IQRA NATIONAL UNIVERSITY PESH.

Sessional Assignment #01

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Subject : Intro. to field Waves and Antenna.

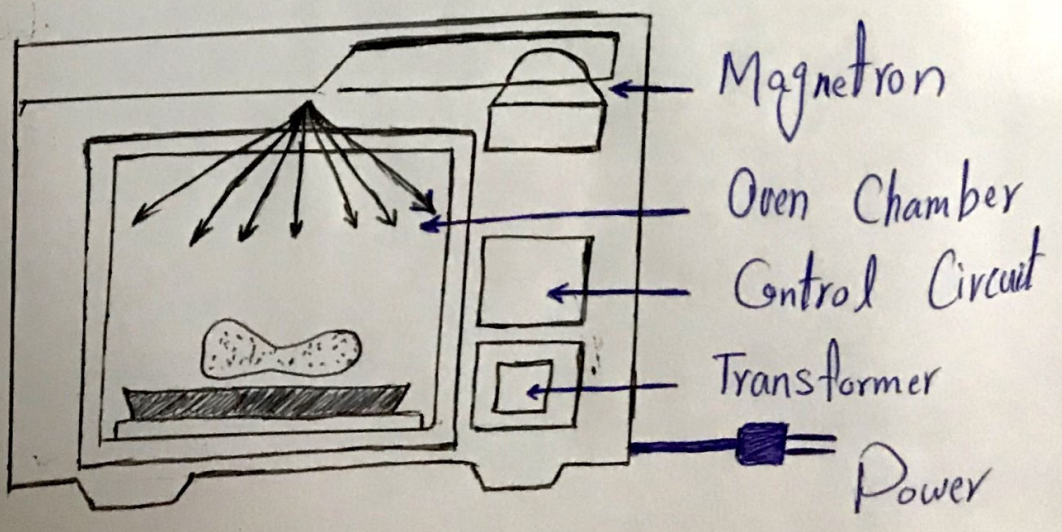
Programe : Bs Telecom

Module : 8th Semester

Q1. Write in detail about the Working Principle of Microwave ovens, fridges, Freezers and Air Conditioners Make a clear diagram of each one of them?

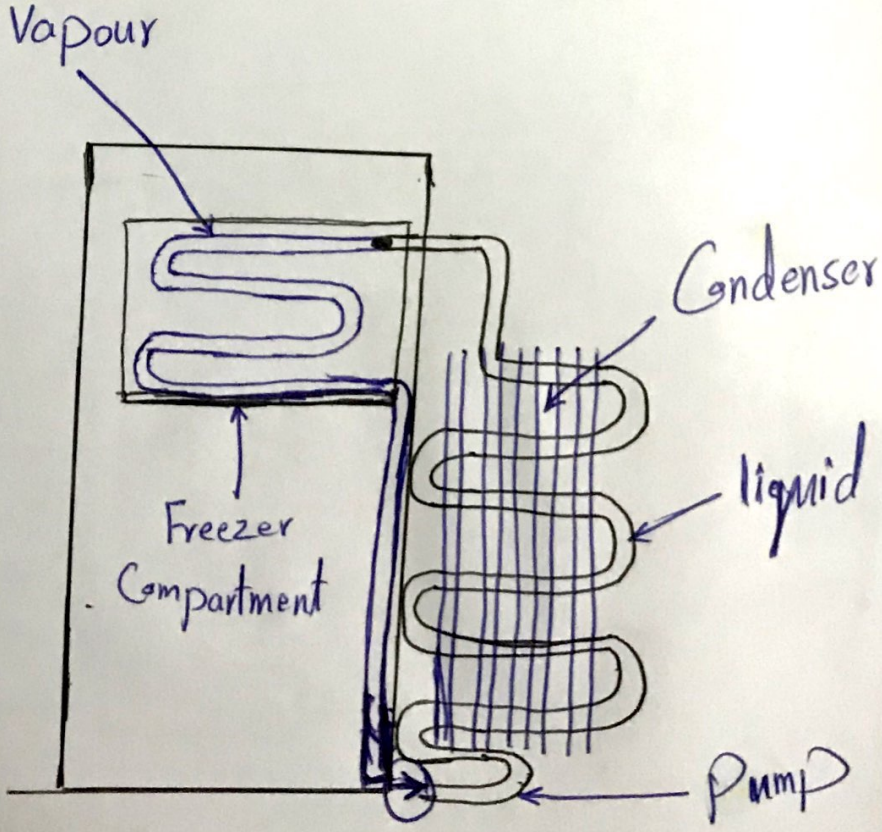
(Ans):- Micro wave Oven =

Microware Oven are So quick and efficient because they channel heat energy directly to the molicules (tiny particles) inside food. Microware heat food like the Sun heats your face by raduction. A microware is a much like the electromagnatic wave that zap through the air from the TV and radio transmitter.



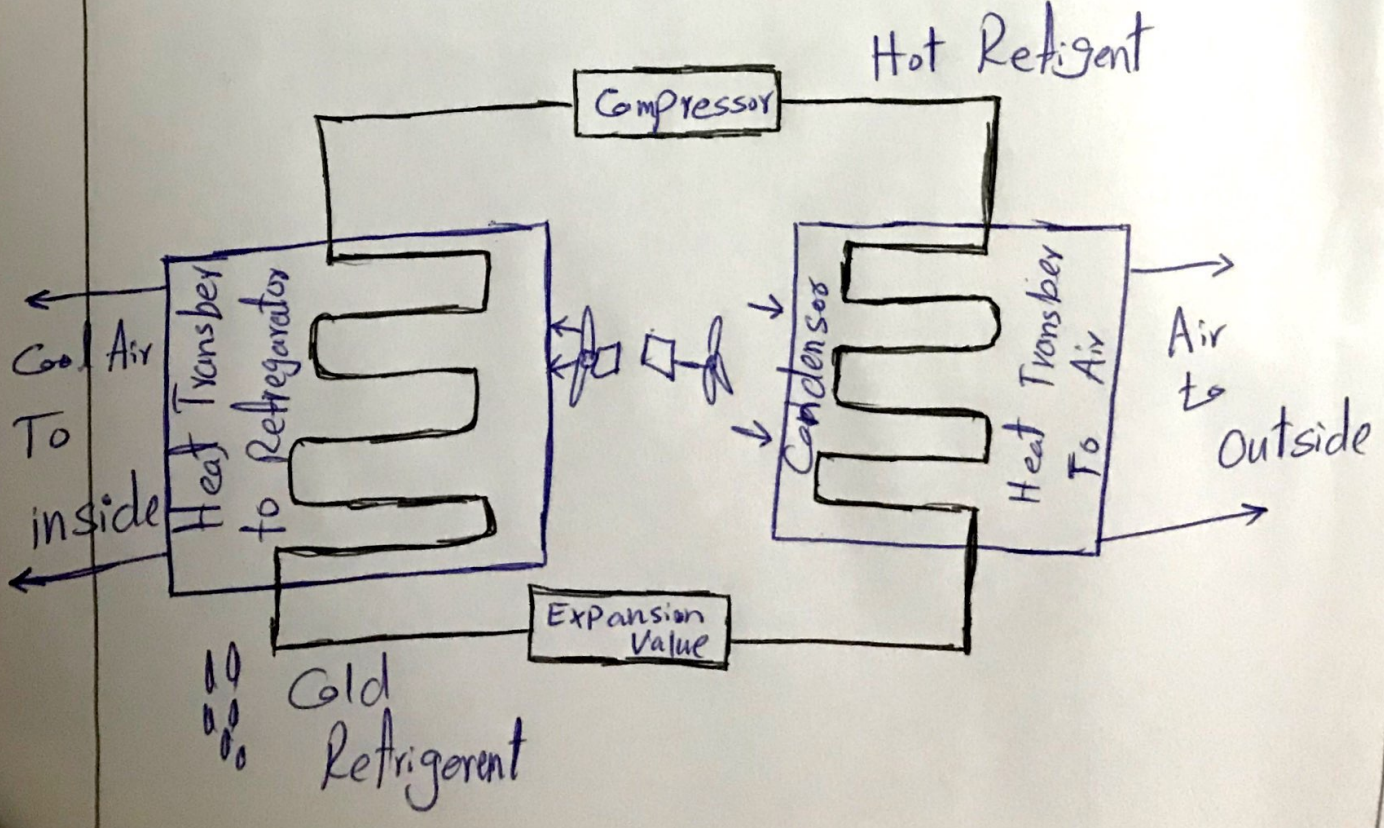
Working Principles of Fridges:-

A refrigerator does not Cool item by lowering their original temperature instead, an evaporating gas called a refrigerant draws heat away leaving the surrounding area much colder Refrigerators and air Conditioner both work on the principle of cooling through evaporation.



⇒ Working Principle of Air Conditioner:

The working principle of Air Conditioner or Ac is Collecting and processing it to release Cool air into the same space where the ~~Cool~~ hot air had orignally been collected. This process is done through the 5 steps. Such as the evaportar Compressor, ~~Conductor~~ Condensor, expansion value Refregerent.



⇒ Working Principle of Freezer:-

The basic working Principle of freezer is evaporation.

When a Liquid evapoatess it Conses the Surrounding area to cool.

A vapour Compression Cycle is used in most freezers. in this Cycle a Carculating refrigent enters a Compressor as low pressure vapour at or slightly above the temporature of the freezer interior.

⇒ We use Smith Chart for :-

The Smith Chart is used to display an actual (Physical) antenna's Impedance when measured on a vector Network Analyzer (VNA).

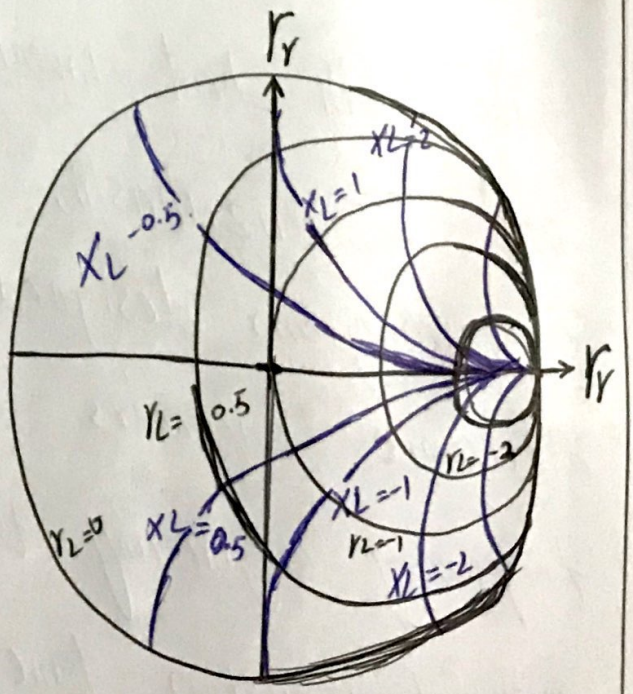
Smith Chart were originally developed around 1940 by Phillip Smith as a useful tool for making the equations involved in transmission Line easier to manipulate.

⇒ Smith Chart parametric Equations :

$$\Gamma = \frac{Z_L/Z_0 - 1}{Z_L/Z_0 + 1} = \frac{Z_L - 1}{Z_L + 1}$$

$$Z_L = \frac{1+\Gamma}{1-\Gamma}$$

$$Z_L = r_L + j x_L$$



Continue....

Q2:-

What is Smith chart ?
Why we use Smith chart ?
Also Explain in detail about the Parametric equation used in Smith chart.

- Wave Impedance.
- SWR. Voltage Maxima and Minima
- Impedance to Admittance Transformation.
- Impedance Matching.
- Lumped - Element matching.

Ans:- Smith Chart:-

The Smith chart invented by Phillp H Smith and T. Mizuhashi, is a graphical Calculator or nomogram designed for electrical and electronics engineers Specializing in radio frequency engineering to assist in Solving problem with transmission Line and matching Circuits.

$$r_L + j x_L = \frac{(1+\Gamma_r) + j\Gamma_i}{(1-\Gamma_r) - j\Gamma_i}$$

$$r_L = \frac{1-\Gamma_r^2-\Gamma_i^2}{(1-\Gamma_r)^2+\Gamma_i^2}$$

$$x_L = \frac{2\Gamma_i}{(1-\Gamma_r)^2+\Gamma_i^2}$$

$$\left(\Gamma_r = \frac{r_L}{1+r_L}\right)^2 + \Gamma_i^2 = \left(\frac{1}{1+r_L}\right)^2$$

The standard equation for a Circle in the x-y Plane with Center at (x_o, y_o) and radius a is

$$(x-x_a)^2 + (y-y_a)^2 = a^2$$

A Similar manipulation of the expression for x_L given by

$$(\Gamma_r - 1)^2 + \left(\Gamma_i - \frac{1}{x_L}\right)^2 = \left(\frac{1}{x_L}\right)^2$$