BT-8/J07   **9672**

Radar Engineering

Paper : ECE-404E

Option : I

Time : Three Hours]   [Maximum Marks : 100

Note :—   Attempt **FIVE** questions selecting at least **ONE** from each unit.

UNIT—I

1. (A) Draw the block diagram of a Radar system and explain the functions of each block in detail.   10

   (B) Discuss the major areas of radar applications.   10

2. (A) Derive the expression :

$$R^4_{max} = \frac{E_T G A_e \sigma E_i(n)}{(4\pi)^2 KT_o F_n(BZ)\left(\dfrac{S}{N}\right)_1}.$$

   10

   (B) Explain the following :—
   (i) System losses
   (ii) Propagation effects.   10

UNIT—II

3. (A) Explain the construction and working principle of a multiple frequency CW radar in detail.   10

   (B) What is CW radar ? Explain the range measurement and Doppler measurement with frequency modulated CW radar.   10

4. Write short notes on each of the following :—
   (i) Delay line cancellors

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(ii) Pulse repetition frequencies

(iii) Range gated doppler filters

(iv) Limitations of MTI performance

(v) MTI with moving platform. 5×4=20

UNIT—III

5. (A) What are the different types of tracking radar systems ? Discuss each of them. 10

(B) Explain the concept of conical scan and sequential lobing. 10

6. Outline the concept of each of the following :—

(a) Monopulse tracking radar 10

(b) Target Acquisition. 10

UNIT—IV

7. Why might a double conversion superheterodyne receiver be used instead of a single conversion receiver ? What limitations might there be in using a double conversion receiver ? Also explain the following terms in connection with radar receivers :—

(i) Low frequency RF amplifier

(ii) The mixer and the detector. 20

8. (A) What do you mean by a receiver protector ? Explain solid state receiver protectors and diode limiters. 10

(B) Briefly describe the concept of duplexers. 10