Roll No. ..... Total Pages : 02

BT-8/D-18 38011

RADAR ENGINEERING

ECE-404-E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

Unit I

1. (a) What are the basic functions of radar ? In indicating the position of a target, what is the difference between azimuth and elevation ? **12**

   (b) A radar is to have a maximum range of 60 km. What is the maximum allowable pulse repetition frequency for unambiguous reception ? **8**

2. Write short notes on the following in a radar system :

   (a) Transmitter power and Signal to noise ratio **10**

   (b) System losses and Propagation effects. **10**

Unit II

3. Draw block diagram of a FM-CW radar. Explain its working principle. Also describe working of each of the block. Discuss the merits and demerits of frequency modulation use. **20**

4. Explain in detail delay line cancellors. Discuss its usage and applications. Also describe the mechanism of shaping the desired frequency response. 20

Unit III

5. (a) Why are very much greater ranges possible with active radar tracking than with passive tracking ? Derive the equation for the maximum range for the reply line when a radar beacon is present on a target. 8

   (b) Describe working principle and applications of a monopulse tracking radar with the help of a neat schematic and suitable example. 12

6. Write short notes on the following : 10+10

   (a) Sequential Lobing (b) Conical Scan.

Unit IV

7. Write short notes on the following in respect of radar receivers :

   (a) Low noise front ends 10

   (b) Receiver protectors. 10

8. Explain duplexers' usage in radar receivers in detail with the help of suitable schematics, explanations and examples. 20