

Roll No. ....

Total No. of Pages : 2

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 :

$$R_{\max}^4 = \frac{E_T G A_e \sigma E_i(n)}{(4\pi)^2 K T_o F_n (BZ) \left(\frac{S}{N}\right)_i} \quad 10$$

(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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(Contd.)



- (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

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