

- iii) The tracking technique that derives angle error information on the basis of a single pulse is
- a) Lobe (sequential) switching
 - b) Conical scan
 - c) mono-pulse
 - d) none of these.
- iv) Pulse radar gives the target
- a) range and velocity b) range only
 - c) size d) shape.
- v) Matched filter
- a) Optimizes SNR b) removes AF signals
 - c) filters RF signal d) is used as amplifier.
- vi) Glint means
- a) Range in accuracy
 - b) Target phase fluctuation
 - c) Angle inaccuracy
 - d) Velocity inaccuracy.
- vii) The Doppler effect is used in
- a) MTI b) Pulse radar
 - c) FM d) both (a) & (b).
- viii) Staggered PRF is used in MTI
- a) to reduce blind speed
 - b) for scanning purpose
 - c) to store many PRF
 - d) none of these.
- ix) Both axial magnetic field and radial electric field are used in
- a) TWT b) Klystron
 - c) Magnetron d) Gunn oscillator.

- x) The range of radar can be increased by
 - a) Increasing antenna diameter
 - b) Increasing pulse transmitter power
 - c) Increasing the frequency
 - d) Any one of the following.
- xi) A high noise figure in the receiver means
 - a) poor minimum detectable signal
 - b) good detectable signal
 - c) receiver bandwidth is reduced
 - d) high power loss.
- xii) A Ka-band radar means

a) 2-4 GHz	b) 27-40 GHz
c) 20 GHz-26GHz	d) 400-450 MHz.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What is false alarm and miss detection in radar terminology ? Why pulse repetition frequency (PRF) is kept low to get unambiguous range value ? What is FM-CW altimeter ?
3. Define Beam, Rotation and Target axis in conical scanning. What is squint angle ? State advantages of phase array radar.
4. What is the function of single delay line canceller ? How blind speed can be waived using Doppler frequency banks.
5. Design a radar block diagram with transmitter and receiver. Pulse radar operating at 10GHz frequency has an antenna with a gain of 28 dB and a transmitted power of 2kW. If it is desired to detect a target of cross-section 12m^2 and the minimum detectable signal is -90 dBm. Find out the maximum range of the radar.

6. What is matched filter ? Discuss how radar cross section of a sphere target will vary with operating wavelength.

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Discuss the operational principle of MTI radar with a neat diagram and explain each block. State advantages of pulse radar over CW. What is second time around echo ? How could it be minimized ? What is duplexer ?

$7 + 3 + 2 + 2 + 1$

8. Derive the simple radar range equation in terms of minimum detectable signal to noise ratio $(S/N)_{\min}$ and explain why $(S/N)_{\min}$ is a better measure of a radar detection than the minimum detectable signal (S_{\min}) . What is sea clutters ? What is the main feature in radar A-scope display ? If the radar pulses are in square shape, what will be the output of matched filter ? Explain.

$7 + 3 + 2 + 3$

9. How signal could be jammed ? Explain operation of a noise jammer. What electronic devices are used to protect radar receiver ? State briefly. Discuss moving binary integrator as pulse integrator.

$3 + 6 + 2 + 4$

10. Explain amplitude comparison monopulse tracking radar with a neat block diagram. How air surveillance radar functions with ADT ? Discuss some radar antennas used in modern radar domain.

$7 + 4 + 4$

11. Write short notes on any *three* of the following : 3×5

- a) Magnetron
- b) Range and velocity ambiguity
- c) Radar receiver
- d) ECCM
- e) TWT.