SEMESTER-II

Code No.	Subject	Study Scheme Period/Week			Evaluation Scheme						Total Marks
		L	T	P	Internal		External Assessment Exam				
					Theory	Practical	Written		Practical		
					Max Marks	Max. Marks	Max. Marks	Hrs.	Max. Marks	Hrs.	
*1	CommunicationTechniques - II	3	-	-	50	-	100	3	-	-	150
*2	Applied Maths - II	3	2	-	50	-	100	3	-	-	150
3	Electrical Machines	4	-	2	50	25	100	3	50	3	225
4	Electronic Components and	4	-	-	50	-	100	3	-	-	150
5	Electronic Devices and Circuits - I	3	1	3	50	25	100	3	50	3	225
6.	Electronics and Electrical Workshop	-	-	8	-	50	-	-	100	3	150
6	Engineering Drawing	-	-	3	-	50	-	-	100	3	150
**	Student Centered activities	-	-	1							
	TOTAL	17	3	20	250	150	500	-	300	-	1150

Syllabus for Semester II (Medical Electronics)

Course code:EC270 Course: Applied Mathematics-II

L:3 P:0 T:2 Total Marks: 150

Course Outcomes:

on completion of this lab students will be able to :

1 The main aim at developing abilities on the basis of limits, differentiation, integration and differential equations. The differential equations play very important role in engineering branches. The equations are from many practices problems such as circuit & systems, filter response.

1. COMPLEX NUMBERS (5%)

(i) Euler's exponential form (modulus argument form)

(ii) Hyperbolic function, relation between hyperbolic and circular functions.

(iii) Phaser, addition of sinusoidal form, Phaser diagram of R-L, R-C, and L-R-C circuits.

2. DIFFERENTIAL CALCULAS. **(40%)**

(i) Functions, concept of evaluation of following limits.

$\lim_{x \to 0} \frac{\sin x}{x}$, $\lim_{x \to a} \frac{x^n - a^n}{x - a}$, _____

$\lim_{x \to 0} (1+x)^{\frac{1}{x}}$, $\lim_{x \to a} a^x - 1$, _____

(ii) Differential coefficient. Its physical application. As rate measure, Geometric interpretation as slope of a curve. Differentiation from first prim of functions like x^n, a^x, Log x , Sin x, Cos x and Tan x. Differentiation of sum, product and quotient of functions.

(iii) Differentiation of Trigonometric and inverse Trigonometric functions.

Differentiation of function of a function, Implicit functions, parametric functions, Logarithmic differentiation.

(iv) Application of differentiation in finding errors, Tangent and normal of curves.

Maxima of functions.

3. INTEGRAL CALCULAS. (35%)

(i) Integration as inverse operation of differentiation. Integral of standard functions. Integration by substitution, by parts and by partial fractions.

(ii) Evaluation of integral of rational and irrational functions of the form.

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(iii) Simple definite integrals. Reduction formulae. Evaluation of $\int Sin^n x\, dx$, $\int Cos^n x\, dx$, $\int Sin^m x \cdot Cos^n x\, dx$.(m,n positive integers)

(iv) Applications of integration to finding area under a curve and axes, volume of solid of revolution of area about axes (simple problems). Mean value and R.M.S. value of a function.

(v) Numerical integrations. Approximate evaluation of definite integral by Trapezoidal rule and by Simpson's rule (without proof).

4. PARTIAL DIFFERENTIATION. (10%)

(i) First order and second order partial derivatives of functions of two variables.
(ii) Euler's theorem on partial differentiation of homogeneous functions. Total differentiation.

5. SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS. (10%)

(i) Order and degree of a differential equation. Solving first order first degree differential equation − variable separable form, Homogeneous form and linear differential equation.

(ii) Solving second order differential equation − complementary function, particular integral with functions of the form e^x , Sin ax , Cos ax , x^n, on the right hand side of the equation.

(iii) Applications to L-C-R electric circuits

Text Books:

1 Applied maths I & II by H.K.Dass

2 Applied mathematics by Dr. R.D.Sharma published by Dhanpat Rai Publications.

3 Applied maths I & II by Dr. Neeraj Pant

Syllabus for Semester II Medical Electronics

Course code:EC270 Course: CT-II
L:3 P:0 T:0 Total Marks: 150

Course Outcomes:

On completion of this lab students will be able to :

(vi) An ability to communicate effectively.

(vii) A recognition of the need for, and an ability to engage in life long learning

(viii) Knowledge of contemporary issued.

(ix) Developing reading writing and communication skills among the students so as to develop confidence in them in writing and oral techniques.

(x) It helps the students in their continuing their education needs.

1. **Précis writing:** (15%)

Précis writing of simple passages of about 250 words.

2. **Concepts of Communication:** (20%)

Importance of communication, one way and two way communication, methods of communication − oral, written and non-verbal, barriers to communication and techniques of overcoming the barriers, concept of effective communication, telephonic communication, public speaking and attending interviews.

3. **Correspondence:** (40%)

(i) Business, official, social letters and letters to pres. Two questions of 10 marks each are to be attempted out of four.

(ii) Telegrams, press release, advertisement, notices and memorandum. Two questions of 10 marks each are to be attempted out of four.

4. **Report Writing:** (15%)

Choice to attempt one out of three topic is to be given.

Syllabus for Semester II Medical Electronics

Course code:EC272 Course: Electronics components and material
L:4 P:0 T:0 Total Marks: 150

Course Outcomes:

on completion of this lab students will be able to :

1 To study & familiar of different Electronic components i.e. types of capacitors, Resistors, Indictors. Their specifications & details of testing also symbolic representation.
2 Different types of transformers, manufacturing processs & testing.
3 To understand various types of switches & relays, ie.e. sensing, manually operated.
4 SMDs & PCB manufacturing process.
5 To categories the materials into three categories.

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1. Materials **(50%)** Classification of materials into conducting, semi conducting and insulating materials through a brief reference to atomic Structure.

(a) Conducting Materials:

(i) Resistivity and factors affecting resistivity such as temperature, alloying and mechanical stressing

(ii) Classification of conducting materials into low resistivity and high resistivity materials. Some examples of each and their typical applications.

(b) Insulating Materials:

(i) Electrical properties − volume resistivity, surface resistance, dielectric loss, dielectric strength (breakdown voltage) and dielectric constant

(ii) Thermal properties − heat resistance, classification according to temperature endurance, thermal conductivity

(iii) Plastics − classification into thermo plastic and thermo-setting categories; examples of each and their typical applications

(iv) Important relevant (electrical, mechanical and thermal) characteristics and applications of the following materials:

Mica	Epoxy Glass	Polythene
Ceramic	Asbestos	Polyester
Glass	Varnish	Phosphor − Bronze alloy
Cotton	Lacquer	Beryllium − copper alloy
Jute	Enamel	Soldering lead alloy
Teflon	Paper (dry and impregnated)	Copper
Acrylics	Rubber	Silver, gold
Silicon grease	Silicon rubber	
Bakelite	PVC	

(c) Magnetic Materials:

(i) Different magnetic materials; (Dia, para, ferro) their properties

(ii) Ferromagnetism, ferrimagnetisms, domains, permeability, Hysteresis loop (including coercive force and residual magnetism and magnetic saturation)

(iii) Soft and hard magnetic materials, their examples and typical applications

2. Components (50%)

(i) Capacitor Polyester, Metallised Polyester ceramic paper, mica and electrolytic types, constructional details and testing, specifications, temperature and frequency stability and other limitations. Mutual comparison.

(ii) Resistors-carbon film, carbon composition wire wound and variable types (presets and potentiometers) Constructional details and testing, specifications, temperature and frequency dependence and noise considerations. Mutual comparison

(iii) Transformers Inductors and RF Coils: Methods of manufacture of inductors, RF coils and small transformers (upto 1 KVA) and their testing. Properties of cores. Need and types of shielding.

(iv) Surface Mounted Devices (SMD)

(v) Connectors, Relays and Switches:

(vi) Various types of switches, e.g. slide, rotary, push, toggle. Micro-switches etc.

Their symbols, specifications and applications

(vii) Concept of 'make' and 'break' contacts in relays. Operating current, Holding current, various types of relays. Their symbols, specifications and applications.

(viii) Various types of connectors. Their symbols specifications and applications

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Text Books:

1. K.S.Jamwal Published by S.k Kataria and sons

Syllabus for Semester II Medical Electronics

Course code: EC-273 Course: Electrical Machines
L: 4 hrs., T: 1hrs, Per Week Total Marks: 150

Course Outcomes

11. Any electronic system is a combination of electronic circuits and electrical components. In order to carry out his job function effectively, apart from the knowledge and skills of electronics, he must possess sound knowledge about basic principles of working of electrical machines and equipment.
12. Students will be able to apply knowledge of basic engineering which can be applied in multidisciplinary problems.
13. The knowledge of machines will be applied in different power sectors.
14. Students will be able to design a system, component, conduct experiments and processes to meet desired needs with in realistic constraints.
15. Gaining ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Unit 1

Transformers

Principles of operation and constructional details of single phase and three phase transformer, core type and shell type transformers, difference between single phase and three phase transformers and advantages and disadvantages, Voltage Regulation of a transformer, Losses in a transformer, Efficiency, condition for maximum efficiency and all day efficiency, Auto transformers and instrument transformer (CT and PT).

Unit 2

Generalized Treatment of Electrical Machines

Introduction, Definition of motor and generator, Basic principles of generator and motor, Torque due to alignment of two magnets and the concept of torque angle. Basic Electromagnet laws, E.M.F. induced in a coil rotating in a magnetic field, Elementary concept of an Electrical Machine, Common features of rotating electrical machines.

Unit 3

DC Machines

Main constructional features, principles of working, Function of the commutator for motoring and generating action**,** Armature winding**,** Factors determining induced e.m.f.**,** Factors determining Electromagnetic torque**,** principles of generating and motoring**,** Action and relationship between terminal voltage and induced e.m.f**,** Factors determining the speed of a DC motor, Different types of a excitation**,** Performance and characteristics of different types of DC machines**,** Starting of DC machines, motors and starters**,** Application of DC machines.

Unit 4

Three Phase Supply

Advantage of three phase system over single phase system, Star Delta connections, Relation between phase and line voltages of single phase and three phase systems, Power and power factor in three phase system and their measurements.

Unit 5

A.C. Motors

Brief introduction about three phase induction motors, its principle of operation**,** Types of induction motors and constructional features of squirrel cage and slip ring motors, Starting and speed control: Star Delta and DOL (Direct on-line) starters**,** Reversal of direction of rotation of 3 phase motors**,** Applications of induction motors.

Unit 6

Single Phase and Fractional Kilowatt Motors

Introduction, Principle of operation of single phase motors, Types of single phase motors and their constructional details (split phase, capacitor start, capacitor start and run, shaded pole), Single phase synchronous motor-reluctance motor (hysteresis motor), AC series motors and universal motors, Introduction to servo-motors and stepper motors.

Text Books:

1. Fundamentals of Electrical and Electronics: *S.K Sahdev, Dhanpat Rai Publications.*
2. Electrical Engineering: *Rajeev Manglik, Katson punlications.*

Reference Books:

1. Electrical Machines: *Ashfaq Hussain, Dhanpat Rai Publications.*
2. Electrical Machines I and II: *Tarlok Singh, Kataria and Sons.*
3. Electrical Machines I and II: *B.R Sharma, Satya Prakashan.*
4. Electrical Machines: P.K Mukharjee, S Chakravarthi, Dhanpat Rai Publications.

Syllabus for Semester II, Diploma Medical Electronics

Course Code:-274 Course Title:- Electronic Devices & Circuits – I
Total Marks: -150

Course Outcomes

1. To understand concepts such as active and passive components their various types, specifications and colour codes

2. To understand the classification of conductors, insulator and semiconductor and their energy level diagrams. Types of semiconductors

3. To understand the different types of rectifiers .

4. To understand the bipolar transistor their configuration and characteristics and load line of transistor.

5 To understand the FET and MOSFET their construction , operation , characteristics and comparsion.

UNIT-1 INTRODUCTION

Introduction to active and passive components, passive components, fixed and variable resistors their various types and specializations including thermistor, LDR and VDR fixed and variable capacitors, their various types and important specification and colour codes.

UNIT-2 SEMICONDUCTORS PHYSICS

Intrinsic semiconductors − Conductivity, atomic and crystal structure of germanium and silicon, covalent bonds, generation and recombination, effect of temperature on conductivity of intrinsic semiconductors, energy level diagram of conductor, insulator and intrinsic semiconductor. Extrinsic semiconductor material − Doping of impurity, P and N type semiconductor and their conductivity. Minority and majority carriers, Drift and Diffusion current.

UNIT-3 SEMICONDUCTOR DIODE

P-N junction diode, mechanism of current flow in P-N junction, drift and diffusion current, depletion layer, potential barrier, behavior of P-N junction characteristics, Zener and avalanche breakdown, concept of junction capacitance in forward and reverse bias conditions.
Semiconductor diode characteristics, static and dynamic resistance and their calculation from diode characteristics. Dynamics resistance of diode in terms of diode current.
Diode as rectifier, half wave rectifier, fullwave rectifier including bridge rectifier, relationship between DC output voltage and AC input voltage, rectification efficiency and ripple factor for rectifier circuits, filter circuits: Shunt capacitor, series inductor, capacitor input filter, bleeder resistance, physical explanations of the working of the typical applications of each
Different type diodes; brief idea and typical applications of power, zener diodes; varactor diodes and point. Contact. Important specification of rectifier dioce and zener .

UNIT-4 INTRODUCTION To BIPOLAR TRANSISTOR

Concept of bipolar transistor as two junction threeter kinds of current carries; PNP and transistors, their, symbols a mechanisms of current Concept of leakage, current ICBO, effect of temperature leakage current CB,CE and CC configuration, Common configuration (CD) : Input and output characterist determination of transistor parameter input dynamic resistance, current amp1ificatien factor. emitter configuration : collector current relations in configuration, collector current in terms of base andleakage current. (ICBO) relationship between the current in CB and CE configuration input and characteristics, determination of dynamic in and output resistances and current amplification factor from the characteristics. Common collector configuration expression of emitter current in terms, of the base and leakage current in CC configuration Comparison of and CE configuration with regard to input and resistance, current gain and leakage current, performance CE configuration over CB configuration. Transistor as amplifier in CE configuration. DC load line, its and drawing it on collector characteristics. Determination of small signal voltage and currents gain of a transistor amplifier using CE gain as product of the voltage and current gain.

UNIT-5 TRANSISTOR BIASING AND STABL1SATION OF OPERATING POINT

Different transistor biasing circuit for fixing operating point, temperature and 'Bdc' operatint point need for stabilization of operating point operating point in cut off and sat on region performance of the amplifier. Calculation of operation point for different circuits. Simple design problems on potential divider biasing circuit.

UNIT-6 SINGLE STAGE TRANSISTOR AMPLIFIER

Single stage CE amplifier circuit with proper biasing components, AC load, line andits use in :

- Calculation of current and voltage gain of a Sinq1e amp1ifier circuit.
- Explanation **O**f phase reversal **OF** the output voltage with respect to inputvoltage .
- Explanation of phase reversal of the output voltage with respect to input voltage.
- Transistor hybrid low frequency model in CE configuration, 'h' parameters and their physical significance, typical values of the parameters.
- Expressions for voltage gain, current gain, input and output impedance for a single stage CE amplifier circuit in 'h' parameters, appropriate approximation.

UNIT-7 FIELD EFFECT TRANSISTOR (FET)

Construction, operation, characteristics and equivalent circuit; of JFET and its circuit app1ication.Construction, operation, characteristics and equivalent circuit of MOSFET indepletion, enhancment modes and its circuit applications.CMOS, advantage and application.. Comparison of JFET, MOSFET, BJT Simple FET amplifier circuit and its working.

TEXT BOOKS: S.K. Sahdev Published by Dhanpat Rai.
REFERENCE BOOK:
Milimum Halkiyas published by Tata Macgrahill .

3. Microelectroelectronics by Sedra Smith Published by Tata Macgrawhill

Syllabus for Semester II , Diploma Medical Electronics

Course code: EC573 Course Title: Engg. Drawing
T: 4 Hrs. Per Week Total Marks: 150

1. Student will be able to sketch neatly diagram.
2. Student can acquire more concept about geometrical shape .
3. Student will understand about various view and its projection .
4. Student will be able to identify various object in different plane.
5. Student will be understand concept of isometric view.

Introduction to instruments and materials used in drawing.

Plate No. 1	Free hand sketching	**(5%)**
Plate No.2	Conventional representation of lines, materials, breaks, electric and electronic symbols.	**(5%)**
Plate No.3	Free hand lettering and numerals in 3,5,8 and 12 mm series. Vertical and inclined lettering at 75*. Instrumental single stroke lettering in 12 mm.	**(10%)**
Plate No.4	Dimensioning techniques	
Plate No.5	Three views of an object in 1st angle projection.	**(8%)**
Plate No.6	Six views of an object in 1st angle projection.	**(8%)**
Plate No.7	Three views of an object in 3rd angle projection.	**(8%)**
Plate No.8	Six views of an object in 3rd angle projection.	**(8%)**
Plate No.9	Identification of surfaces from different objects including inclined and curved surfaces.	

Plate No.10	Sections – conventional representation of materials, general conventions of revolved and removed sections.	**(8%)**
Plate No.11	Representation of pictorial/isometric view of a simple object. **(8%)**	
Plate No.12	Isometric views of simple objects including slant and curved surfaces. **(8%)**	
Plate No.13	Isometric of circle, semicircle, arcs and angles.	**(8%)**
Plate No.14	Missing views and lines.	**(8%)**
Plate no.15	Scales, diagonal scale, scale of chords.	**(8%)**

Text Books:

1. Engineering drawing – N.D.Bhatt

. Reference Material :- CD

Syllabus for Semester II, Medical Electronics

Course code: EC-273 Course: Electrical Machines
L: 4 hrs., T: 0 hrs, Per Week Total marks: 75

Course Outcomes

1. Any electronic system is a combination of electronic circuits and electrical components. In order to carry out his job function effectively, apart from the knowledge and skills of electronics, he must possess sound knowledge about basic principles of working of electrical machines and equipment.
2. The practical work done in this subject will help in developing skills of operating, repairing and testing of electrical machines and components (e.g. small electrical motor, transformer etc).
3. The knowledge of machines will be applied in different power sectors.
4. Students will be able to design a system, component, conduct experiments and processes to meet desired needs with in realistic constraints.
5. Gaining ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

List of Practical's:

1. Conversion of Galvanometer into Ammeter and Voltmeter.

2. To measure power and power factors in a 3 phase system with
a) balanced load
b) unbalanced load by the two wattmeter method and any one other method.

3. To find the value of capacitance and power factor of a capacitor by approximate method.

4. To draw the equivalent circuit of a transformer and to determine efficiency and regulation by performing:
a) Open circuit test
b) Short circuit test

5. To measure the induced e.m.f. of a separately excited DC generator as a function of field current.

6. To measure the terminal voltage of a separately excited DC generator as a function of load current

7. To measure the terminal voltage of a DC shunt generator as a function of load Current.

8. To measure the speed of a separately excited DC motor a function of load torque at rated armature voltage.

9. To measure the speed of a dc series motor .as a function of load torque at rated armature voltage

10. To determine the efficiency of a DC shunt motor by the measurement of losses (Sunburn's method)

12. To observe the difference in the effect of switching on a single phase capacitor start induction motor with
(i) the capacitor disconnected
(ii) the capacitor connected
Also to determine how to reverse the direction of rotation.

Syllabus for Semester II , Medical Electronics

Course Code :- EC281 Course:- Electronic Devices & Circuits – I (Lab)
Total Marks: 75marks

List of Practicals

1. Experiments to be Performed
i) Measurement of voltage at var1ous setting (low and high voltages) of reulgated power supply by using <w> and digital multimeter.
ii) Measurement of voltage and current by loading the regulated power supply.
iii) To obtain various voltages like +15V + 5V and measure them with the help of analog and digital multimeter.
iv) Practice in the use of signal generator and CRO : measurement of d.c. and a.c. voltages, time period/frequency of sine/square wave using sweep CRO

2. Identification and familarisation of passive components..
i) Measurement of resistors by and ordinary multimeter and an electronic multimeter and their vertification on the basis of colour code & specification.
ii) Measurement of transformer turn ratio of a transformer and to note its specification.
iii) Note the variations in resistance by variation of and to note its specification.
(a) light on LDR (b) temperature on a thermistor

3. Semiconductor diode characteristics :
i) Identification of types of packages, terminals and ting different ratings using data books for various types of semiconductor diodes. (germanium point contact, silicon low power and high power and switching diodes.
ii) Plotting of forward V.I characteristics for a <W> P.N. Diode (silicon and germanium diodes).

4. Rectifier circuits using semiconductor diode measurement of input and output voltage and plotting of input and waveshape
i) half wave rectifier. (ii) fullwave rectifier, (iii) bridge rectifier diode circuits.

5. Plot forward and reverse V-I characteristics for a zener Diode.

6. Plot the waveshapes of a full wave rectifier with <W> Capacitor, series inductor, and pie filter circuit.

7. Ploting input and output characteristics and calculation of Parameters of a transistor in common base configuration.

8. Ploting input and output characteristics and calculation of Parameters of a transistor in common emitter configuration.

9. Transistor biasing circuit. Measurement of operating point (IC and VCE) for a:
i) fixed bias circuit (ii) potential divider biasing circuit.
(Measurement can be made by changing the transistor in the circuits by another of same type number).

10. Single stage common emitter amplifier circuit.
i) Measurement of voltage gain at 1 KHz for different load resistances.
ii) Measurement of input and output impedance of the amplifier circuit.

11. a) Plot the FET characteristics and determine the FET parameters from its characteristics.
b) Measure voltage gain and plot the frequency response of JFET or MOSPET amplifier circuit.

Reference Material: Lab Manuals

Syllabus for Semester II , Medical Electronics

Course code: EC282 Course: Electronics and electrical workshop

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Course Outcome:

1. Student will get knowledge of various electronics and electrical assembly and designing tools
2. Student will practice on various electronics and electrical tools
3. Student will work as a team
4. Student will aware about assembly of various electronics and electrical system.

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1. Identification and familiarization with the following electronic instruments :
a) Multi-meter digital (Three and half digit)
b) Single beam simple CRO function of every knob on the front panel
c) Audio-oscillator sine and square wave output
d) Power supply fixed voltage and variable voltage, single output as well as dual output.

2. Practice in the use of above mentioned equipment a small experiment may be done by them so that they can just use of them.

3. Identification and familiarization with commonly used tools; statement of their uses. Identification and familiarization with active and passive components; colour code and types of resistor and potentiometers (including VDR, LDR and thermister); some small practical exercises on measurement of these components; identification of diode and transistor terminals. Identification of other components including LED, LCD, UJT, FET, Coils, relays, switches (SPDT, DPDT, etc) connectors, micro-switches, read relays, transformer (mains, audio and RF etc) Linear and Digital Ics, Thyristors, etc.

4. Study of wires & cables and develop technical skill to cut, strip, join and insulate two length of wires/cables (repeat with different types of wires/cables)

5. To develop technical skill to connect/solder/crimp different kinds of wires/cables (included shielded cable) to different types of Power / General purpose / Audio / Video / Telephone plug, socket, jacks, terminal, binding posts, terminal strip, connector's. The task should include making complete recording / Playback / Antena / Speaker loads for common consumer electronics products such as Radio, T.V., VCR, cassette recorder, Hi-Fi equipment, Head set, Microphone etc.

6. Study of soldering techniques:
(a) Various tools for Soldering (Soldering iron, Soldering station or temperature control soldering iron, Exposure to Modern Soldering Process.)
(b) Soldering material (solder wire, flux, cleaning fluid)
(c) Develop skill to cut, bend, insert and solder components (Resistance, Capacitance., diodes, Transistors. I.F.T. type coil, IC's etc.) on a PCB.
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(d) Demonstrate the skill to assemble component on PCB, wiring of a small Ckt on a PCB involving lacking, sleeving and use of identifier tags.

7. Study of De-Soldering Techniques:
(a) Various tools for De-soldering (De-Soldering Pump, De-Soldering Gun, De-Soldering strip/wick, Exposure to modern De-Soldering process.
(b) Demonstrate the skill to remove and clean the components, wires from a given equipment or PCB.

NOTE: Demonstration Boards for the above components should be made.

8. Demonstrate (or explain) the joining (or connecting) methods or/and mounting and dismantling method as well as uses of the items mentioned below:
a) Various types of single, multi-cored insulated screened pour, Audio video, general purpose wires/cables
b) Various types of plugs, sockets, conn4ectors suitable for general purpose audio video use. Some of such connectors area : 2 and 3 pin mains plug and sockets, Banana plugs and sockets, BNG, RCA, DIN, UHF, Ear phone speaker connector, telephone jacks and similar male and female connectors and terminal strips.
c) Various types of switches such as : normal/miniature toggle, slide, push button piano k4ey, rotary, SPST,SPDT,DPST,DPDT, band selector, multi-way Master Mains Switch.
d) Various types of protective devices such as : Wire fuse, cartridge fuse, slow acting/fast acting fuse, HRC fuse, thermal fuse, single/multi-pole miniature circuit breakers, over and under current relays.

9. Explain (or demonstrate) various methods of making and laying of cable forms, wiring techniques

10. Field visits

11. Electric Shop

- Demonstration of tools commonly used in Electric Shop
- Safety precaution, electric shock treatment
- Demonstration of common Electric material Material like : wires, fuses, ceiling fans, batteries, ciets and allied items
- Demonstration of voltmeter, Ammeter, Multimeter & Energy meter
- Job : Wiring Practice in batten wiring, plastic casing-capping and conduit
- Job : Control of one lamp by one switch
- Job : Control of one bell by one switch
- Job : Assemble a Tube light
- Job : Dismantle study, find out fault, repair the fault, assemble and test domestic appliances like Electric Iron, Electric Mixer, Ceiling & Table fan, Tube light, Water heater (Geyser) and desert cooler
- Job : Laying out of complete wiring of a jpise (Single-phase and Threephase)