Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER -VIII - EXAMINATION- SUMMER 2020

Subject Code: 2181103 **Date:29.10.2020**

Subject Name: Radar and 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)**	Enlist the applications of RADAR and explain briefly.	**03**
	(b)	List four methods of navigation and briefly describe any one.	**04**
	(c)	Derive the fundamental form of Radar range equation. Discuss the factors affecting the maximum range of radar	**07**
Q.2	**(a)**	Explain briefly **:** Multiple around echoes.	**03**
	(b)	Discuss errors and accuracy in DECCA system.	**04**
	(c)	Draw the block diagram of MTI radar with power oscillator transmitter and explain its operation.	**07**
		OR	
	(c)	Describe GAGAN and NAVIC receiver system.	**07**
Q.3	**(a)**	Write advantages and limitations of VOR	**03**
	(b)	Explain briefly operation of VHF Omni directional radio range receiver.	**04**
	(c)	Draw and explain block diagram of CW radar. Compare it with FMCW radar and multiple frequency CW radar.	**07**
		OR	
Q.3	**(a)**	Distinguish between COHO and STALO.	**03**
	(b)	Explain the working principle of synthetic aperture radar (SAR) and write its application.	**04**
	(c)	What is the principle of TACAN? Explain working of TACAN with the help of simple block diagram.	**07**

Q.4	**(a)**	Explain how tracking and scanning radar differ ?	**03**
	(b)	Draw block diagram of an electronic scanning system and explain its operation.	**04**
	(c)	What do you mean by term tracking radar? Explain the working of mono pulse radar with the help of block diagram.	**07**

OR

Q.4	**(a)**	Explain briefly : Minimum detectable signal, Blind Speed , Pulse repetition frequency	**03**
	(b)	Describe Delay line Cancellers for MTI radar.	**04**
	(c)	Explain the working of microwave landing system. Write advantages and disadvantage of it.	**07**

Q.5	**(a)**	Describe briefly Satellite Constellations.	**03**
	(b)	Discuss the relation between effective aperture and aperture efficiency of radar antenna.	**04**
	(c)	Write GPS principle of operation and explain three major segments of GPS system.	**07**

OR

Q.5	**(a)**	A pulse Doppler radar has a carrier frequency of a 9 GHz and pulse repetition frequency of 4 KHz. Calculate its blind Doppler frequencies and radial velocity of target which would be undetected by the radar.	**03**
	(b)	Calculate the maximum range in nmi for a radar which operates at 3 cm wavelength with peak power of 500 kw,if P_{min} is 10^{-12}W,the capture area of its antenna is 5 m^2 and radar cross section area of target is 20 m^2	**04**
	(c)	Explain Adcock Direction Finder and write Its advantages over loop antenna.	**07**