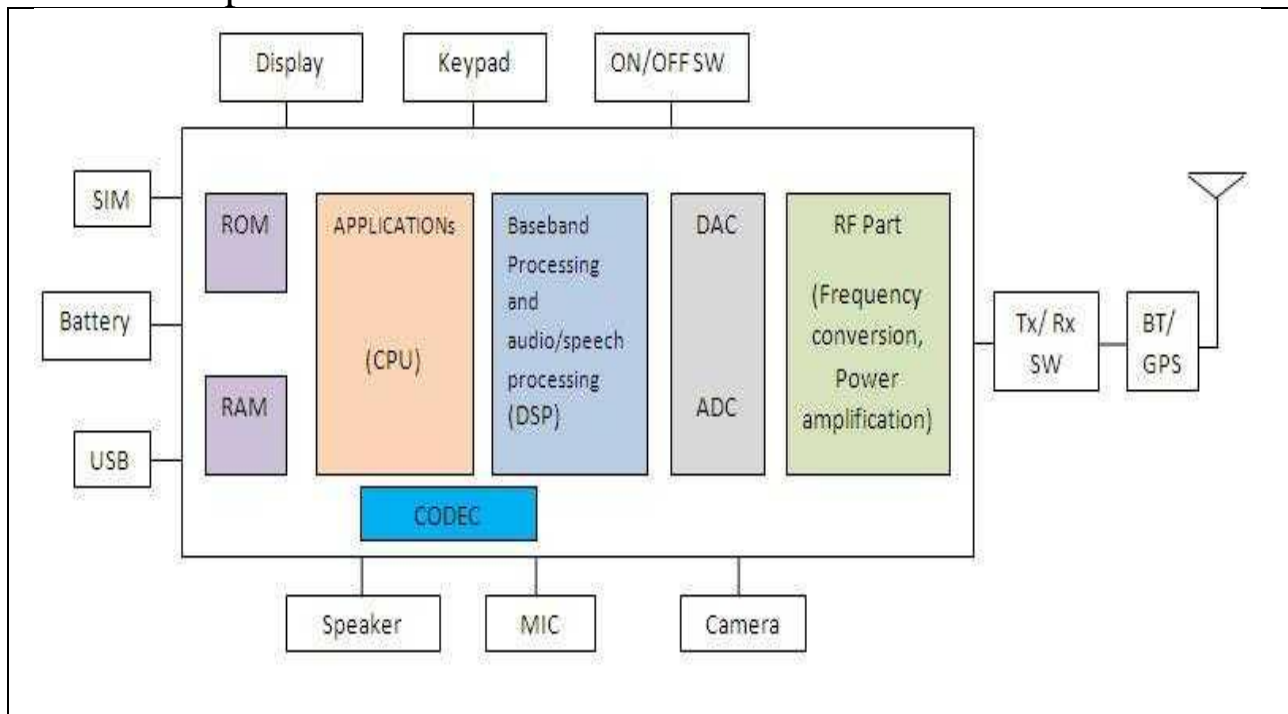




Sheet (2)

(1) Draw the block diagram for mobile phone system with brief description?



(2) What are the main applications of Mobile Enhancer

- ☐ To maintain the complete silence in library and lecture hall
- ☐ To avoid fraud in examination hall
- ☐ To avoid disturbance in class room
- ☐ For providing security in business conference, board of directors rooms, seminars, etc.,
- ☐ For providing calm and peaceful atmosphere in Hospitals Church/Mosques/Cathedral/Temple/Religious establishment

(3) Classify the different types of jamming techniques?

- ☐ Type "A" Device: JAMMER

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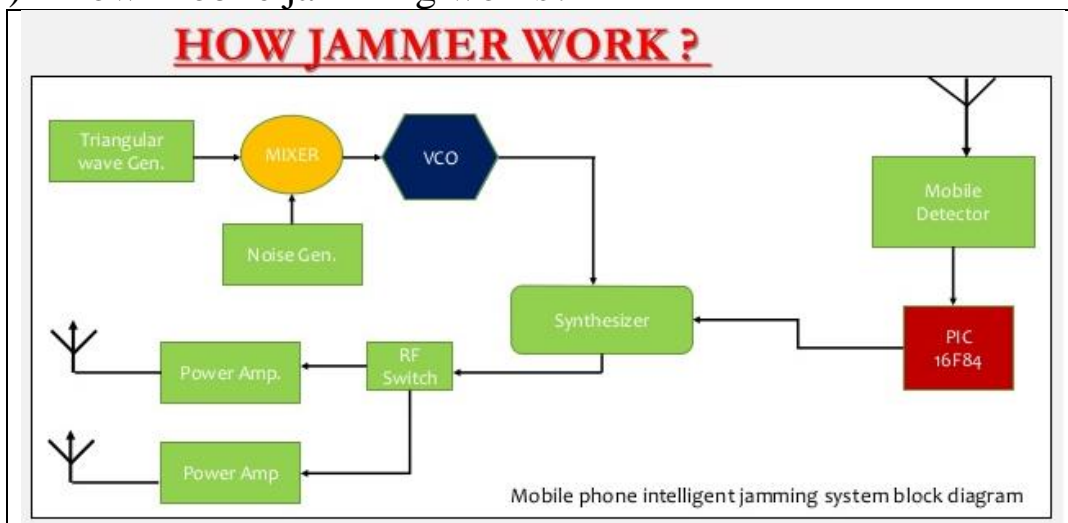


- ☐ Type “B” Device: INTELLIGENT CELLULAR DISABLERS
 - ☐ Type “C” Device: INTELLIGENT BEACON DISABLERS
 - ☐ Type “D” Device: DIRECT RECEIVE & TRANSMIT JAMMERS
 - Type “E” Device: EMI SHIELD - PASSIVE JAMMING
- Explain briefly each technique (from lecture Slides)

(4) Show the main design parameters or specifications of Mobile Jamming?



(5) How Mobile jamming works?



(6) Show the future scope of jamming technology?

- ☐ While the law clearly prohibits using a device to actively disrupt a cell-phone signal, there are no rules against passive cell-phone blocking.

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❑ Companies are working on devices that **control a cell phone** but do not "jam" the signal.

(7) Show the different stages of signal enhancer design in home and cars

In homes



In cars

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(8) What causes a weak cell phone signal ?

What Causes a Weak Cell Phone Signal?

1. DISTANCE FROM CELL PHONE TOWER

One biggest reasons of poor service is distance from the cell tower. The farther away you're from the cell tower, the weaker the signal your cell phone receives and inversely the closer you are to your carrier's cell tower the better your cell signal is.

2. OUTSIDE INTERFERENCE

Cell signals are basically radio waves (the AM/FM kind) that cover great distances but are easily disrupted. They generally need a line of sight to the cell tower for effective transmissions. Trees, hills, mountains, tall structures (buildings, billboards, other urban surroundings), and weather (rain, thunderstorms, and snow) can easily affect your signal.

3. INSIDE INTERFERENCE

Dense building material (thick concrete or brick), metal, glass, radiant barrier, and other conductive material or clutter (electrical or magnetic) will either weaken or block incoming signal. So even if you have great outside signal and even if you are close to a cell tower, inside interference can still cause you have poor signal.

(9) Show the main applications of GPS & GSM Module?

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Vehicle Tracking, Remote Monitoring, Location Identification, People Tracking, etc.

(10) List some applications for RF transceivers

automobile anti-theft products
home security products
electric doors, shutter doors, windows
remote control LED / audio / electric doors, garage /electric cars / MP3.

(11) Tabulate the RFID applications according to frequency bands

Frequency Band	Characteristics	Typical Application
Low 100-500 kHz	Short to medium read range, inexpensive, low reading speed	Access control Animal/Human identification Inventory Control
Medium 10-15 MHz	Short to medium read range Potentially inexpensive Medium reading speed	Smart Cards
High UHF: 850-950MHz Microwave: 2.4 – 5.8 GHz	Long read range High reading speed Line of sight required (Microwave) Expensive	Railroad car monitoring Toll collection systems (OGS)

(12) Give a brief view on different automotive radar systems

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Radar Systems for Automobiles

10 GHz / 24 GHz Radar System

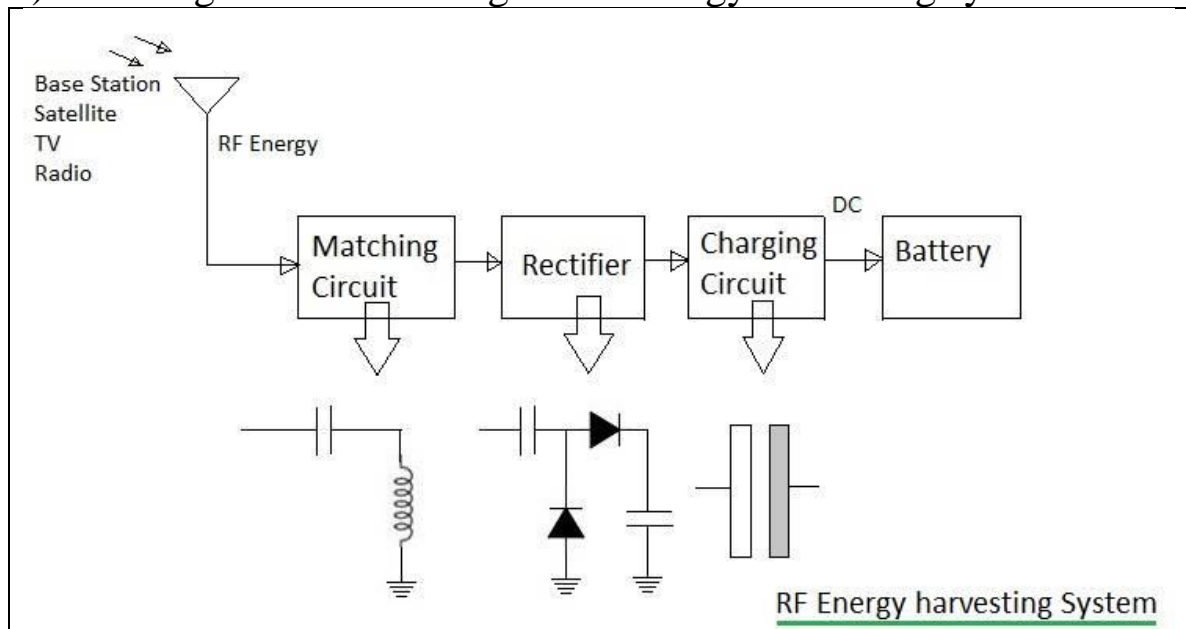
- To measure speed of the vehicle (5 km/s to 200 km/s)
- To measure length of the vehicle (0.1 m to 10's of m)
- Extremely Sensitive – can detect even hand movement

77 GHz Radar System

Collision Avoidance for the vehicle



(13) Draw a general block diagram of energy harvesting system



(14) Show the difference between MW generators, spectrum analyzer and network analyzer

Microwave generators:

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- ❑ There are many types of microwave generators, Generate output of only up to **one** gigahertz or up to **3** gigahertz or **10** gigahertz or **20** gigahertz and up to **100** gigahertz also.
- ❑ MW generators use amplitude modulation or frequency modulation or it may have a digital modulation built in two way. So, you can get a modulated signal output also.
- ❑ in microwave generator you can change the frequency from a low frequency (kilohertz) to a higher frequency (gigahertz) and the output power also can be changed from a very small value (-100 dB to up to +10 to +20 dBm).

Spectrum Analyzer:

- ❑ A spectrum analyzer. Basically, spectrum analyzer is a equipment which measures the spectrum of a given signal. So, what you see over here that here is a signal is present over here and this is nothing, but a noise floor. So, again in spectrum analyzer majority of the time what should do you actually set the start frequency and the stop frequency and then you can see the spectrum of a given signal.

Network Analyzer:

- ❑ Network analyzer is used to measure the S-parameters of a device S-parameters also we will discuss in more detail, but just in a simple form suppose if this device is an amplifier. So, we connect the input over here we connect the output over here. So, you can actually measure the gain of the amplifier.

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