(Time: 3 Hours)   Max Marks: 80

N:B:
1. **Question No. 1 is compulsory.**
2. **Out of remaining questions, attempt any three questions.**
3. **Assume suitable additional data if required.**
4. **Figures in brackets on the right hand side indicate full marks.**

Q. 1 (a) Explain Frequency Agility and Diversity Technique.   **[05]**
        (b) Compare CW Radar with Frequency Modulated Radar.   **[05]**
        (c) Explain factors which govern pulse repetition frequency.   **[05]**
        (d) Compare low power and High Power Radar Transmitter along with their   **[05]**
             applications.

Q. 2 (a) Explain Doppler Filter banks along with its merits and demerits.   **[10]**
        (b) Discuss in brief Radar Resolution Cell, land and Sea Clutter.   **[10]**

Q. 3 (a) Derive the radar range equation as governed by minimum detectable   **[10]**
             signal to noise ratio. Enumerate the system losses that might occur in
             long range surveillance radar and indicate the typical value of the losses
             due to each factor.
        (b) Give importance of Match filter of Radar and discuss them in detail.   **[10]**

Q. 4 (a) Explain methods of Integration of Radar Pulses to improve its detection. **[10]**
             Define Integration Improvement Factor. How does it affect Radar
             Equation?
        (b) What is the maximum Radar Cross section in m^2 of an automobile license **[10]**
             plate that is 12 inch wide and 6 inch high at a frequency of 10.525 GHz?
             What frequency will result in Maximum radar cross section of a metallic
             sphere whose diameter is 1 m?

Q. 5 (a) With the help of detailed block diagram explain Conical Scanning used   **[10]**
             in Radar Systems.
        (b) What do you mean by Radar Cross Section? Explain RCS of Sphere, Rod   **[10]**
             and Cone.

Q. 6 (a) Draw and explain Travelling Wave Tube Amplifier used in Radar   **[10]**
             Transmitter.
        (b) Draw block diagram of MTI Radar and explain each block in detail.   **[10]**

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