

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2181103

Date: 15/11/2018

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) Blind speed 2) pulse reception frequency 3) Radar cross section	03
	(b) Enlist and explain the applications of RADAR.	04
	(c) Explain the block diagram of MTI radar with neat sketch in detail.	07
Q.2	(a) A CW radar (MTI) is operating at a PRF of 1KHz, find the lowest blind speed, if it operating at 2cm wave lengths.	03
	(b) List and explain the parameters that affect the radar range.	04
	(c) Calculate the maximum range of radar system which operates at 3cm wavelength with a peak power of 500kw, if its $P_{min} = 10^{-12}$ w, the capture area of its antenna is $5m^2$ and radar cross section area of target is $20m^2$.	07
	OR	
	(c) A transmit frequency of 10Ghz and doppler frequency is 1000Hz, Calculate the radial velocity of target.	07
Q.3	(a) How clutter attenuation is obtain in the delay line cancellers?	03
	(b) What is the use of delay line cancellers? Obtain the frequency response of single delay line cancellers.	04
	(c) How FMCW radar overcomes the shortcomings of Doppler CW radar? Explain the principle and operation of FM-CW radar in brief.	07
	OR	
Q.3	(a) Give the point difference between STALO and COHO.	03
	(b) Explain the need of staggered pulse repetition frequencies in case of MTI Doppler Filters to reduce the effect of blind speed.	04
	(c) Write note on (i) Digital MTI Signal Processor (ii) Doppler beam configuration	07
Q.4	(a) Write a short note on sea clutter.	03
	(b) Explain celestial method of navigation in detail.	04
	(c) Write short note on Instrument landing system.	07
	OR	
Q.4	(a) Write a short note on land clutter.	03
	(b) Explain pilotage method of navigation in detail.	04
	(c) Explain working of the LORAN system.	07
Q.5	(a) Explain Goniometer in detail.	03
	(b) Explain Global Positioning System	04
	(c) What is VOR? Explain its working.	07
	OR	
Q.5	(a) Enlist the application of NAVIC receiver.	03
	(b) Explain the features of TACAN.	04
	(c) How we can use RADAR for imaging? Explain working of SAR?	07
