



SUMMER – 13 EXAMINATION

Subject Code: 12234

Model Answer

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**Important Instruction to examiners:**

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more importance. (Not applicable for subject English and Communication Skills)
- 4) While assessing figures, examiner may give credit for principle components indicated in a figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case some questions credit may be given by judgment on part of examiner of relevant answer based on candidate understands.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.

**Important Note: - For this subject there is no Textbooks OR Reference books so examiner should consider equivalent answers also & do not sticks up with model answer.**

**Q.1. A) Attempt any Three of the following**

**12 Marks**

**i) Write the procedure for soldering.**

**(Marks-4)**

**Procedure of Soldering:**

- i) Solders are metallic substances which have lower melting points than metals they are to joint together.
- ii) Two surfaces to be joined by the introduction of molten metal which has penetrated into the surfaces.
- iii) The solder is alloy of lead and tin.
- iv) It melts at a comparatively low temperature.
- v) The grade of solder most suitable for electrical joints is 60% tin and 40% lead. Before soldering the surface should be cleaned to expose the bare metal and make it free from grease.



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ii) Explain common faults in electrical equipments.

1) Open circuit fault :-

( 1 mark)

Connect test lamp between phase & neutral then check the lamp glow or not.

2) Short circuit fault:-

Connect test lamp between phase & neutral then check the lamp glow

Bright or not.

(1 mark)

3) Earth fault :-

Connect test lamp between neutral & body then check the lamp glow or not.

(1 mark)

4) Defective power cord :-

Check continuity of power cord, if not then change it.

(1 mark)

**Note:** - If answer is written w.r.t. any particular device / equipment then it should be Consider.

iii) List the part of automatic iron. State the function of each part.

The following parts of Automatic iron: (Any four parts expected each part- 1 Mark)

1. Base Plate:

- It is made of cast iron.
- Its bottom is nickel plated to avoid rust on which heating element rests.

2. Heating Element:

- It is made of nicrome wire.
- It is wounded on mica sheet.
- The bottom & the top of the element is covered with thick mica-sheets.
- This element is kept under the pressure plate (weight)
- These are available in different wattage like 450W, 750W, 1000W

3. Pressure Plate:

- It is made of cast iron.
- It sets and presses the element on the base plate with the help of screw & nuts.
- If pressure plate is kept loose the element will fuse quickly.



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4. Handle:

- It is made of wood or Ebonite.
- It is fitted on the iron cover with the help of screw & nuts.

5. Terminal housing:

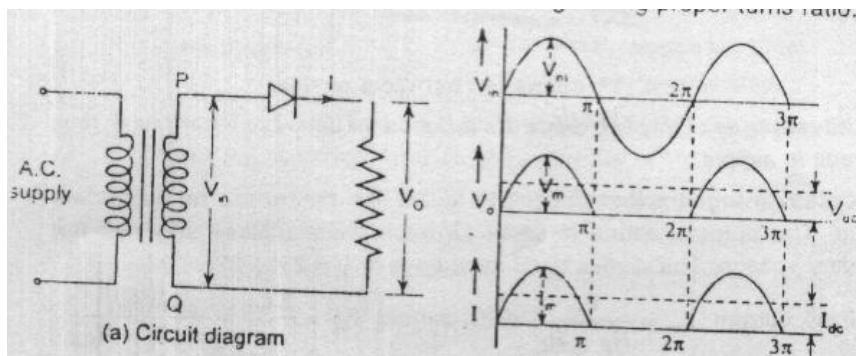
- This is fitted with nuts with iron case & insulated with porcelain on the both side of the iron.
- The heating rate of such iron depends upon the wattage.

6. Thermostat:

- This control device is used along with adjusting screw. A thermostat is a bimetallic molded plate.
- It interrupts the supply at certain pre-defined value of temperature.

iv) Explain any one type of rectifier circuit with neat diagram. (Explanation-2 Mark & Figure-2 Mark)

1) Half Wave Rectifier:-



or equivalent diagram

- Transformer: - It is used to step-up to step-down the voltage.
- Diode: - It will conduct when it is forward biased.

OR



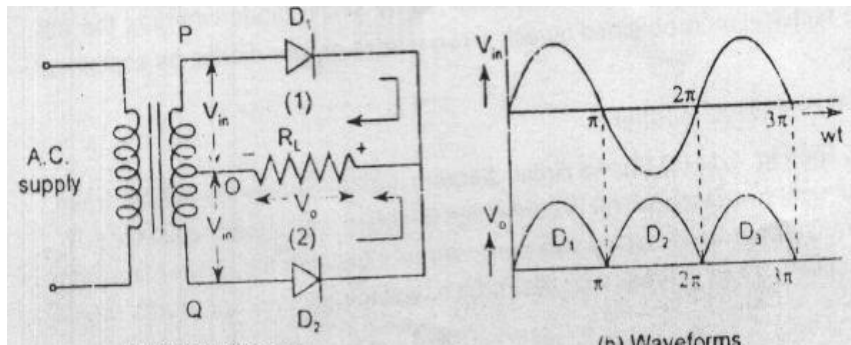
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2) Centre tapped full wave rectifier:-



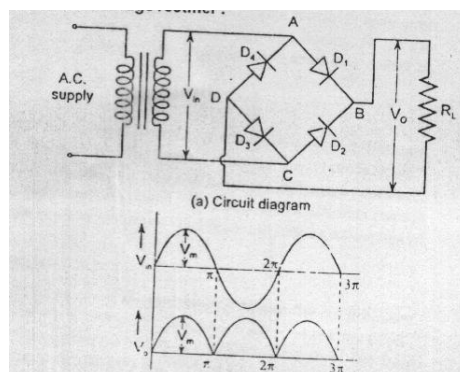
or equivalent diagram

D1 & D2 are diodes

Transformer & diodes are used their function is same as above.

OR

3) Full Wave bridge Rectifier:-



or equivalent diagram

Function of parts is same as above.

Any one from above three rectifier circuits, each have 4 marks.

Q.1. B) Attempt any one of the following

06 Marks

i) Explain different materials used in electrical equipments with their properties of characteristics.

(Each materials & their properties -2 Mark each)

a) Conductor: - (Any one expected)

i) Solid conductor- e.g. – Aluminum, copper.

ii) Liquid conductor- e.g. – Mercury, sulphuric acid.

iii) Gaseous conductor- e.g. – Helium, Neon



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**Properties or characteristics of conductor: - (Any two expected)**

1. Low resistance
2. High tensile strength
3. It should not affect by corrosion due to air or rain etc.
4. Easy to soldering.
5. Cost is low & easily available in market
6. When current flowing through the conductors it will get heated, therefore is not affected by heat

**b) Insulator – (Any one expected)**

- i) Solid Insulator- e.g. – Mica, porcelain
- ii) Soft Insulator - e.g. – Rubber, paper.
- iii) Liquid Insulator - e.g. – Varnish

**Properties or characteristics of Insulator: - (Any two expected)**

1. It has high resistance and specific resistance.
2. High dielectric strength
3. Good mechanical strength
4. May not get change due to temperature.
5. Withstand high temperature.
6. May not absorb water.
7. Condition gets fire easily.

**c) Semi conductor – e.g. diode, triac, etc**

**Properties or characteristics of Insulator: - (Any two expected)**

1. High specific resistance.
2. Low temperature co-efficient of resistance
3. Good mechanical strength
4. Good ductility
5. High melting point
- 6.



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ii) List the parts of automatic Washing Machine. State the function of each part.

**(List of parts any three expected-3 Marks each & any three parts function- 3 Marks each)**

**List the part automatic Washing machine: (Any three expected)**

1. Wash timer
2. Wash Selector
3. Spin Shower selector
4. Cycle Selector
5. Spin Timer

**Function: (Any three expected)**

1. **Wash timer:** The function of the wash timer is to select desired time for washing or rinsing in wash tub.
2. **Wash Selector:** There are two actions selected during the washing of the clothes. Set the selector to 'Strong' for sturdy fabrics or to 'regulator' for normal fabrics.
3. **Spin Shower selector:** There are two ways for selection. Select either 'spin shower' or 'wash tub fill'
4. **Cycle Selector:** For washing or rinsing in the wash tub, cycle selector sets wash rinse or drain respectively.
5. **Spin Timer:** The function of spin timer is to select spinning the time during the washing procedure.



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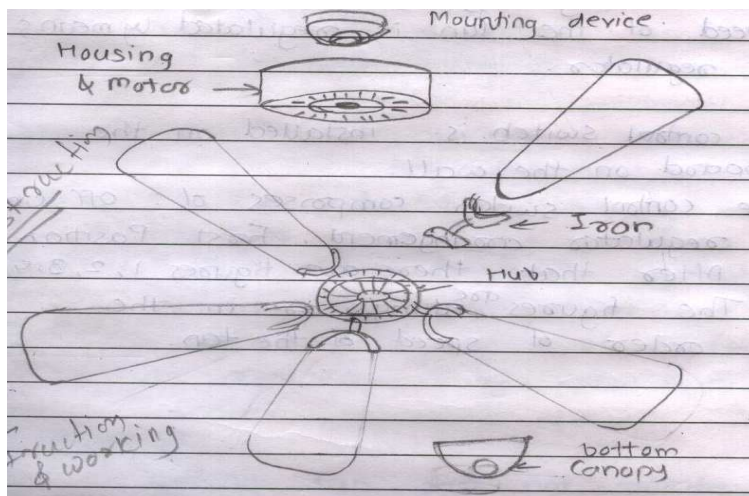
Q.2 Attempt any Two of the following

**16 Marks**

a) Explain construction and working of ceiling fan.

**(Figure-2 Mark & Construction 3 Marks & Working-3 Marks)**

**Ceiling fan:-**



or equivalent diagram

**Construction of ceiling fan:-**

A ceiling fan consists of few basic parts namely Electric motor housing, blades, down rod or other mounting device, bottom canopy a control that is wall mounted or a hand held speed regulator, Condenser.

**Working of ceiling fan:-**

1. The ceiling fan is propeller blade fan having two or more blades driven by an electric motor.
2. The type of motor used in the ceiling fan either shaded pole type or capacitor type.
3. A capacitor run motor consists of two windings i.e. starting winding & running winding.
4. The speed of the fan is regulated by means of speed regulator.
5. The control switch is installed on the switch board on the wall.
6. The control switch comprises of; off. On & speed regulator arrangement.





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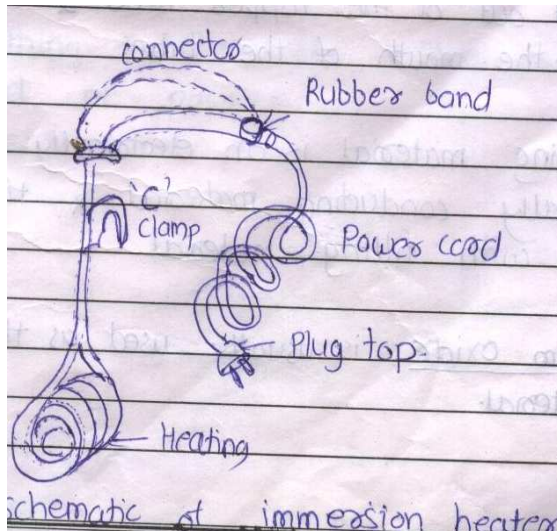
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b) Explain construction and write common faults of Immersion type water heater.

(Figure -2 Marks & Explanation of Construction 3 Marks & Common Fault 3 Marks)



OR  
or equivalent diagram

**Construction of Immersion type water heater:**

- An immersion heater is an appliance used to heat water or some liquid kept in a container.
- The immersion heater is partially immersed in water or the liquid and is switched on and then the water or the liquid gets heated.
- They work with 220V, AC power supply. Rating usually from 250watt to 2 kilowatt
- High capacity immersion heaters are sometimes permanently installed in tank or vessels in industries to heat liquid & viscous materials. They have sophisticated control features like automatic on/off feature etc.
- A basic immersion heater is seamless copper tube in suitable shape. The copper tube is chrome plated.
- The heating element is a nicrome coil. The heating element is stretched concentrically inside the seamless copper tube.
- The end terminals of the heating element are brought out of the copper tube & are sealed at the mouth of the tube.





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- The filling material is an electrically insulating but thermally conducting material & the tube is fitted with filling material. (Magnesium oxide is usually used as the filling material)

**Common faults of Immersion type water heater: (Any two points expected)**

- Immersion type water heater does not working.
- Heater & water to be heated gives shock.
- Fuse blows while using water heater.
- Defective power cords

**c) Explain possible faults of DVD with Remedies (any four expected) (1 Marks each point)**

S.No	Fault	Remedies
1	DCD player totally dead	1. Check AC plug and switch 2. Check mains cord 3. Check AC fuse 4. Check on-off switch and its connections 5. Check power supply section 6. Check micro controller IC section
2	Fuse blows off	1. Check mains cord 2. Check transformer (AC mains transformer) 3. Check rectifier diodes 4. Check filter capacitor 5. Check voltage regulator IC 6. Check SMPS transformer
3	No Disc Display	1. Check disc position 2. Check lens and its connector 3. Check sled drive mechanism 4. Check limit switch 5. Check total optical sensor unit 6. Check spindle motor table adjustment 7. Check lens supply. 8. Check all connections of various sections
4	Tray does not get open/close	1. Check loading motor 2. Check loading, motor pulley, belt 3. Check supply to loading motor 4. Check connector of loading motor 5. Check in/out command micro switch 6. Check tray is properly fitted in gear 7. Check Micro-controller section
5	Damages of disc	1. Check spindle table height setting 2. Check lens and its adjustment 3. Check any bend/broken in mechanism

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6	Disc spins in wrong direction	1. Check lens (Defective lens) 2. Tracking adjustment not proper. 3. Check motor and its connections 4. Check supply of motor from power supply.
7	DVD player operates but no display	1. Check supply display 2. Check display tube. 3. Check display connector 4. Check any short on display panel.
8	Front control panel not working	1. Check Micro switches 2. Check connector of front panel control 3. Check supply of front panel control 4. Check any dry solder on panel control.
9	VCD player not operate on remote	1. Check remote control battery 2. Any dry solder in R/C. 3. Check IR led of R/C 4. Check supply of sensor 5. Check connector of front control panel
10	Automatic Open/Close of tray	1. Check pen/close micro switch 2. Check alignment of loading gear. 3. Check alignment of disc tray 4. Check drawer drive motor
11	Humming Sound	1. Check AC transformer 2. Check filter capacitor. 3. Check rectifier circuit. 4. Check audio output amplifier circuit
12	Audio without video	1. Check Video output socket 2. Check connector of video output section 3. Check disc –moving pulley. 4. Check video output amplifier section.
13	Video without audio	1. Check audio output socket. 2. Check connector of audio output secondary 3. Check selector switch of audio mode. 4. Check audio output amplifier section.
14	Audio/Video not available at RF socket	1. Check supply of RF modulator section 2. Check RF output connector 3. Check for dry solder in RF output section 4. Check RF output socket
15	Poor picture/deemed picture	1. Check disc 2. Check for dry solder at video output section 3. Player may be in moisture condition 4. Defective lens.



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**Q.3 Attempt any Four of the following**

**16 Marks**

**a) Enlist any four effects of electric current with one example for each.**

**Effects of an Electric current -**

1) Heating effect –

e.g. – Electric Heater/Electric Iron / Geyser etc.

**(1 mark)**

2) Magnetic effect –

e.g. – Electric Bell etc.

**(1 mark)**

3) Chemical effect –

e.g. – Battery charging etc.

**(1 mark)**

4) Lighting effect –

e.g. – Electric bulb etc.

**(1 mark)**

**b) Electric fan is not working. Write steps for locating faults using multimeter.**

**(Any Four locating Faults 1 Marks each )**

**Electric fan is not working due to following faults**

- Open circuit fault.
- Short circuit fault.
- Defective condenser.
- Earth leakage fault.

**Steps for locating above faults using multimeter**

- **Open circuit Test:** - connect multimeter probes in series with starting winding (or Running winding) if meter shows infinity reading then there is an open circuit.
- **Short circuit Test:** - connect multimeter probes in series with starting winding (or Running winding) if meter shows zero reading then there is a short circuit.
- **Defective Condenser:-** Set multimeter to RX10 or RX1K scale & connect the terminal to the condenser, if condenser is defective the pointer is rest on zero on the scale & remains stationary at zero point which is an indication that the capacitor is shorted.



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- Earth leakage fault: - connect multimeter probes with one terminal to starting winding (or Running winding) & other terminal to body of the electric fan if meter shows zero reading then there is a earth leakage fault.

**c) Estimate the cost of repairing of mixer if motor is out of order.**

**Note: Rate depending upon the motor company**

**(4 Marks)**

Name of firm: - ABC

Job No. XX

Job Name: - Repair of Mixer Motor.

Date: xx/xx/xxxx

Date of delivery: - xx/xx/xxxx

Details of job: - Replacement of Mixer motor

Sr. No.	Item	Rate	Quantity	Total	Remarks
1	1-ph, 230V Motor (universal motor)	500.00	01	500.00	
2	Testing Charges	250.00		250.00	
3	Taxes @ 5 % VAT	38.00	-	38.00	
	Total =			788.00	

Delivery taken by

Manager

(Sign of Customer)

**d) Write two names of IC's for each of the following i) Timer ii) Amplifier ( 2 Marks each)**

**1. Name of IC for Timer:** 1) IC 555 2) IC 7555 3) IC 8051 4) IC 556

**2. Name of IC for Amplifier –** 1) IC 810 2) IC 741



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e) Give any four problems when battery operation is affected.

(Any four point expected 1-Mark each point)

S.No	Troubles	Causes	Remedies
1	Battery is not registering charging current	a) Discontinuity in charging on account of blown fuses, loose connections	a) Check charging circuit thoroughly, replace blown fuse, tighten connection and repair breaks
2	Battery is giving low output than its rated capacity	a) Plates have outlived their life. b) Active material has got detached from positive plates. c) contaminated electrolyte d) Sulphation of plates. e) Heavy self discharge. f) Low operating temperature.	a) Change plates. b) Change plates if shedding is considerable. c) Wash out the cell and fill it with non contaminated electrolyte. d) Battery may be charged to restore the capacity. e) Inspect the cells, clean and dry them. f) To avoid loss of heat use lagging increase specific gravity of the electrode.
3	Cell does not register voltage across its terminals	a) Short circuited. b) Heavy leakage or self discharge. c) Sulphation	Remove the cause of the short circuit of the cell. Clean and dry it and charge the cell.
4	Very high temperature being experienced during charging.	a) Charging rate very high. b) Regulator i.e ampere hour meter not set correctly. c) Charging has not stopped automatically. d) Short circuit in the cell e) Heavy sulphation	a) Discontinue charging and reduce the charging voltage. b) Check and correctly set the meter. c) Check timing mechanism and take remedial measures. d) Remove the cause of short circuit. e) De-sulphation charging be resorted to.
5	Heavy gassing during early stage of charging	a) Sulphation b) Heavy charging current. c) Battery is being charged at very low temperature.	a) De-sulphation charging be resorted to. b) Reduce charging currents. c) Warm the surrounding so as to increase the temperature of battery.
6	Very high temperature being experienced on discharge	a) Ambient temperature too high. b) Loads are excessive and capacity of the battery is less c) Battery not fully charged before it is put into service.	Take the remedial measures for decreasing ambient temperature of installation of correct size of battery or topping of cells.



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		d) Level of the electrolyte is low.	
7	Heavy gassing during discharging	Contaminated electrolyte	Replace the electrolyte
8	Level of the electrode gets low too early	a) Cracked cell jars b) Topping has been overlooked. c) Heavy charging.	a) Check and replace jar. b) Topping should be done regularly. c) Reduce charging rates.
9	Cell voltage unequal	a) Over discharge. b) One of the cells has got short circuit. c) Electrolyte level low. d) Positive plates worn out. e) Too much active material has been shedded.	a) Give equalization charge. b) Remove short circuited. c) Pay attention to the topping of the cells. d) Replace the plates or the cell. e) Replace the plates or the cell.
10	Unequal specific gravity in various cells	a) Cracked jars. b) Strength of the electrolyte different in various cells. c) Neutralization material in the cells	a) Replace the jars. b) Replace the electrolyte and add correct electrolyte. c) Replace the electrolyte. Jars should be cleaned and dried.

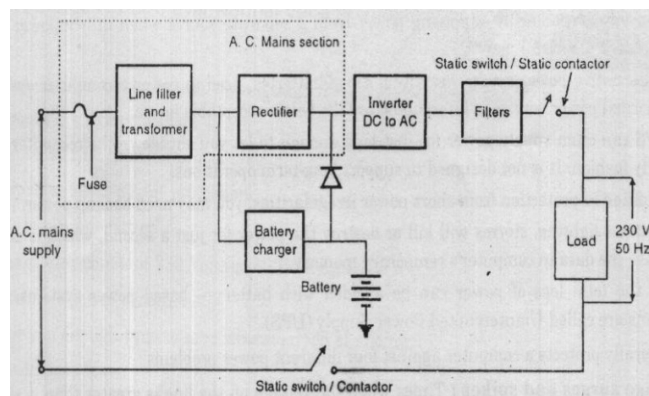
**Q.4. A) Attempt any Three of the following**

**12 Marks**

**i) Draw block diagram of UPS and explain function of each block**

**(2 Marks Diagram & Functions 2 Marks)**

**Block dia. Of UPS-**



**or equivalent diagram**

**1) A.C. main section-**

It receives A.C. supply filters it & rectifies it to desired level.

**2) Inverter & Filter –**

It is flexible section when power is there; it delivers const. 230v, A.C. supply



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3) **Battery & Battery charger unit –**

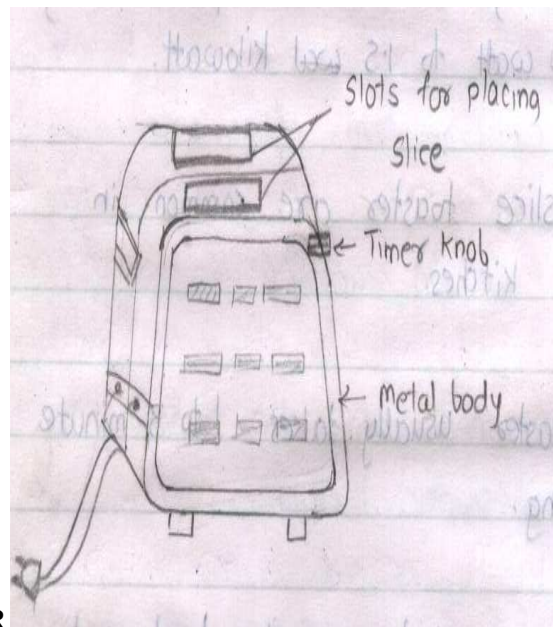
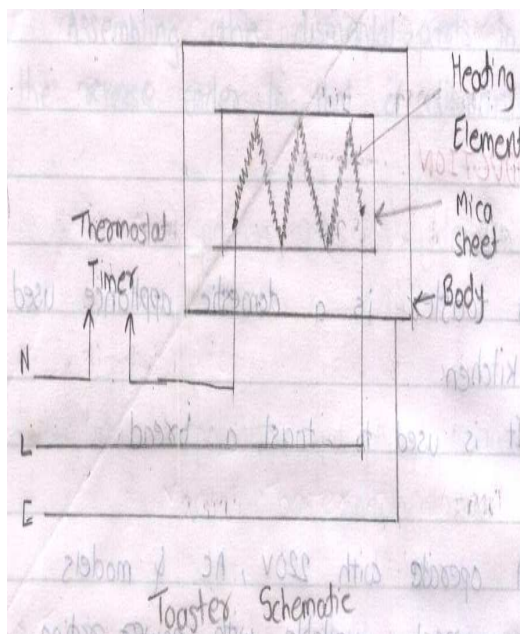
When supply is available it charges the battery through battery charger circuit.

4) **Static switches –**

When power fails inverter is connected to load with the help of static switch.

- ii) **Draw neat diagram of electric toaster and write the procedure of testing it for different faults.**  
**(2Marks for Diagram & 2 Marks for Procedure of Testing)**

**Diagram of electric toaster:**



OR

**or equivalent diagram**

**The procedure of testing it for different faults:**

**1) Open circuit fault:-**

Connect test lamp between phase & neutral then check the lamp glow or not.

**2) Short circuit fault:-**

Connect test lamp between phase & neutral then check the lamp glow

Bright or not

**3) Earth fault :-**

Connect test lamp between neutral & body then check the lamp glow or not.

**4) Defective power cord :-**

Check continuity of power cord, if not then change it.





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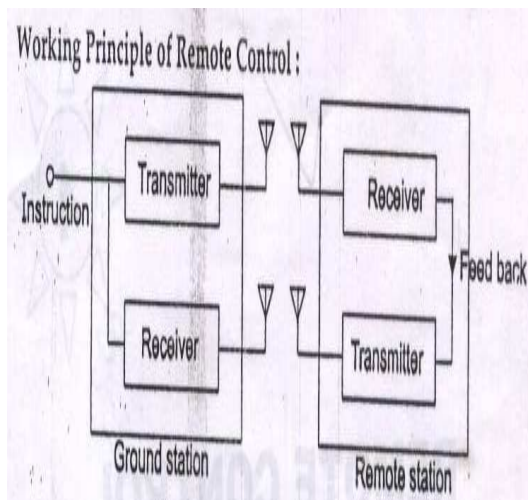
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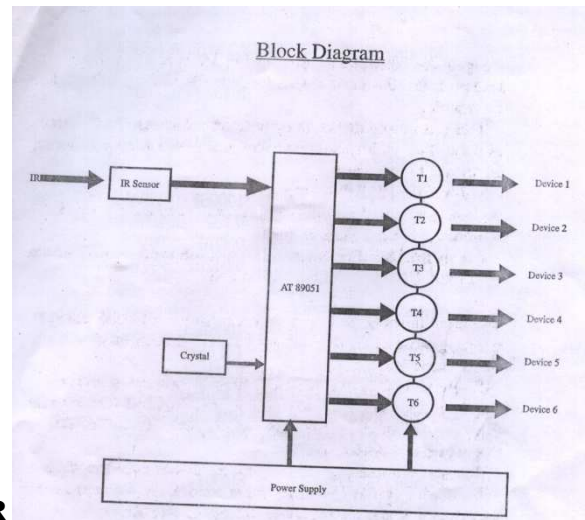
iii) Give operating principle of Remote control with neat block diagram.

( 2 Marks for Diagram & 2 Marks for operating principle Working)

**Block Diagram of Remote Control:**



OR



**or equivalent diagram**

**Working Principle of Remote control:**

1. Remote control used for satellite, space science study such as measurement of weather condition humidity rainfall etc. of various areas is completely different process than remote control used for consumer product.
2. It is two way communication system here both the station have both transmitter and receiver.
3. Figure shows basic structure of remote control .Instruction to be transmitted from ground station is fed to it.
4. Transmitted signal are in form of pulse code modulation having carrier frequency in GHz or microwave frequency to avoid distortion and noise for long distance communication.
5. The signals are received at remote station by the receiver which always tuned at ground station transmitter frequency.
6. The instruction are decoded and fed to machinery to be operated.
7. Then feedback may be either instruction or data about temperature or rainfall which is then sent by transmitter of remote station to ground station.



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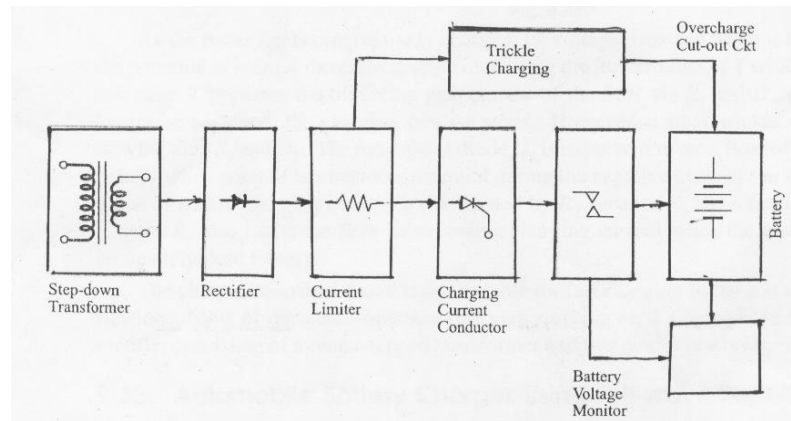
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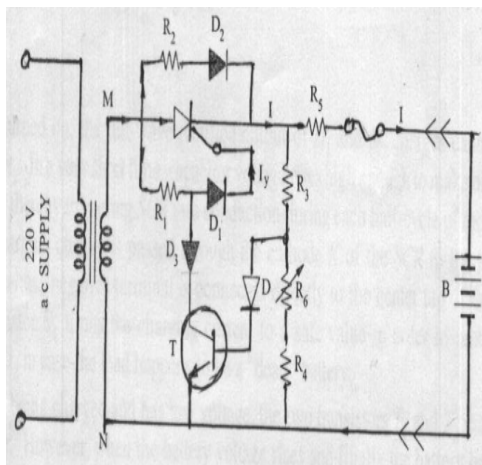
8. Here also receiver of ground station is tuned to transmitter frequency of remote station hence signal is received and then instruction is transmitted.

iv) Draw neat labelled circuit diagram for battery charger unit.

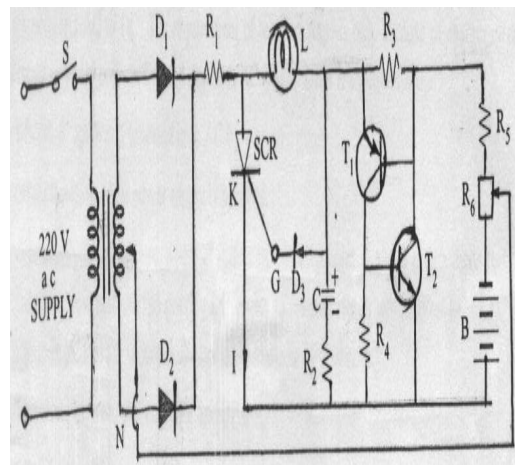
(4 Marks)



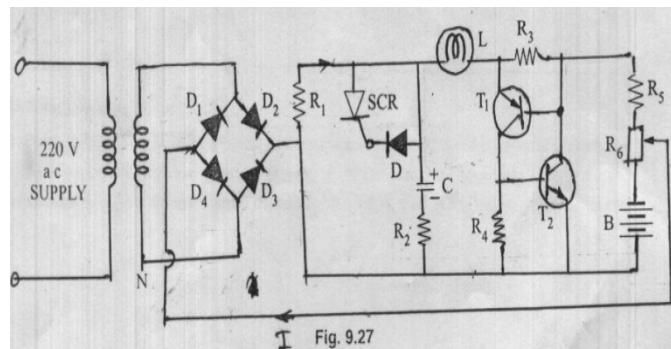
OR equivalent diagram



OR



OR equivalent diagram



or equivalent diagram



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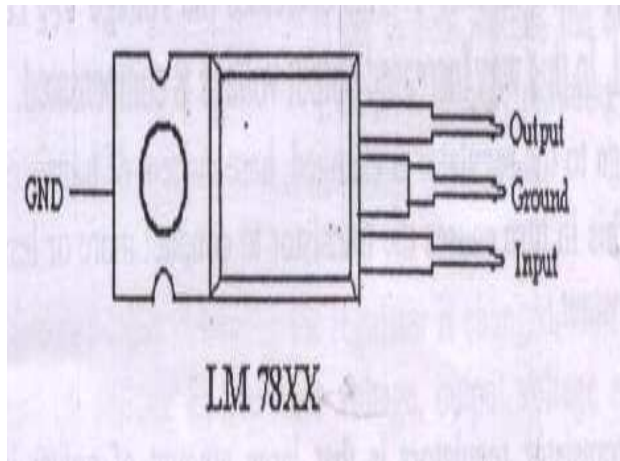
Q.4. B) Attempt any One of the following

06 Marks

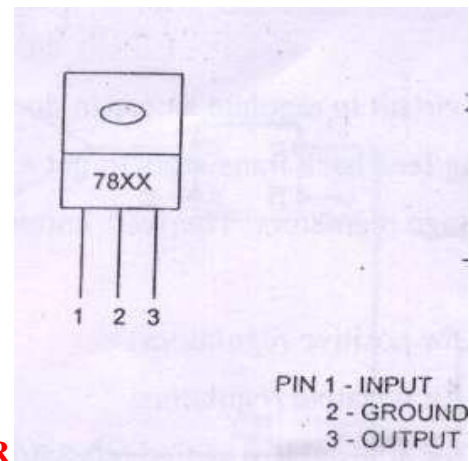
i) Draw a pin diagram for 78XX regulator IC.

( 6 Marks)

Pin Diagram for 78XX regulator IC:



OR



or equivalent diagram

ii) An air cooler is not working. List the possible faults with their remedies.

( Any Three point expected 2 Marks each )

S.No	Faults	Remedies
1	Blower does not throw cool air	1. Check the water level indicator. Float & fill the water in the water tank if exhaust or less
2	Pump may be not working properly	1. Check & replace 2. Check & clean the pump 3. Check & change the connection to get correct rotation
3	Motor fails to start	1. Check the cord with test lamp & replace 2. Check the connection & correct them 3. Check the motor with test lamp or megger or replace it.
4	Cooler gives shock	1. Check & tight 2. Check the motor with test lamp & remove the defects



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**Q.5 Attempt any Two of the following**

**16 Marks**

**a) Estimate the cost of repair of following equipments i) Automatic iron ii) Ceiling Fan**

**(Automatic iron-4 Mark & Ceiling fan-4 Marks)**

**i) Estimating the cost of repairing of automatic electric iron.**

Name of firm: - ABC

Job No. XX

Job Name: - Repair of automatic iron.

Date: xx/xx/xxxx

Date of delivery: - xx/xx/xxxx

Details of job: - Automatic electric iron

Sr. No.	Item	Rate	Qty	Total	Remarks
1	Material used Heating coil	300.00	01	300.00	
2	Testing Charges	100.00		100.00	
3	Taxes @ 5 % VAT	15.00	-	15.00	
	Total =			415.00	

Delivery taken by  
(Sign of Customer)

Manager

**ii) Estimating the cost of repairing of Ceiling Fan.**

Name of firm: - ABC

Job No. XX

Job Name: - Repair of Ceiling Fan.

Date: xx/xx/xxxx

Date of delivery: - xx/xx/xxxx

Details of job: - Ceiling Fan

Sr. No.	Item	Rate	Quantity	Total	Remarks
1	Material used : Winding charges	400.00	01	400.00	
	Replacement of bearing	75.00	02	150.00	
	Replacement of condenser	30.00	01	30.00	
2	Testing Charges	100.00	-	100.00	
3	Taxes @ 5 % VAT	35.00	-	35.00	
	Total =			715.00	

Delivery taken by  
(Sign of Customer)

Manager



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b) Explain different methods of Jointing (any two)

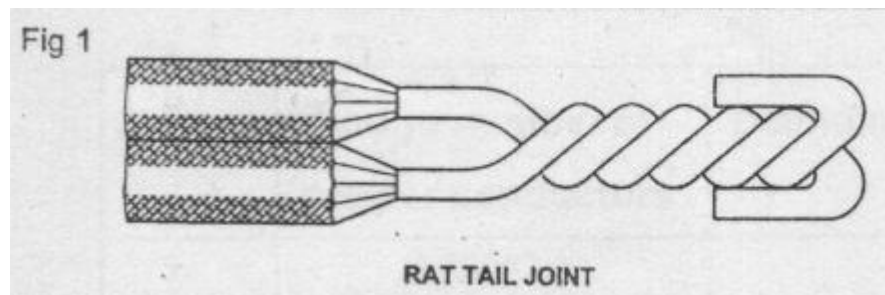
In electrical work different types of joints are used.

(Any two joints - 4 Marks each joint)

- 1) Pig – tail or rat-tail or twisted joints.
- 2) Married joint.
- 3) Tee joint.
- 4) Britannia joint.
- 5) Western union joint.
- 6) Scarfed joint.
- 7) Tap joint.

1) **Pig – tail or rat-tail or twisted joints -**

**RAT – TAIL JOINT**



**or equivalent fig.**

This type of joint is suitable for pieces where there is no mechanical stress on the conductors. This type of joint is found in the junction box or conduit accessories box. These joints maintain good electrical conductivity.

**OR**

**Married joint –**



**or equivalent fig.**



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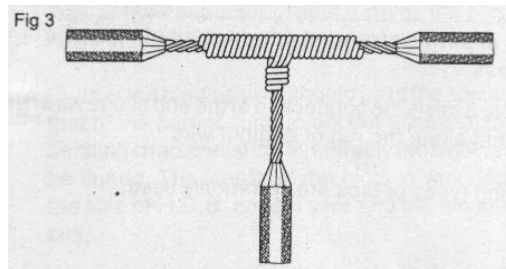
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This type of joint is used in places where appreciable electrical conductivity is required along with compactness, the mechanical strength for this joint is less. This joint is used at places where tensile stress is not so more.

**OR**

**2) Tee joint –**



or equivalent fig.

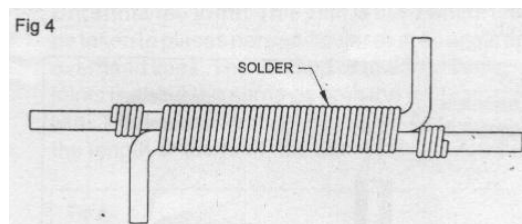
This type of joint is used in overhead distribution lines where the electrical energy is to be tapped for service connection.

**OR**

**3) Britannia joint –**

- \* Britannia straight joint
- \* Britannia tee joint

**\* Britannia straight joint –**

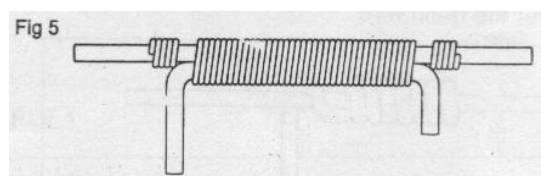


or equivalent fig.

This joint is used in overhead lines where considerable tensile strength is required. It is also used for both inside & outside wiring where single conductors of diameter 4 mm or more are used.

**OR.**

**\* Britannia tee joint –**



or equivalent fig.



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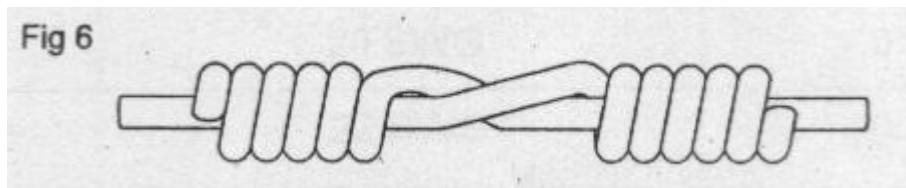
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This joint is used for overhead lines for tapping the electrical energy permanently to the service lines.

OR

4) **Western union joint –**

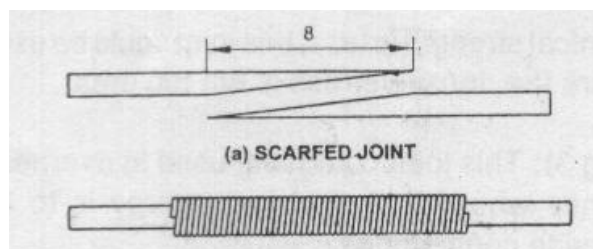


or equivalent fig.

This joint is used in overhead lines for extending the length of wire where the joint subjected to considerable tensile stress.

OR

5) **Scarfed joint –**



or equivalent fig.

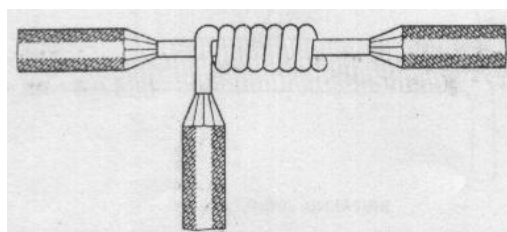
This joint is used in large single conductors where good appearance and compactness are the main considerations. This joint is not subjected to appreciable tensile stress. For indoor wiring for earth conductors this joint is used.

OR

6) **Tap joint –**

Commonly used tap joint.

i) **Plain tap joint –**



or equivalent fig.

This type of joint is most frequently used and is quickly made. Soldering makes the joint more reliable.





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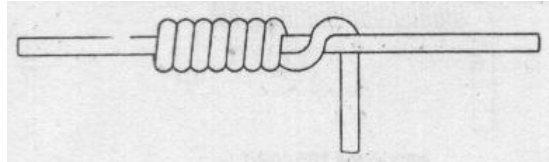
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OR

ii) **Aerial tap joint –**

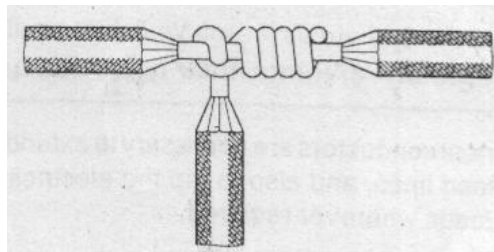


or equivalent fig.

This type of joint is used for wires where there is a considerable movement. Therefore it is left without soldering for low current circuits only. In this type of joint there is tapping of wire for a long distance over a main wire. The wire is twisted in such a fashion that there should be a free movement of the tap wire over the main wire.

OR

iii) **Knotted tap joint –**

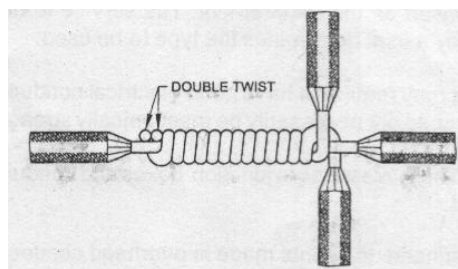


or equivalent fig.

This type of joint is used where there is a considerable tensile stress. Duplex

OR

iv) **Cross – tap joint -**



or equivalent fig.

This type of joint is used where two wires are to be tapped at the same time.

This type of joint is used where two wires are to be tapped at the same time.

OR



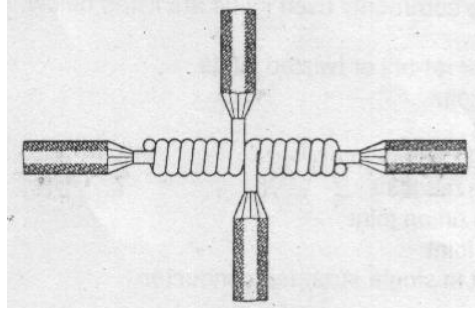
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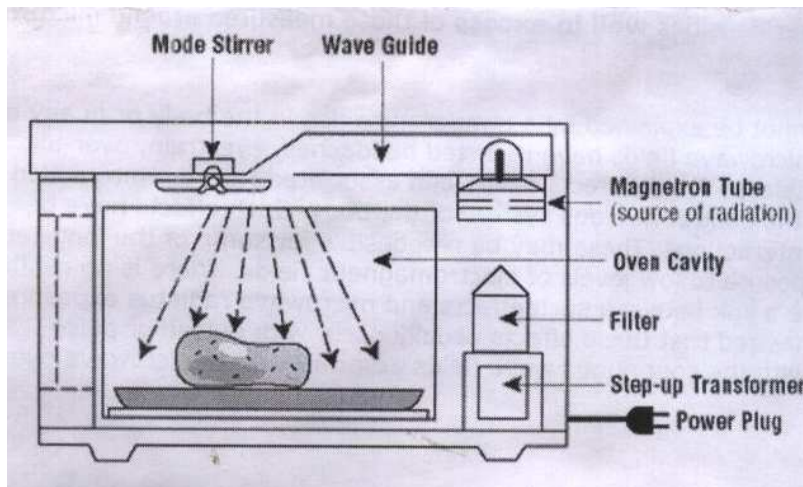
v) Double-cross tap joint -



or equivalent fig.

This is a combination of two plain taps.

c) Explain principle construction and operation of microwave oven. (Diagram- 1 Marks,  
Principle-1 Mark, construction-3 Mark & operation -3 Marks)



or equivalent fig.

**Principle of Microwave oven:**

1. Microwaves are a form of electromagnetic radiation.
2. Electromagnetic radiation is the flow of photons through space in the form of electric & magnetic fields

**Construction of Microwave oven:**

1. Oven light: for illuminating the interior of the oven so that the food being heated can be examined visually through door window without opening the door & also serve as cook indication.



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2. Blower Motor: Drives the fan which helps to cool the surrounding of the magnetron assembly.
3. Magnetron tube: For generating high frequency microwaves of 2450 MHz required for microwave oven.
4. Thermocut out: To prevent damage to magnetron of an overheated condition develop in the tube.
5. Power transformer: For providing low & high voltage AC for filament winding & magnetron voltage doubles circuit.
6. Mode Stirrer: Used to spreads the microwave energy more or less evenly throughout the oven

**Operation of Micro oven:**

1. Food with high moisture content will absorb microwave energy. As microwave energy with high frequency enters the food molecules align themselves with the energy.
2. Since the microwave are changing polarity even half cycle the food molecules are changing direction every half cycles or oscillating.
3. This high frequency oscillations causes friction building between the molecules there by converting microwave energy to heat.
4. This heat cooks or warms up the food.

**Q.6 Attempt any Four of the following**

**16 Marks**

- a) Which type of material is used in making elements of heating appliance? State its characteristics

**Type of material is used in making elements of heating appliance:**

**(Any four expected 1/2 marks each)**

1. Nichrome
2. Constantan or Eureka
3. Nickel-Chromium ferrous (Iron)



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4. Iron (chromium- aluminium kanthal)
5. Silicon carbide
6. Tungsten
7. Platinum
8. Carbon

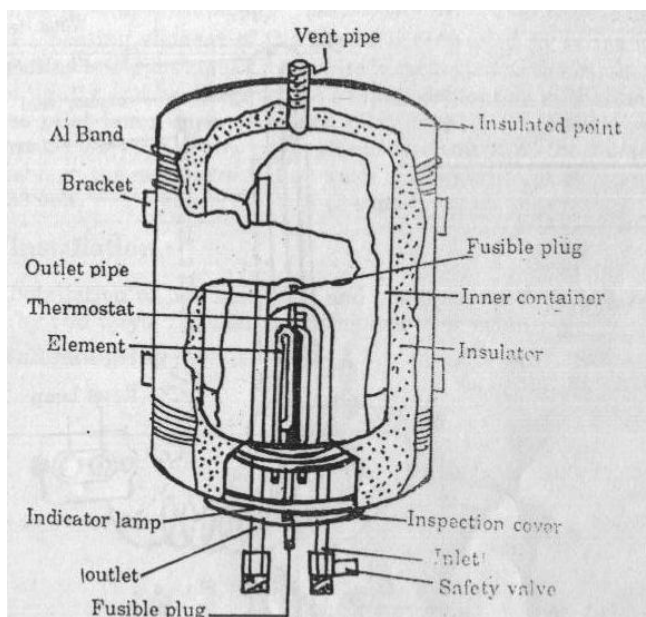
**Characteristics of heating Element:**

**(Any four expected 1/2 marks each)**

1. High resistivity
2. High melting point
3. High oxidizing temperature
4. High resistance to corrosion
5. Mechanical strength
6. Ductile
7. It should not be brittle
8. Low temperature coefficient of resistance
9. Long life
10. Less costly and easily available

**b) Draw a labelled diagram of Geyser:**

**(4 Marks)**



**or equivalent fig.**



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c) What is LASER? What are its characteristics?

(Meaning -1 Mark & Characteristics-3 Marks)

**LASER:-**

Light amplification by stimulated emission of radiation. The laser is a device that produced a light beam with some remarkable properties.

**Characteristics of LASER – (Any two expected)**

1. Coherence (same phase)- Laser light is perfectly coherent in nature . i.e. the waves are exactly in phase with one another. The emitted photon after getting triggered is exactly in phase with incident photon.
2. Monochromaticity ( same wave length of frequency) –  
The laser light is perfectly monochromatic. The light emitted by laser is much more monochromatic than that of any conventional monochromatic source.
3. Unidirectionality (sharp focus) - Conventional light source emits light in all directions. But laser emits (spreads) light in one direction. The width of laser beam is very narrow and can travel to long distance without spreading. Hence it can be focused sharply.
4. High intensity (extreme brightness)- Since emitted photon and incident photon are in same phase, laser light is much more brighter (intense) than that from any of the conventional source. It can vaporize hardest metal.

d) Remote control of VCD is not working. Suggest possible faults with remedies

(Any four points expected -1 Mark each)

S.No	Faults	Remedies
1	Battery of remote control may be low	Check & Replace the battery by new one
2	There may be problems in transmitter circuits.	Check transmitter circuit & replace or repair it.
3	LED may be faulty	Check & replace LED by new one
4	IR (Infra Red) signals may not be generated	Check & generate IR(Infra Red) signals



e) List eight features of microwave oven. (Any eight expected 1/2 marks each features)

**Features of Microwave oven: (Any eight expected)**

1. Cooking time is short.
2. Timer for setting the cooking time
3. Child lock arrangement
4. Destruction of nutrients is less.
5. No physical change of foods.
6. Melting process is easy
7. Sterilization effect exists.
8. There is no flame
9. Handling is easy.
10. Easy & simple used to with complete function.
11. Pleasant & compact structure
12. Microwave oven uses 75% less electricity than electric oven.

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