

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

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