICIAN
SECOND YEAR
PAPER III: AUTOMOBILE SERVICING & MAINTENANCE

Time: 3 hrs

Marks: 50

SECTION – A

Note: i) Answer all questions

10 x 2 =20

ii) Each question carries two marks

1. Define garage.
2. What is the purpose air compressor?
3. What is the need of servicing?
4. What is meant by bleeding of brakes?
5. What is meant by trouble shooting
6. What is overhauling.
7. Define decarbonising.
8. What are the defects in brakedrum?
9. what are advantages of good maintenance.
10. Draw the diagram of . DE spanner.

SECTION –B

Note: i) Answer all questions

5 x 6 = 30

ii) Each question carries six marks

11. Explain about car washing machine
12. Explain about cylinder reboring.
13. Write about brake drum lathe with neat sketch.
14. Explain about injection test bench.
15. Write short notes on:
 - a) Specialist repair shop.
 - b) Preventive maintenance.
16. Explain the general troubles and their remedies of a four wheeler.
17. Explain water cooling system.
18. Write the maintenance procedure for daily, weekly and monthly of two wheeler.

VII. LIST OF EQUIPMENT

Measuring Instruments and Inspection Equipment

1. Outside caliper
2. Inside caliper
3. Vernier caliper
4. Depth gauge
5. Dial indicator
6. Try square
7. Straight edge
8. Steel top
9. Pair of V. blocks
10. Special gauge for crown wheel and pinion adjustment
11. Surface gauge
12. Magnifying glass
13. Steel almarah

Machines

1. Bench drill
2. Central lathe
3. Pedestal grinder
4. Arc welding Inverter type
5. Gas welding
6. Wire brush
7. Clipping Hammer
8. Cleaning Brush
9. Painting Brush
10. Floor Brush

Electrical Items

1. Heater
2. Soldering Iron
3. Inspection lamp
4. Electrical wire-
5. Insulation tape
6. Growler
7. Soldering flux
8. Voltmeter D.C. 25 volt
9. Hydrometer for Battery
10. Ammeter

Electrical Items

1. Battery Charger
2. High rage discharge tester for Battery

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 Shank
4. HSS hand Reamer Taper pin
5. Various types of chisels, files, scrapers, reamers, taps, dies, Hammers,

Safety Equipment

1. Goggles for Grinders
2. Goggles for welding
3. Welding glass shield/Eye shield
4. Overall
5. Rubber apron
6. Fire extinguisher foam type
7. Sand Bucket
8. Barrier cream 250 gms
9. First Aid Box
10. Stretcher
11. Padlocks
12. Metal Racks
13. Fire Extinguisher
14. Car washing machine (with water storage tank with pump etc)
15. cylinder reboring machine
16. Honning machine
17. Wheel balancer
18. Battery Charger
19. Hydraometer
20. Multimeter
21. Crankshaft regrinding machine
22. Brake drum lathe
23. Brake shoe riveting machine
24. F.I.P test bench and Fuel injector testing machine

(A) SUGGESTED LIST OF COLLABORATING AGENCIES

1. Road transport corporations, workshops.
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 organizations having auto section.
7. Private organization 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 authorized Two, Three & Four Wheelers Service Stations
3. All Private and Government Transport Companies

X. TEACHING STAFF & THEIR QUALIFICATIONS

1. Vocational Junior Lecturer in A E T

Degree in Mechanical Engineering/Automobile Engineering (as per
G.O.Ms.No.12 HE (I.E-2),
Dept., dated 15.02.2001

XI. VERTICAL MOBILITY

a) Without Bridge Course:

Eligible for degree courses, B.A./B.Com.

b) With Bridge Course:

1. Eligible for all degree Courses
(Except Biology i.e., B.A, B.Com. B.Sc, MPC, Comp.Science, etc.)
2. Eligible for direct polytechnic inII- Year inMechanical and Automobile
Branchwithout 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
4. Automotive Electrical Equipment - by P.L. Kohli
5. Elements of Technology - by B.L.Theraja
6. Automobile Electrical System by N.R Khatavate
7. Automobile Servicing and Maintenance by K. Ashraf Ali
8. Workshop Technology Vol-I & Vol-II by Hazra Chowdhary
9. Workshop technology by Raghuvamsi
10. Motor vehicle Act. And Rules 1961 ----- Central Government

XIV. EQUIVALENCY OF PAPERS

FIRST YEAR SUBJECTS

Name of the existing subject	Name of the subject proposed.
Theory	Theory
Work shop Technology	No change.
Basic Mechanical and Electrical Engineering	No Change.
Auto Power Plant	No Change.
Practical	Practical
Workshop Practice	No Change.
Engineering Drawing and Auto CAD.	No change.
Automobile Engine Lab	No change.
On the Job Training	No Change.

SECOND YEAR SUBJECTS

Name of the existing subject	Name of the subject proposed.
Theory	Theory
Auto Transmission and Electrical Systems	No change.
Auto Chassis and Body Engineering	No Change.
Auto Servicing and Maintenance	No Change.
Practical	Practical
Auto Transmission and Electrical Systems Lab	No Change.
Auto Chassis and Body Engineering Lab	No Change.
Auto Servicing and Maintenance Lab	No Change.

XIII. LIST OF PARTICIPANTS

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