

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII EXAMINATION – WINTER 2025

Subject Code:3171110

Date:13-11-2025

Subject Name:Radar and Navigational Aids

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

	MARKS
Q.1 (a) Explain the basic principle of RADAR system.	03
(b) Define Pulse Width, Pulse Repetition Time, Average power and Clutter.	04
(c) Discuss Radar applications in detail.	07
Q.2 (a) Explain Doppler effect.	03
(b) Define Navigation, Pilotage, Celestial Navigation and Dead reckoning.	04
(c) Derive the simple form of radar range equation and relates the transmitter peak power to the maximum range of the radar.	07
OR	
(c) Explain prediction of range performance in detail.	07
Q.3 (a) Define blind speed. How can you avoid it?	03
(b) Explain the necessity of Delay line canceller in MTI.	04
(c) Explain the working of CW radar with the help of block diagram. Also give its limitations and applications.	07
OR	
Q.3 (a) With CW transmitter frequency of 3 GHz, calculate doppler frequency seen by a stationary radar when target radial velocity is 36 km/hr.	03
(b) Name the methods used to generate the error signal. Explain sequential lobbing method of tracking.	04
(c) Draw the block diagram and explain the operations of an MTI radar.	07
Q.4 (a) Explain the principle of duplexer in Radar.	03
(b) Explain the line-type modulator in brief.	04
(c) Explain Monopulse tracking radar in detail.	07
OR	
Q.4 (a) What do you understand by radar display? Define A – Scope display.	03
(b) Describe the conical scanning method of tracking of an acquired target.	04
(c) Explain LORAN – C as hyperbolic navigation system.	07
Q.5 (a) Compare the navigation satellite system like Galileo and GLONASS.	03
(b) List down the types of Radar antennas. Explain any one in brief.	04
(c) Explain the principal of phased array for electronic scanning.	07
OR	
Q.5 (a) Explain GPS in brief.	03
(b) How ‘cone of silence’ is heard in LF/MF radio range?	04
(c) Explain Instrument Landing System in detail.	07
