

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER- VIII (New) EXAMINATION – WINTER 2019

Subject Code: 2181103

Date: 21/11/2019

Subject Name: Radar & Navigational Aids

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Define following terms: 1) Pulse width 2) clutter 3) Duty Cycle	03
	(b) Explain range ambiguities and PRF.	04
	(c) Briefly explain the basic principle of radar. Also explain and draw the Appropriate block diagram of the pulse radar.	07
Q.2	(a) Explain minimum detectable signal.	03
	(b) Explain CW radar with IF amplification.	04
	(c) Explain the principal and operation of FMCW radar in brief.	07
	OR	
	(c) Explain MTI radar with all necessary details.	07
Q.3	(a) How multiple frequency CW radar can be used to measure the range of a moving target?	03
	(b) Explain MTI radar using power oscillator as transmitter.	04
	(c) A radar operating at 10GHz with the peak power of 500kW, the power gain of the antenna is 5000 and minimum power is 10^{-14} . Calculate the maximum range of the radar if the effective area of the antenna is 10m^2 and the radar cross section is 4m^2 .	07
	OR	
Q.3	(a) Write a short note on whether clutter.	03
	(b) Briefly discuss the propagation effects in radar.	04
	(c) A CW transmits frequency of 10GHz and Doppler frequency is 1000Hz. calculate the radial velocity of the target.	07
Q.4	(a) List the advantages and capabilities of electronic scanning.	03
	(b) Explain dear rocking method of navigation in detail.	04
	(c) Derive an expression for the emf induced in a loop antenna by an electromagnetic wave incident at an angle Θ with the plane of the loop antenna. Explain how the arrangement is used for determining the bearing of the transmitting station. How sense finding is done.	07
	OR	
Q.4	(a) List and explain types of tracking.	03
	(b) Explain radio method of navigation in detail.	04
	(c) For air surveillance radar Explain how Tracking is done (TWS)?	07
Q.5	(a) How position location determination is done GPS?	03
	(b) Explain Adcock direction finder in detail.	04
	(c) What is VOR? Explain its working.	07
	OR	
Q.5	(a) Define working principal of LORAN-C and list the components of LORAN-C system.	03
	(b) Explain Global Satellite Navigation system in detail.	04
	(c) Explain microwave landing system in brief.	07
