

Vocational Curriculum – 2012

(With effect from the academic year 2012-2013)

Curriculum of Intermediate Vocational Course In MECHANICAL ENGINEERING TECHNICIAN



State Institute of Vocational Education

**O/o the Commissioner of Intermediate Education,
Andhra Pradesh, Hyderabad**

&

**Board of Intermediate Education,
Andhra Pradesh, Hyderabad**

RECOMMENDATIONS FOR UPDATING COURSE CONTENT & COURSE TITLE

- 1) The existing course content in all the subjects of Rural Engineering Technician” has been thoroughly examined. In the existing course content more emphasis has been given to Agricultural sector & Domestic Appliances in which there is no much scope for self employment or wage employment.
- 2) Syllabus review Committee felt that there is an urgent need to update the syllabus/course content to meet the growing needs of the today’s industries.
- 3) Accordingly, new Units relevant to the needs of the industry incorporated in the course content so that self/wage employment potential of the students improves considerably.
- 4) It is proposed to change the course title as given below which is more appropriate to the new course content

Existing course title	Proposed course title
Rural Engineering Technician(306)	Mechanical Engineering technician
1st Theory	1st Theory
Paper-I Workshop Technology	Paper-I Basic Workshop Technology
Paper –II Mechanical Technology	No changes
Paper –III Electrical Technology	No changes
1st Year Practicals	1st Year Practicals
Workshop Practice	No changes
Engineering Drawing	No Changes.
Electrical & Computer Fundamental Lab	Mechanical & Electrical Engg. Lab.
2nd year Theory	2nd year Theory
Non conventional energy sources	Energy sources and Power plant.
Farm Equipment and Tractor	Light motor vehicles.
Domestic appliances	Refrigeration and Air conditioning.
2nd year Practicals	2nd year Practicals
NCE sources Lab	Energy Sources Lab.
Farm Machinery Lab	Light motor vehicle servicing lab.
Domestic Appliances Lab	R& AC Servicing Lab.

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Introduction

To meet the needs of fast changes in the present day's mechanical field & industry, it is essential to develop the employable skills to match the requirements in this ever growing industry. In view of the above, the curriculum 'Mechanical Engineering Technician' course has been designed and developed for a two year course at the plus two stage of Intermediate Education.

All industries and manufacturing areas are established in large scale, to meet essential services and well trained members with necessary skills sets are in great demand to get wage & self employment. This course provides the student, the techniques and skills of General Engineering work and servicing of light motor vehicles and refrigeration and Air Conditioning sector. In addition to this course imparts knowledge in all other subject related to Mechanical Engineering field. Application of Computer software i.e. designing is also incorporated in the drawing. The skills and techniques acquired during this course develop the required competency in performing job effectively whether one is placed in a waged employment or a self employment.

OBJECTIVES OF THE COURSE

1. To develop employable skills for manufacturing industries (large, medium and small scale industries)
2. To develop skills for wage employment and self employment in the following areas :
 - a) Refrigeration & Air conditioning
 - b) Light Motor Vehicle
 - c) General Machine shop (Lathe shop, grinding machine shop etc.)
 - d) Fabrication shop (Welding, Sheet metal shop etc.)
 - e) Non conventional energy sector (Solar energy, Bio-gas plants, etc.)
3. To develop skilled man power needs of modern industries.

SKILLS TO BE PROVIDED.

1. Lathe, grinding operations in General Work shop.
2. Fitting, drilling skills in General Engineering.
3. Welding skills in Fabrication work
4. Electrical works in batteries servicing.
5. Experience hand in solar energy plants.
6. Repairing of Refrigerators.
7. Repairing of Air Coolers.
8. Repairing of Air-conditioning.
9. Repairing of Light motor vehicle.

JOB OPPORTUNITIES
(a) WAGE EMPLOYMENT

1. AP Transco/ AP Genco/APSRTC/ RWS/ Railways/ all Departments Mechanical Sections
2. Technician (LMV) in Automobile Servicing centre like Maruti, Hyundai, Tata Mahindra & Mahindra, Voltas Wagon, Toyota, Ford etc.
3. Technician in Refrigeration & Air Conditioning Service centers like Blue star, BPL, LG, Kelvinator, Godrej, Whirlpool etc.
4. Workshop Technician in manufacturing industries like BHEL, BEL, HAL, HMT, BDL, DRDO, DMRL, Railway Workshops etc.
5. Technician in Power plants
6. Pump/tube well operator cum mechanic
7. Technician (Solar system)

JOB OPPORTUNITIES
(b) SELF EMPLOYMENT

1. Ancillary units for large manufacturing industries.
2. General workshop (Lathe, drilling, Grinding etc.)
3. Servicing centres for Light Motor Vehicles
4. Servicing and maintenance of Refrigeration and Air Conditioning Equipments
5. Welding workshop
6. Installation and maintenance of Solar plants
7. Installation and maintenance of Bio-gas plants

SCHEME OF INSTRUCTION AND EXAMINATION
I. ANNUAL SCHEME OF INSTRUCTION AND EXAMINATION FOR
1ST YEAR MECHANICAL ENGINEERING TECHNICIAN COURSE

Part-A		Theory		Practicals			Total	
		Periods	Marks		Periods	Marks	Periods	Marks
1.	English	150	50		-	-	150	50
2.	General Foundation	150	50		-	-	150	50
Part-B								
3.	Paper-I Basic Workshop Technology	135	50	Paper-I Workshop Practice.	135	50	270	100
4.	Paper-II Mechanical Technology	135	50	Paper-II Engg. Drawing.	135	50	270	100
5.	Paper-III Electrical Technology	135	50	Paper-III Mechanical & Electrical Lab	135	50	270	100
6.	OJT	-	-		365	100	365	100
Total		705	250		770	250	1475	500

On the Job Training November and December

II. II YEAR MECHANICAL ENGINEERING TECHNICIAN COURSE

Part-A		Theory		Practicals			Total	
		Periods	Marks		Periods	Marks	Periods	Marks
1.	English	150	50		-	-	150	50
2.	General Foundation	150	50		-	-	150	50
Part-B								
3.	Paper-I Energy Sources & Power Plant	110	50	Paper-I Energy Sources Lab	115	50	225	100
4.	Paper-II Light Motor Vehicles	110	50	Paper-II Light Motor Vehicles Servicing Lab	115	50	225	100
5.	Paper-III Refrigeration & Air Conditioning	110	50	Paper-III Refrigeration & Air Conditioning	115	50	225	100

				Servicing Lab				
6.	OJT	-	-		450	100	450	100
	Total	630	250		795	250	1425	500
								1000

On the Job Training : August, September & 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 (363) I year and (450) II 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 INSTRUCTIONS PER WEEK ELECTRICAL TECHNICIAN COURSE

Part-A		Theory	Practicals	Total
1.	English	4	--	4
2.	G.F.C.	4	--	4
Part-B Vocational Subjects				
Paper-I		4	4	8
Paper-II		4	4	8
Paper-III		4	4	8
Total		20	12	32

LIST OF SUBJECTS IN MECHANICAL ENGINEERING TECHNICIAN**SYLLABUS****FIRST YEAR**

Theory		Periods	Marks
1.	Basic Workshop Technology (Theory Paper I)	135	50
2.	Mechanical Technology (Theory Paper II)	135	50
3.	Electrical Technology (Theory Paper III)	135	50
Practicals			
1.	Workshop practice (Practical Paper-I)	135	50
2.	Engineering Drawing (Practical Paper II)	135	50
3.	Mechanical & Electrical Engineering Lab (Practical Paper III)	135	50
4.	On the Job Training	813	100

SECOND YEAR

Theory		Periods	Marks
1.	Energy Sources & Power Plant (Theory Paper I)	110	50
2.	Light Motor Vehicles (Theory Paper II)	110	50
3.	Refrigeration & Air Condition (Theory Paper III)	110	50
Practicals			
1.	Energy sources Lab (Practical Paper I)	115	50
2.	Light Motor Vehicles- Servicing Lab (Practical Paper II)	115	50
3.	Refrigeration & Air conditioning Servicing Lab (Practical Paper III)	115	50

Note : Scheme of Valuation for Practical :

- | | | |
|-----------------|---|----------|
| 1. Experiment | : | 20 Marks |
| 2. Presentation | : | 10 Marks |
| 3. Viva | : | 10 Marks |
| 4. Record | : | 10 Marks |

50 Marks

**MECHANICAL ENGINEERING TECHNICIAN
FIRST YEAR
BASIC WORKSHOP TECHNOLOGY
THEORY PAPER-I**

PERIODS PER WEEK : 4**PERIODS PER YEAR : 135**

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
1.	Engineering Materials	15	08	1	1
2.	Measuring instruments	15	06		1
3.	Fitting & Drilling	20	10	2	1
4.	Sheet Metal Work	10	08	1	1
5.	Foundry	15	08	1	1
6.	Forging and Welding	20	10	2	1
7.	Lathe and Grinding	20	10	2	1
8.	CNC Technology	20	08	1	1
		135	68	10	8

**MECHANICAL ENGINEERING TECHNICIAN
I YEAR
BASIC WORK SHOP TECHNOLOGY
THEORY PAPER-I**

PERIODS PER WEEK : 4

PERIODS PER YEAR : 135

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
1.	Engineering Materials : 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.	15	08	1	1
2.	Measuring Instruments : Verneir caliper, Micrometer, Height guage, Dial indicator, Sine bar	15	06	Nil	1
3.	Fitting & Drilling : Cutting Tools – Chisels, Hacksaws, files, scrapers, Drill Bits, reamers Taps, Dies and Sockets, Striking tools : Hammers, Holding Devices – Vices, Marking Tools & Mescellaneous tools, Checking & Measuring Instruments, Calipers & Deviders, Drilling Machines – Sensitive and Radial, Various Fitting and Drilling operations	20	10	2	1
4.	Sheet Metal Work : 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.	10	08	1	1
5.	Foundry : Advantages and limitations of Casting, foundry equipment – Hand moulding Tools, Moulding Boxes, Types of sands and properties, Patterns : Classification & Making, Cores & Core making Castings: Green sand and dry sand moulding,	15	08	1	1

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
	Shell Moulding, ceramic moulding, Special castings, Defects in castings.				
6.	Forging and Welding : Hand Forging, Hand Tools, Heating Devices, Smith Operations, Machine Forging, Forging hammers, Forging press, Machine Forging Operations, Welding : Arc Welding & Gas Welding, TIG & MIG Welding.	20	10	2	1
7.	Lathe and Grinding : Lathe main parts, simple Lathe operation Grinding – working principle, Grinding wheel materials, Applications of Grinding	20	10	2	1
8.	CNC Technology : CNC Machines, Advantages, Comparison between CNC m/c & Conventional machine, G-Codes & M-Codes, Simple CNC programme for plain & step turning, chamfering, corner radius, threading etc.	20	08	1	1
		135			

S.No.	Unit deleted	Unit added
1.	Carpentry, Mechanical Working of metals	Measuring instruments, CNC Technology, TIG & MIG Welding.

MECHANICAL ENGINEERING TECHNICIAN
FIRST YEAR
MECHANICAL TECHNOLOGY
THEORY PAPER-II

PERIODS PER WEEK : 4

PERIODS PER YEAR : 135

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
1.	Thermo Dynamics	10	04	2	Nil
2.	Laws of Thermo dynamics	8	02	1	Nil
3.	Laws of perfect gases	15	10	2	1
4.	Thermo dynamics process in gases	21	08	1	1
5.	Fuels and combustions	20	08	1	1
6.	Air standard cycles	10	08	1	1
7.	I.C. Engines	36	20	4	2
8.	Pumps	15	08	1	1
	Total	135	68	13	7

**MECHANICAL ENGINEERING TECHNICIAN
I YEAR
MECHANICAL TECHNOLOGY
THEORY PAPER-II**

PERIODS PER WEEK : 4

PERIODS PER YEAR : 135

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
1.	Thermo Dynamics : 1.1 Introduction 1.2 Thermo dynamic system, 1.3 Types of thermo dynamic systems, 1.4 Properties thermodynamic systems, 1.5 definitions of properties like pressure (P) Volume (V) Temperature (T) Enthalpy, Atmospheric pressure, Internal Energy, specific heat.	10	04	2	Nil
2.	Laws of Thermodynamics : 2.1 Zeroth law of thermodynamics, 2.2 First law of thermodynamics, 2.3 Second law of thermo dynamics	8	02	1	Nil
3.	Laws of perfect gases : 1.1 Introduction, 1.2 Brief Explanation of Boyles Law, Charles Law, Avagadro's Law, Joules law, Regnaults law, 1.3 Characteristic of gas equation, 1.4 General gas equation	15	10	2	1
4.	Thermo dynamics process in gases : 4.1 Types of thermodynamic processes, 4.2 Constant volume process, constant pressure process, constant temperature process, Adiabatic process, polytropic process, 4.3 Equation for work done during the above processes and calculations of change of internal energy, 4.4 Evaluation of heat supplied or rejected during the process	21	08	2	1
5.	Fuels and combustions : 5.1 Introduction, 5.2 Types of fuels, solid fuels, liquid fuels, gaseous fuels, 5.3 Merits and demerits of liquid fuel, 5.4 Merits and demerits of gaseous	20	08	2	1

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
	fuels, 5.5 Calorific value				
6.	Air standard cycles : 6.1 Introduction, 6.2 Study of cornot cycle, Otto Cycle, Diesel cycle, 6.3 Comparison of Otto Cycle and Diesel Cycle.	10	08	2	1
7.	I.C. Engines : 7.1 Heat Engines 7.2 Classification of engines 7.3 Classification of I.C. Engines, 7.4 Working principle of two stroke petrol and diesel engine, 7.5 Working principle of four stroke petrol and diesel engine, 7.6 Comparison between two stroke and four stroke cycle engine, 7.7 Comparison between petrol & diesel engine, 7.8 Carburetor, fuel injection pump.	36	20	2	2
8.	Pumps : 8.1 Functions of a pump, 8.2 Classification of pumps, 8.3 Applications of pump, 8.4 Working of centrifugal, reciprocating, jet, submersible pumps	15	08	1	1
	Total	135			

S.No.	Unit deleted	Unit added
1.	<i>Sprinklers</i>	<i>FIP Pump, Carburetor</i>

**MECHANICAL ENGINEERING TECHNICIAN
FIRST YEAR
ELECTRICAL TECHNOLOGY
THEORY PAPER-III**

PERIODS PER WEEK : 4**PERIODS PER YEAR : 135**

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
1.	Safety	7	2	1	
2.	Basic Electricity	22	08	1	1
3.	Work Power and Energy	12	08	1	1
4.	Conductors and Insulators	12	02	1	
5.	Electrical Accessories	12	08	1	1
6.	Magnetism and Electro Magnetism	22	08	1	1
7.	Electro Magnetic Induction	7	08	1	1
8.	Electrical Machines	17	08	1	1
9.	Electrical Appliances	12	08	1	1
10.	Batteries	12	08	1	1
	Total	135	68	10	8

**MECHANICAL ENGINEERING TECHNICIAN
FIRST YEAR
ELECTRICAL TECHNOLOGY
THEORY PAPER-III**

PERIODS PER WEEK : 4

PERIODS PER YEAR : 135

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
1.	Safety : 1.1 Introduction, 1.2 Safety precautions, 1.3 Removal from Electric Shock, 1.4 Methods of Artificial Respiration, 1.5 Hand tools of an electrician	7	2	1	Nil
2.	Basic Electricity : 2.1 Introduction, 2.2 Electric Potential, 2.3 Potential Difference, 2.4 Resistance, 2.5 Current, 2.6 Ohm's Law, 2.7 Problems on ohm's Law, 2.8 Laws of Resistance, 2.9 Specific Resistance 2.10 Specific conductivity, 2.11 Effects of Temperature on Resistance, 2.12 Series and parallel connections of Resistance, 2.13 Simple problems on series and parallel, 2.14 Kirchoff's Laws, 2.15 Problems on Kirchoff's Law, 2.16 Wheat stone Bridge	22	08	1	1
3.	Work, Power and Energy : 1.5 Work and its units, 1.6 Power and its units 1.7 Energy and its units, 1.8 Electrical power, 1.9 Electrical Energy, 1.10 Simple problems on Monthly electricity bills.	12	08	1	1
4.	Conductors and Insulators : 4.1 Conductors, 4.2 Properties of conductors, 4.3 Insulators, 4.4 Properties of insulators, 4.5 Semi conductors, 4.6 Grading of conducting wires.	12	02	1	Nil

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
5.	Electrical Accessories : 5.1 Electrical Accessories and their uses, 5.2 Switches and their types, 5.3 Lamp holders and their types, 5.4 Ceiling rose, 5.5 Pin plug, 5.6 Socket and adopter, 5.7 Fuses, 5.8 Wires and cables.	12	08	1	1
6.	Magnetism and Electro Magnetism : 6.1 Some important Definitions of Magnetism, 6.2 Magnetic field, 6.3 Magnetic poles, 6.4 Magnetic lines of force, 6.5 Magnetic flux, 6.6 Flux Density, 6.7 Magneto motive force, 6.8 Reluctance, 6.9 Care and maintenance of magnets, 6.10 Magnetic field around a current carrying conductor, 6.11 Comparison between Electric and Magnetic Circuits.	22	08	1	1
7.	Electro Magnetic Induction : 7.1 Faraday's Laws of Electromagnetic Induction, 7.2 Lenz's Law, 7.3 Flemings Right hand rule, 7.4 Self inductance, 7.5 Mutual Inductance.	7	08	1	1
8.	Electical Machines : 8.1 D.C Generator, 8.2 Principle of working, 8.3 Parts of Generator, 8.4 D.C. Motors, 8.5 Principle of Working, 8.6 Parts of Motor, 8.7 Flemings Left hand and Right hand rule, 8.8 Trouble shooting in an electric motor.	17	08	1	1
9.	Electrical Appliances : 9.1 Immersion Rod, 9.2 Electric Iron, 9.3 Electric stove, 9.4 Geyser,	12	08	1	1

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
	9.5 Water Heater, 9.6 Ceiling Fan				
10.	Batteries : 10.1 Batteries, 10.2 Cell, 10.3 Lead-Acid Cell Construction, 10.4 Applications of Lead-Acid Cells, 10.5 Care and Maintenance of Cells, 10.6 Charging and discharging of Batteries.	12	08	1	1
	Total	135			

**MECHANICAL ENGINEERING TECHNICIAN
FIRST YEAR
WORKSHOP PRACTICE
PRACTICAL PAPER-I**

PERIODS PER WEEK : 4**PERIODS PER YEAR : 135**

Sl. No.	Name of the Unit	No. of Periods
1.	Fitting & Drilling	30
2.	Lathe & Grinding	20
3.	Black Smithy	20
4.	Tin Smithy	15
5.	Welding	20
6.	CNC Lab	30
	Total	135

**MECHANICAL ENGINEERING TECHNICIAN
WORKSHOP PRACTICE
PRACTICAL PAPER-I**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 135**

Sl. No.	Name of the Unit	No. of Periods
1.	Fitting & Drilling : Identification & Usage of tools, Sawing Practice, Filing practice, Chiselling Practice, Preparation of 'T', 'L' Sections, Drilling, Tapping	30
2.	Lathe & Grinding : 2.1 Plain Turning, 2.2 Step Turning, 2.3 Chamfering, 2.4 Knurling, 2.5 Threading, 2.6 Cylindrical Grinding, 2.7 Surface Grinding	20
3.	Black Smithy : Practicing of usage of tools, Making a round bar from a square bar, Making a ring of given round rod, Making of crane hook, S-hook T-bolt, Flat Chisel, Gib head sunk key	20
4.	Tin Smithy : 4.1 Make a Rectangular tray, Make a Rectangular Scoop, Funnel, 4.3 Rivetting practice, 4.4 Soldering the joints, 4.5 Elbow	15
5.	Welding : Arc Welding : 5.1 Make a square butt joint, Making of T joint, lap joint, corner joint, Identification of welding positions Gas Welding : Identification Gas welding equipment, Setting of Gas welding equipment, Setting of Gas Welding flames Practicing of Gas welding techniques	20
6.	CNC Lab : Simple CNC Programme for Lathe operations i.e, Plain turning, step turning & threading	30
	Total	135

**MECHANICAL ENGINEERING TECHNICIAN
FIRST YEAR
ENGINEERING DRAWING
PRACTICAL PAPER-II**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 135**

Sl. No.	Name of the Unit	No. of Periods
1.	Introduction	5
2.	Free hand letter writing	15
3.	Geometrical construction	25
4.	Orthographic Projections	25
5.	Sectional views	25
6.	Pictorial Drawings	10
7.	CAD	30
	Total	135

**MECHANICAL ENGINEERING TECHNICIAN
FIRST YEAR ENGINEERING DRAWING
PRACTICAL PAPER-II**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 135**

Sl.No.	Name of the Unit	No. of Periods
1.	Introduction : 1.2 Importance of Engineering Drawing, 1.3 Description of Drawing instruments	5
2.	Free hand letter writing : 2.1 Free hand letter writing and Numbers Dimension, 2.2 Different types of lines and their use, standard practice of writing single stroke, 2.3 Capital and Small letters and Numerical	15
3.	Geometrical construction : 1.11 Division of a line in to equal parts, 1.12 Construction of regular of polygon, 1.13 Construction of ellipse, Parabola and Hyperbola.	25
4.	Orthographic Projections : 4.1 Different angle methods of projection, 4.2 Concept of plan, elevation and side view, 4.3 Orthographic projections of Triangle, Square, pentagon and Hexagon Prisms and Pyramids, Circles, Cube, Cylinder, cone and different Engineering objects in 1 st Angle.	25
5.	Sectional views : 5.1 Need for drawing sectional views, 5.2 Location of cutting plane, 5.3 Meaning of full, Half, Revolved, Local or partial sections, 5.4 Hatching, 5.5 Conventional practices to represent the sections of Ribs, Shafts, bolts, nuts, screws, rivets, spokes, webs, keys, cotters, thin sections etc as per B.I.S. specifications.	25
6.	Pictorial Drawings : 6.1 Brief Description of Isometric, oblique and perspective drawings and uses, 6.2 Isometric drawing of common features like Rectangles, Circular shapes non-isometric lines, 6.3 Use of box and offset construction, 6.4 Prepare isometric projections for the give Orthographic drawings, 6.5 Oblique drawing of common feature like rectangular, circular and inclines surfaces.	10
7.	CAD : 7.1 Study of Auto CAD Screen, Tool bars & Menus & Various commands, 7.2 Exercise on Mirror, rotate, Array & move commands, 7.3 Exercises on Dimensioning & Hatching, 7.4 Exercises on 2D Drawings, 7.5 Study the 3D solids and solid tool bar options, 7.6 Draw Bolt & Nut in 3D	30
	Total	135

MECHANICAL ENGINEERING TECHNICIAN

<i>S.No.</i>	<i>Unit deleted</i>	<i>Unit added</i>
<i>1.</i>	<i>Development of surfaces</i>	<i>Computer Aided Designing.</i>

**MECHANICAL ENGINEERING TECHNICIAN
FIRST YEAR
MECHANICAL AND ELECTRICAL ENGINEERING LAB
PRACTICAL PAPER-III**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 135**

Sl. No.	Name of the Unit	No. of Periods
1.	Flash & Fire point tests	10
2.	Viscosity Measurement	10
3.	Calorific Value Tests	15
4.	A.C. Circuits	15
5.	D.C. circuits	15
6.	D.C. Machines	15
7.	Battery	5
8.	Wiring	35
9.	Overhaul the appliances	15
	Total	135

**MECHANICAL ENGINEERING TECHNICIAN
FIRST YEAR
MECHANICAL & ELECTRICAL ENGINEERING LAB.
PRACTICAL PAPER-III**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 135**

Sl. No.	Name of the Unit	No. of Periods
1.	A. Mechanical Engineering Lab : 1.1 Flash point 1.2 Fire point test	10
2.	2.1 Viscosity measurement	10
3.	3.1 Calorific value tests	15
1.	B. Electrical Engineering Lab : 1. A.C. Circuits 1.1 Determination of voltage & current in series 1.2 Determination of voltage & current in parallel 1.3 Calibration of single phase energy meter	15
2.	D.C. Circuits : 2.1 Verify the Ohm's Law 2.2 Practice the Ammeter, Voltmeter 2.3 Practice the Multimeter – Finding Resistance 2.4 Practice on Rheostat	15
3.	D.C. Machines : 3.1 Identify the components in a D.C. Motor 3.2 Identify the components in a D.C. Motor 3.3 Practice a D.C. machine	15
4.	Battery : 4.1 Charging procedure of battery 4.2 Discharging position of battery reactions	5
5.	Wiring : 5.1 Connect one lamp from two different places in stair case wiring 5.2 Practice conduit wiring 5.3 Setting of fuse 5.4 Connect the fluorescent lamp 5.5 Earthing practice	35
6.	Overhauling the Appliances : 6.1 Over haul an Electric Iron 6.2 Over haul a ceiling fan	15
	Total	135

S.No.	Unit deleted	Unit added
1.	Computer fundamentals	Mechanical Engineering Lab.

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
ENERGY SOURCES & POWER PLANT
THEORY PAPER-I**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 110**

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
1.	Energy Sources	5	2	1	Nil
2.	Solar Energy	20	10	--	2
3.	Wind Energy	5	4	2	
4.	Bio Energy	15	10	--	2
5.	Tidal Energy	8	4	2	
6.	Fuel Cells	8	4	2	
7.	Steam Boiler	15	10	1	2
8.	Steam Nozzle	10	10	2	1
9.	Steam Turbine	15	10	2	1
10.	Steam Condenser	9	04	2	
	Total	110			

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
ENERGY SOURCES & POWER PLANT
THEORY PAPER-I**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 110**

Sl. No.	Name of the Unit	No. of Periods
1.	Energy Sources : 1.1 Introduction to Energy 1.2 Different forms of Energy 1.3 Energy Sources and their availability 1.4 Conventional and Non-Conventional sources of energy	5
2.	Solar Energy : 2.1 Introduction 2.2 Solar Constant 2.3 Solar Radiation at the Earth's Surface 2.4 Instruments for measuring Solar Radiation and Sun shine 2.5 Solar Energy Utilisation - Basic ideas about the pre-historic ways of using solar energy. 2.6 Solar energy applications – Solar collectors, solar cooker, solar water heater, solar distillation, solar pumping, electricity from solar energy, solar photo voltaic, applications of solar photo voltaic system in Rural areas	20
3.	Wind Energy : 1.1 Introduction 1.2 Classification of wind mills 1.3 Horizontal wind mills, Vertical wind mills 1.4 Advantages and Disadvantages of wind energy	5
4.	Bio Energy : 4.1 Introduction, History of Bio-gas 4.2 Process of Bio-gas, generation-wet process, dry process. 4.3 Raw materials available for Bio-gas fermentation 4.4 Selecting of site for installation of a Bio-gas plant 4.5 Materials required for the construction of Bio-gas plant 4.6 Constructional Details of Bio-gas plant	15
5.	Tidal Energy : 5.1 Introduction 5.2 Components of Tidal Power Plant 5.3 Sine tidal power plant 5.4 Advantages and imitations of tidal Power plant	8
6.	Fuel Cells : 6.1 Working principle 6.2 Bacon's High Pressure Fuel cell-construction details and working principle 6.3 Aluminium and fuel cell working principle	8
7.	Steam Boilers : 7.1 Classification, function use or boilers 7.2 Cochran and Babcock Wilcox boilers	15
8.	Steam Nozzles : 8.1 Flow of steam through Nozzles, convergent Nozzle, Divergent nozzle.	10

9.	Steam Turbines : 9.1 Classification, working principle of impulse & reaction turbines with line diagrams	15
10.	Steam condenser : 10.1 Function	9
	Total	110

NOTE: SUBJECT NONCONVENTIONAL ENERGY SOURCES RENAMED AS ENERGY SOURCES AND POWER PLANT.

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
LIGHT MOTOR VEHICLES
THEORY PAPER-II**

PERIODS PER WEEK: 4

PERIODS PER YEAR: 110

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
1.	Description of Motor vehicles	8	2	1	
2.	Wheels, tyres & tubes	8	2	1	
3.	Steering Mechanism	8	8	1	1
4.	Braking system	8	14	2	1
5.	Transmission system	18	8	1	1
6.	Gear Box	18	8	1	1
7.	Engine Cooling system	8	6	1	1
8.	Lubrication	13	6		1
9.	Carburetor	8	8	1	1
10.	Fuel injection system	13	8	1	1
	Total	110	68	10	8

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
LIGHT MOTOR VEHICLES
THEORY PAPER-II**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 110**

Sl. No.	Name of the Unit	No. of Periods
1.	Description of Motor vehicles: 1.1 General descriptions of motor vehicles 1.2 Major assemblies	8
2.	Wheels, tyres & tubes : 2.1 Description of wheels & tyres, selection of tyres, inflation pressure and carrying capacity	8
3.	Steering Mechanism : 3.1 Different types of steering boxes, power steering description, its advantages	8
4.	Braking system : 4.1 Breaks in cars & trucks, Hand breaks, Mechanical & Hydraulic breaking system in cars.	8
5.	Transmission system : 5.1 Different types of clutches used in vehicles, layout of transmission system, study of hydraulic clutches.	18
6.	Gear box : 6.1 Operation in different gear positions, 6.2 Common troubles & remedies, 6.3 Lubrication in gear box.	18
7.	Engine Cooling system : 7.1 Engine cooling Methods 7.2 Air & water cooling radiators, pump, thermostats & fan 7.3 Reasons for Engine overheating	8
8.	Lubrication : 8.1 Need for Lubrication of engine parts, 8.2 Lubrication system parts, oil filters & their uses	13
9.	Carburetors : 9.1 Types of carburetors 9.2 Different adjustments & their purposes	8
10.	Fuel injection system : 10.1 Fuel fed system in motor vehicles, its layout 10.2 Study of diesel fuel supply 10.3 FIP timing 10.4 Engine idling speed adjustment 10.5 Study of LPG & CNG driving vehicles 10.6 Study of Air Conditioning	13
		110

Note: Previous subject farm equipment and tractors deleted and light motor vehicles subject introduced.

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
REFRIGERATION AND AIR CONDITIONING
THEORY PAPER-III**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 110**

Sl. No.	Name of the Unit	No. of Periods	Weightage in Marks	Short answer questions	Essay type questions
1.	Fundamentals of Refrigeration	10	10	2	1
2.	Refrigeration equipment	25	16	2	2
3.	Refrigeration applications	15	8	1	1
4.	Fundamentals of Air conditioning	10	10	2	1
5.	Air conditioning equipment	25	8	1	1
6.	Air conditioning applications	15	8	1	1
7.	Servicing and maintenance of Refrigeration and air conditioning equipment	10	8	1	1
		110	68	10	8

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
REFRIGERATION AND AIR CONDITIONING
THEORY PAPER-III**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 110**

Sl. No.	Name of the Unit	No. of Periods
1.	Fundamentals of Refrigeration : Introduction 1) Methods of refrigeration Ice refrigeration Dry ice refrigeration Air expansion refrigeration Liquid gas refrigeration Vapor compression refrigeration	10
2.	Refrigeration equipment : 2.1 Compressors Condensers & cooling towers Evaporators Expansion devices	25
3.	Refrigeration applications : Definition of refrigeration Unit of refrigeration Domestic refrigerator Water cooler Ice plant Cold storage	15
4.	Fundamentals of Air conditioning : 4.1 Introduction Meaning of air conditioning Psychrometry & its properties 4.4 Dry air 4.5 Moist air 4.6 Dry bulb temperature 4.7 wet bulb temperature	10
5.	Air conditioning equipment : 5.1 Fans & Blowers 5.2 Ducts 5.3 Supply air outlets 5.4 Return air outlets 5.5 Filters & dust collectors 5.6 Heating and cooling coils	25
6.	Air conditioning applications : 6.1 Air cooler 6.2 Window air conditioner 6.3 Split air conditioner 6.4 Packaged air conditioner	15
7.	Servicing and maintenance of Refrigeration and air conditioning equipment:	10
		110

Note: Previous subject Domestic appliances renamed as Refrigeration and Air Conditioning.

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
ENERGY SOURCES LAB
PRACTICAL PAPER-I**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 115**

Sl. No.	Name of the Unit	No. of Periods
1.	Solar Radiation measurement	8
2.	Solar distillation	8
3.	Solar pumping	10
4.	Solar cooker	9
5.	Solar water heater	10
6.	Solar lanterns and street light	5
7.	Bio gas plant	10
8.	Wind Energy	10
9.	Fuel cells	5
10.	Boilers	10
11.	Nozzles	5
12.	Turbines	10
13.	Condensers	5
14.	Industrial Visit to power plant	10
	Total	115

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
ENERGY SOURCES LAB
PRACTICAL PAPER-I**

PERIODS PER WEEK: 4

PERIODS PER YEAR: 115

Sl. No.	Name of the Unit	No. of Periods
1.	Solar Radiation Measurement : 1.1 Study of Solar Radiation by using pyramometer – Aim Apparatus, Procedure	8
2.	Solar Distillation : 2.1 Study of solar distillation – Aim, Apparatus, procedure	8
3.	Solar pumping : 3.1 Study of Solar waterpumping – Aim, Apparatus, procedure	10
4.	Solar Cooker : 4.1 Prepare delicious food by using solar cooker – Aim, Apparatus, Ingredients, procedure 4.2 Dismantling and Assembling of a solar cooker – Aim, Apparatus, Tools required, procedure	9
5.	Solar Water Heater : 5.1 Study of Thermo siphon system – Aim, Apparatus, procedure 5.2 Study of forced circulation system – Aim, Apparatus, procedure	10
6.	Solar Lanterns and Street light : 6.1 Study of Solar lanterns – Aim, Apparatus, procedure	5
7.	Bio Gas : 7.1 Study of KVIC Bio gas plant – Aim, Apparatus, procedure 7.2 Study of pragathi Bio gas plant – Aim, Apparatus, procedure 7.3 Study of Janata Bio gas plant – Aim, Apparatus, procedure 7.4 Study of Deenabandhu Bio gas plant – Aim, Apparatus, procedure	10
8.	Wind Energy : 8.1 Study of Horizontal Wind mill – Aim, Apparatus, procedure	10
9.	Fuel Cells : 9.1 Study of Fuel cells – Aim, Apparatus, procedure	5
10.	Boilers : 10.1 Study of boilers	10
11.	Nozzles : 11.1 Study of Nozzles	5
12.	Turbines : 12.1 Study of Turbines	10
13.	Condensers : 13.1 Study of Condensers	5
14.	Industrial visit to power plant :	10
	Total	115

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
LIGHT MOTOR VEHICLES SERVICING LAB
PRACTICAL PAPER-II**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 115**

Sl. No.	Name of the Unit	No. of Periods
1.	Wheels, Tyres & Tubes	13
2.	Steering Mechanism	13
3.	Braking system	13
4.	Transmission	15
5.	Gar Box	24
6.	Engine Cooling System	8
7.	Lubrication system	8
8.	Carburetors	8
9.	Fuel injection System	13
	Total	115

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
LIGHT MOTOR VEHICLES SERVICING LAB
PRACTICAL PAPER-II**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 115**

Sl. No.	Name of the Unit	No. of Periods
1.	1.1 General servicing of vehicles, Washing, cleaning oiling, Greasing and lubrication of vehicles. Wheels, Tyres & Tubes : 1.2 Removing wheel from vehicle, dismantling tyres & tubes, checking puncture, assembling & inflating to correct pressure.	13
2.	Steering system : 2.1 Inspect & adjust steering linkages, alignment of steering wheel with respect to front wheel, check and correct toe-in	13
3	Braking system : 3.1 Adjusting brake pedal play, dismantling wheel brake assembly, clearing & inspecting brake shoes for proper clearance, bleeding hydraulic brakes & disk brakes.	15
4	Transmission : 4.1 Adjusting clutch pedal play, removing gear box & clutch assembly from vehicle cleaning & inspecting parts.	15
5.	Gear box : 5.1 Dismantling of gear box, identifying noise from gear box and rectifying, changing oil in gear box.	22
6.	Engine cooling system : 6.1 Checking Engine cooling system, Dismantling & cleaning of radiators, testing water pump.	8
7.	Lubrication system : 7.1 Study of lubrication oil flow system in engine, overhauling oil filters, repairing lubrication system.	8
8.	Carburetors : 8.1 Repairs to carburetors, adjusting float level, studying flow circuit in carburetors.	8
9.	Fuel injection system : 9.1 Simple repairs in fuel feed system, overhauling of petrol pump, carburetors, fuel filters and air cleaners	13
	Total	115

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
REFRIGERATION AND AIR CONDITIONING LAB
PRACTICAL PAPER-III**

PERIODS PER WEEK: 4

PERIODS PER YEAR: 115

Sl. No.	Name of the Unit	No. of Periods
1.	Servicing & maintenance of refrigeration applications :	50
2.	Servicing & maintenance of Air conditioning applications	45
3.	Industrial visit	20
		115

**MECHANICAL ENGINEERING TECHNICIAN
SECOND YEAR
REFRIGERATION AND AIR CONDITIONING LAB
PRACTICAL PAPER-III**

PERIODS PER WEEK: 4**PERIODS PER YEAR: 115**

Sl. No.	Name of the Unit	No. of Periods
1.	Servicing & maintenance of refrigeration applications : 1. a) Domestic refrigerator b) water cooler c) Ice plant d) Cold storage	50
2.	Servicing & maintenance of Air conditioning applications : 1. a) Air cooler b) Window Air conditioner c) Split air conditioner d) packaged Air condition system	45
3.	Industrial visit to Cold storage plant	20
	Total	115

LIST OF EQUIPMENT FOR MECHANICAL ENGINEERING TECHNICIAN**A. Name of the Equipment**

1. General purpose Lathe
2. Welding Set (Transformer type)
3. Hand Drilling Machine
4. Drilling Machine – Bench Type
5. Grinder (Rough and Smooth)
6. 4 Strokes Diesel Engine
7. CNC Trainer Lathe
8. Window A/C
9. Split A/C
10. Cleave land apparatus
11. Pensky martin apparatus
12. Saybolt Viscometer
13. Redwood Viscometer
14. Bomb Calorimeter
15. Diesel car
16. Petrol car
17. Gas Welding equipment
18. Refrigerator
19. Air Cooler

B. Light Motor Vehicle Tools and equipment

- | | | |
|--|---|---|
| 1. Fuel pump old for practice | 2 | |
| 2. Distributor | 2 | |
| 3. Carburetor | 1 | |
| 4. Water Pump and Oil Pump | 1 | |
| 5. Wheel alignment guage - | 1 | |
| 6. Sectionised engine gear box and differential mounted on chassis | | 1 |
| 7. Brake assembly, master cylinder, wheel cylinder | | 1 |
| 8. Air brake assembly | | 1 |
| 9. Brake lining riveting machine (foot operated) | | 1 |
| 10. Clutches different types | | 1 |
| 11. Axle, gear boxes, steering boxes front axle assembly | | 1 |
| 12. Steering assembly – Rack and Pinion type | | 1 |
| 13. Steering assembly – Power Steering | | 1 |
| 14. Spring tension scale -0 – 4.5 Kg. | | 1 |
| 15. Carburetor repair tool kit | | 1 |
| 16. Puller set steering wheel universal | | 1 |
| 17. Lifting jack, screw type | | 1 |
| 18. Hot patch clamp | | 1 |

General Machinery:

- | | |
|---|---|
| 1. Light Motor vehicle in running condition (Diesel)(Indian make) | 1 |
| 2. Motor Car (Petrol) in running condition (Indian make) | 1 |
| 3. Petrol Engine running condition (Car type) (Indian make) | 1 |
| 4. Diesel Engine running condition (Vehicle type) | 1 |

Miscellaneous Tools, Equipment and furniture

1. Hand Reamers – 1 set
2. Taps and Dies – Complete BSW Metric – 1 set each
3. Micrometer outside 25-100 mm
4. Micrometer inside 50-100 mm
5. Extension Rods -2
6. Vernier Callipers set 300 mm inside/outside – 1 set
7. Straight Snip – 1 No.
8. Safety goggles – 2 No.
9. Tachometer – 1 No.
10. Anvil with stand
11. Forge with chimney fitted with blower – 1 No.
12. Chain and pulley clock – 3 tons capacity – 1 No.
13. Work Bench – 2.5 x 1.25 x 7.5 meters – 2 Nos.
14. Bench vice –n 10 Nos.
15. Trays – 4
16. Pipe Wrench – 2 No.
17. Allenkey – 2 Nos.
18. Service equipment kit for I.C. engines – 2 Nos.
19. Compressor Unit – 1 No.
20. Chair for Lecturers – 2 Nos.
21. Metal Racks – 2 Nos.
22. Fire Extinguisher – 2 Nos.
23. Fire Buckets with hands and stand – 4 Nos.
24. Inspection lamp – 2 Nos.

Building Tools

1. Soldering Iron – 120 watts
2. Spanner Socket – 2 sets
3. Infector Testing set – 1 No.
4. Cylinder gage (Cop-6.1) – 1 No.
5. Spray gun set – 1 No.
6. Puncture equipment – 1 set
7. Ring Expander and Remover – 1 No.
8. Ring groove cleaner-1000
9. Fedar gage – 1 No.
10. Infector cleaning kit – 1 No.
11. Triangular, Half Round, Flat Files – (25 cm) – 4 each

Hand Tools

1. Ball peen hammer – (7.5 Kg, 5 Kg, 2.5 Kg) – 2 each
2. Plastic Hammers – 5 Nos.
3. Wooden Mallet – 1 No.
4. Chisel – Flat 20 mm – 5 Nos.
5. Half Round Chisel – 5 Nos.
6. Centre punch – 10 mm – 10 Nos.
7. Hollow punch – 1 set
8. Letter punch – 1 set
9. Screw drivers – 10 Nos.
10. Callipers – all types – 1 set each
11. Steel Rules – 10 Nos.
12. Hand Files – 2nd Cut- 10 Nos.
13. Cutting Pliers – 10 Nos.
14. All Types of Files – each type – 5 Nos.
15. Dividers – 4 Nos.
16. Ring Spanner Sets – 2 sets
17. Adjustable spanner – 15 cm 2 Nos.
18. Twist drills – 3 mm – 12 mm – 2 sets
19. Tongs Flat and Round – 2 Nos. each

Refrigerator Servicing Tools

1. Flaring Yoke
2. Flaring Block
3. Tube Bender
4. Brazing set
5. Gas Charging Cylinders
6. Charging tubes
7. Pinching Tool
8. Tube Cutter
9. Vacuum Pump
10. Blower

**COLLABORATING INSTITUTIONS/DEPARTMENTS FOR CONDUCT OF ON THE JOB
TRAINING**

1. Department of Renewable Energy
2. Refrigeration and Air conditioning Industry
3. Maruthi Servicing centre
4. Hyundai Servicing centre
5. Tata Servicing centre
6. Voltas Refrigeration Servicing centre
7. L.G Refrigeration & Air conditioning Servicing centre
8. Thermal power Stations
9. APSRTC Workshops

ON JOB TRAINING, SYLLABUS AND EVALUTION

1. General Work shop [Lathe Shop, grinding etc.]
2. General Engineering [Fitting, drilling, etc.]
3. Fabrication shop [welding, sheet metal shop etc]
4. Electrical Work & Batteries, Servicing. [50 periods, 12 months]
5. Working with pumps & motors [50 periods, 10 months]
6. Hands on experience in non-conventional energy sector like solar energy plants, Bio-gas flats etc.
7. Repairs & Servicing of Refrigeration
8. Repairs & Servicing of Air Coolers.
9. Repairs & Servicing of Air Conditioners [Window A.Cs/ Split A.Cs]
10. Repairs & Servicing of Light Motor vehicles.

TEACHING STAFF & QUALIFICATIONS**Qualifications for Teaching staff:**

Must possess a Second class Graduation in B.E. Mechanical or AMIE in Mechanical or an qualification of university of India established or incorporated by or under Central Act, State Act or provincial Act or Institution recognized by the University Grants Commission. (GoMs.No.12, Higher Education (Intermediate Education.2) Department, dated 15.02.2001)

Equivalency:

In the new curriculum 2012 there is no equivalency paper to any paper. Hence the old syllabi students will be given two chances to clear their backlogs (i.e. March & ASE 2013) for I year and (March & ASE 2014) for II year.

VERTICAL MOBILITY

1. The Intermediate Vocational course Mechanical Engineering Technician passouts can be admitted into degree like BA/B.Com/B.Sc/BCA/BBM courses
2. Mechanical Engineering Technician passouts with Bridge course can directly admit into second year Diploma Mechanical/Automobile/Degree in Engineering/and join in any Engineering course through EAMCET.

REFERENCE BOOKS**I Year****1. Workshop Technology**

- 1.1. Elements of workshop technology – Haxara Chowdary Workshop Technology – Shalihabibulla

2. Mechanical Technology

- 2.1 Mechanical Tchnology – R.S. Kurmi
2.2 Mechanical Technology – K.Venkateswarlu
2.3 Pump Operation and Maintenance – Tata Mc.Graw Hill
2.4 Pumps – Jagatheesh

3. Electrical Technology

- 3.1 Electrical Technology – B.L. Theraja

II Year**1. Energy sources and power plant**

- 1.1 Solar Energy – G.D. Rai
1.2 Solar Energy – S.P. Sukhatme
1.3 Solar Energy – Shali Habibulla
1.4 Bio-gas Technology – A.N. Mattur
1.5 Bio-gas Technology – Shali Habibulla

2. Light Motor Vehicle

- 2.1 The Motor Vehicle – Newton steeds & Garret
2.2 Automotive chasis – P.M. Heldt
2.3 Mechanism of car – A.W. Judge
2.4 Automotive mechanism – Joseph Heitner

3. Refrigeration and Air Conditioning

- 3.1 Refrigeration and Air Conditioning – S.Dom Kundwar
3.2 Refrigeration Repairing – Shali Habibulla

MODEL QUESTION PAPER
MECHANICAL ENGINEERING TECHNICIAN
BASIC WORKSHOP TECHNOLOGY
FIRST YEAR PAPER-I

Time : 3 Hours

Max.Marks : 50

SECTION-A

Note : (i) Answer all the questions

(ii) Each Question carries 2 marks

10 x 2 = 20

1. What are the Ferrous and Non-Ferrous metals?
2. What are the common tools used in fitting section?
3. Mention the parts of clisel and hammer?
4. What are the common tools used in smithy?
5. List out the measuring instruments?
6. What are the safety precautions to be followed while practicing arc welding?
7. What is the use of Drilling machine and name its parts?
8. What are the advantages of CNC machines
9. Write G. codes of CNC machines
10. What are the parts of a Lathe?

SECTION-B

Note : (i) Answer any 5 Questions

(ii) Each Question carries 6 marks

5 x 6 = 30

11. What are the general safety precautions to be taken for preventing accidents?
12. Sketch and explain 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 short note on smithy forge (or) Hearth and Anvil?
15. Explain the working of Micrometer with sketch?
16. Explain the comparison between conventional and CNC machines?
17. Explain briefly about arc welding with the help of a neat sketch?
18. Explain briefly about oxy-acetylene flames with sketches?

MODEL QUESTION PAPER
MECHANICAL ENGINEERING TECHNICIAN
MECHANICAL TECHNOLOGY
FIRST YEAR PAPER-II

Time : 3 Hours

Max.Marks : 50

SECTION-A

Note : (i) Answer all the questions

(ii) Each Question carries 2 marks

10 x 2 = 20

1. Define Thermodynamic 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 constituents?
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. Define first law of Thermodynamics?
10. What are the main parts of Reciprocating and submersible pumps?

SECTION-B

Note : (i) Answer any 5 Questions

(ii) Each Question carries 6 marks

5 x 6 = 30

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

MODEL QUESTION PAPER
MECHANICAL ENGINEERING TECHNICIAN
ELECTRICAL TECHNOLOGY
FIRST YEAR PAPER-III

Time : 3 Hours

Max.Marks : 50

SECTION-A

Note : (i) Answer all the questions

(ii) Each Question carries 2 marks

10 x 2 = 20

1. Name hand tools used for electrical work?
2. Define Ohm's Law?
3. What is Electrical Power?
4. What is Semi Conductor?
5. Name some types of switches?
6. What is Flux density?
7. What is Electromagnetic Induction?
8. List out main components in Generator?
9. What is the use of Geyser?
10. Write two differences between primary and Secondary Cell ?

SECTION-B

Note : (i) Answer any 5 Questions

5 x 6 = 30

(ii) Each Question carries 6 marks

11. a) Define Kirchoff's Laws?
b) Define laws of Resistance
12. In an Electrical Installation 16 tube lights of 40 w each, 12 fans 60 w each works for 12 hours/day. 1 HP Motor pump set works for 5 hours/day. 100w light 6 No's each works for 5 hours/day. Calculate Electric bill for the installation per month @ Rs.1.50/- BOT Unit. Add Rs.5/- for meter rent for month.
13. List out and mention the uses of important electrical accessories?
14. a) How the magnetic field created around a current carrying conductor?
b) Compare electric circuit with a magnetic circuit
15. Classify and explain the inductance?
16. Explain working of D.C.Motor with a Sketch?
17. Explain working of Electric Iron with a Circuit diagram?
18. Briefly explain about lead-acid battery?

MODEL QUESTION PAPER
MECHANICAL ENGINEERING TECHNICIAN
ENERGY SOURCES AND POWER PLANT
SECOND YEAR PAPER-I

Time : 3 Hours

Max.Marks : 50

SECTION-A

Note : (i) Answer all the questions

(ii) Each Question carries 2 marks

10 x 2 = 20

1. What are the different forms of Energy?
2. What are the conventional and Non-conventional sources of Energy?
3. What is the function of boiler?
4. What are the basic components of Solar Water Pumping?
5. Give the classification of Nozzles?
6. How the wind mills are classified?
7. What are the raw materials required for Biogas generation?
8. Mention the parts of Bio gas plant?
9. What is meant by impulse turbine?
10. What are the basic components of Tidal Power plant?

SECTION-B

Note : (i) Answer any 5 Questions

(ii) Each Question carries 6 marks

5 x 6 = 30

11. What are the conventional sources of Energy and explain briefly?
12. Explain any one of the solar collectors with the aid of neat sketch?
13. Explain briefly about horizontal wind mill?
14. Explain briefly about K.V.I.C. Biogas plant?
15. Explain the working principle of Cochran boiler with neat Sketch?
16. Describe the working principle of reaction turbine?
17. Write short notes on
 - a) Condenser
 - b) Nozzles
18. Classify the condensers? Explain working principle of Surface condenser.

MODEL QUESTION PAPER
MECHANICAL ENGINEERING TECHNICIAN
LIGHT MOTOR VEHICLES
SECOND YEAR PAPER-II

Time : 3 Hours

Max.Marks : 50

SECTION-A

Note : (i) Answer all the questions

(ii) Each Question carries 2 marks

10 x 2 = 20

1. Define 'Light Motor Vehicle'?
2. What is the function of carburetor?
3. Mention advantages of power steering?
4. What is the importance of hand brake?
5. Mention different types of clutches?
6. Why lubrication is required in gear box?
7. Write brief note on 'inflation pressure' in LMV?
8. Write brief note on "CNG" Driving Vehicles?
9. Write briefly on need for lubrication of engine parts?
10. Mention reasons for engine over heating?

SECTION-B

Note : (i) Answer any 5 Questions

(ii) Each Question carries 6 marks

5 x 6 = 30

11. Write short notes on
 - a) Water pump
 - b) Radiator
 - c) Thermostat
12. Explain working of pressure lubrication system?
13. Explain working of Fuel injection pump?
14. Explain working principle of Zenith carburetor with neat sketch?
15. List out common troubles & remedies in gear box of light motor vehicle?
16. Draw a line sketch for layout of transmission system and briefly explain different parts?
17. Explain power steering mechanism with line sketch
18. Explain the operation of Hydraulic braking system with neat sketch?

MODEL QUESTION PAPER
MECHANICAL ENGINEERING TECHNICIAN
REFRIGERATION AND AIR CONDITIONING
SECOND YEAR PAPER-III

Time : 3 Hours

Max.Marks : 50

SECTION-A

Note : (i) Answer all the questions

(ii) Each Question carries 2 marks

10 x 2 = 20

1. Define Refrigeration?
2. What are the main components of vapour compressor refrigeration system?
3. What are the main parts of the Air Cooler?
4. What are the functions of Evaporator?
5. How many types of Expansion Devices?
6. What are the applications of Refrigeration?
7. Define Dry bulb temperature and Wet bulb temperature?
8. State the applications of Air Conditioning?
9. State the function of Fan?
10. List out the Air conditioning equipment?

SECTION-B

Note : (i) Answer any 5 Questions

(ii) Each Question carries 6 marks

5 x 6 = 30

11. Explain Vapour compression Refrigeration system with neat diagram
12. Describe the working principle of Reciprocating compressor with neat sketch?
13. Draw a neat sketch of Ice plant and Explain working principle?
14. Explain briefly about psychrometric properties?
15. Explain the working of Electrostatic filter with neat sketch?
16. Explain the working principle of window Air conditioner with neat sketch?
17. Write the trouble shooting of Air conditioner
18. Write short notes on
 - a) Cooling Tower
 - b) Air Cooler

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