

**BT-8/D-21****48145****RADAR ENGINEERING**

Option-II

Paper-ECE-422N

Time Allowed : 3 Hours]

[Maximum Marks : 75

**Note** : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

**UNIT-I**

1. (a) A pulsed radar has a duty cycle of 0.016. If the rising time is 380 msec then calculate the pulse width, PRF and minimum range in meters of this radar? 6
- (b) What do you mean a Radar? Describe the principle of Operation of a basic radar with the help of neat block diagram. What are the various applications of radar? 9
2. (a) Calculate the maximum range of a radar system which operates at 3 cm wavelength with a peak power of 500KW if its  $P_{\min}$  is  $10^{-12}$  Watt, the capture area of its antenna is 5m square and radar cross section area of target is 20 m square? 7
- (b) What are the different types of system losses? Explain in detail. 8

**UNIT-II**

3. (a) How do you find the relative velocity of a target using CW radar? How does flicker noise affects its working? 8
- (b) Explain the Operation of Non-coherent MTI radar with the help of its block diagram? 7
4. (a) For a FMCW radar altimeter, operating at 4 GHz, calculate the beat frequency  $f_b$  between the transmitted and received signals when  $f = 30$  Khz,  $R = 2.5$  Km and  $f_m = 10$  KHz ? 7
- (b) Define staggered pulse repetition and explain about Gated Doppler filter. 8

### UNIT-III

5. (a) Explain the working of mono pulse tracking radar with one angle coordinates? 8
- (b) Explain split gate tracker and range glint. 7
6. (a) Explain the Conical scanning method of tracking of an acquired target in detail? 7
- (b) Explain the Radar servo tracking system with the help of block diagram. 8

### UNIT-IV

7. (a) What are the factors influencing the bandwidth of a radar receiver? What are the advantages and disadvantages of a very large bandwidth? 8
- (b) Explain the working of Radar Receiver in detail. 7
8. Write a short notes on the following :
- (a) Receiver Protectors. 7
- (b) Displays. 8

