2005-PUNJAB UNIVERSITY
B.TECH DEGREE EXAMINATION
RADAR SYSTEM AND VAVIGATIONS
(ELECTRONICS AND COMMUNICATION ENGINEERING)

TIME-3HOUR
MARKS-100

PART A[10*2=20 MARKS]

1(a) Enlist the factors that determine the detection range of a radar.

(b) State the Doppler effect. HOw is it used for radar applications?

(c) Sketch the block diagram of FM-CH radar.

(d) What is staggered PRF? Explain.

(e) How does an active electronic counter measure reduce the detection range of a radar?

(f) What are the possible errors in direction finding in radar systems? Explain.

(g) Give the different acquisition search patterns for tracking radar.

(h) Explain the pulse comparison mono pulse technique for tracking.

(i) Enlist the characteristics features of an actual radar systems.

(j) How does integration of radar pulses improve the detection performance of a radar? Explain.

PART B[10*8=80 MARKS]

2. Consider an S-band pulsed radar with the following parameters:

Peak transmitted power = 300kW.
Pulse width = 1 user.
PRF = 600Hz.
Antenna radius = 6ft.
Transmitted frequency = 3000MHz.
Transmit loss = 6dB.
Antenna efficiency = 0.95
Calculate the maximum signal power at the range of 50 nauticals miles.

3. An altimeter using FM has a modulation frequency of 200 Hz. and a frequency excursion of 60 MHz. Calculate the modulation slope which will result in a range quantization of 10 KM.

4. Consider a radar with multiple PRF ranging using f1 = 13.770 kHz and f2 = 14.580 kHz. Calculate the need of multiple PRF.

5. Write a brief technical note on an actual radar system.

6. What are Electronic Counter Measures? Describe a typical adopted for this measure.

7. With the help of a block diagram, explain the working of a conical scan tracking radar.

8. Discuss the blind speed situation in an MTI radar. Derive the formula for blind speeds for the case of a single

delay line canceles. In a five pulse stragger (four periods) in a long range airtraffic control radar, the periods are in the ratio 25 : 30 : 27 : 31. How many times the first blind speed would became as compared to that of a constant PRF waveform with the same average period.

9. Discuss instrument landing System in detail.