Roll No. ..... Total Pages : 03

BT-8/M-19 38145

RADAR ENGINEERING

ECE-422N

Time : Three Hours] [Maximum Marks : 75

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

Section I

1. (a) Explain the operation of Radar with the help of its block diagram. 7

   (b) A radar transmitter has a peak powder of 400 kW, a PRF of 1500 PPS and pulse width of 0.8s. Calculate :

   (i) Maximum unambiguous range

   (ii) Duty cycle

   (iii) Average power

   (iv) Suitable bandwidth. 4×2=8

2. (a) Calculate the maximum radar range in terms of signal to noise ratio. 8

(b) What is the peak power of a radar whose average power is 200 W, pulse width of 1 μs and pulse repetition frequency is 1 kHz. It has to detect the target of cross section 2 m^2 when it operates at a frequency of 3 GHz with the antenna diameter of 2 m, antenna aperture efficiency of 0.6 and mds is 10^{-12} W. Also calculate the maximum range in nmi ? 7

Section II

3. (a) Explain the working of Multiple Frequency CW radar with the help of block diagram. 8

(b) Discuss the limitations of CW Radar. 7

4. (a) Explain staggered Pulse repetition frequency ? 7

(b) Explain the operation of Coherent MTI Pulse Doppler Radar. 8

Section III

5. (a) Explain Sequential Lobbing method of tacking of an acquired target in detail. 8

(b) Explain Tracking with radar in detail. 7

6. (a) Explain conical scanning method of tacking of an acquired target in detail. 8

(b) Explain the acquisition of target and mono pulse tracking technique. 7

Section IV

7. (a) Explain the purpose of mixer of and write different types of mixtures used in radar. 7

(b) Explain different types of Radar display in brief. 8

8. Write short notes on the following :

(a) Low Noise Front Ends. 7

(b) Radar Protectors. 8