

N.B. : (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** questions from remaining **six** questions.

1. (a) Explain the factors which govern the pulse repetition frequency. 5
 (b) Explain in brief the various system losses in the radar. 5
 (c) Explain the mechanism of range tracking of a moving target. 5
 (d) Explain in brief about M.F.C.W. radar. 5
2. (a) Explain the methods for the integration of radar pulses to improve detection. 10
 Define the term integration improvement factor. How does their, factor affect the radar range equation ?
 (b) Describe the chief characteristics of the radar echo from a target when 10
 its radar cross-section is in the (a) Rayleigh region; (b) Resonance region and (c) in the optical region.
3. (a) What do you mean by RCS fluctuation ? Explain different Swerlings model 10
 for RCS fluctuations.
 (b) What do you understand by the term clutter ? Explain the different types 10
 of radar clutter. Enumerate the properties of sea and land clutter.
4. (a) State the factors which influence the bandwidth of a radar receiver. Write 10
 down the advantages of large bandwidth.
 (b) Derive an expression for doppler frequency shift in terms of transmitted 10
 frequency and radial component of target velocity vector.
5. (a) Explain the principle of operation of Hyperbolic Navigation system. Compare 10
 the principle of operation of Loran A and Loran C.
 (b) Explain the role of loop antennas in radio direction finders. What is the 10
 need for a sense finder antenna system ? Enumerate various methods employed for increasing loop voltage.
6. (a) Draw the block diagram of amplitude comparison monopulse tracking radar 10
 and explain its principle of operation with suitable sketches.
 (b) Draw the functional block diagram of MTI radar system and explain its 10
 operation. Define the terms blind speed and MTI improvement factor.
7. Write short notes on the following :-
 (a) Phased array radar 5
 (b) ILS – limitations 5
 (c) Delay line canceler 5
 (d) Conical scan tracking. 5