

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2024

**Subject Code:3171110**

**Date:19-11-2024**

**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.

- Q.1** (a) Define : (1) Blind Speed (2) Pulse width (3) Pulse Repetition Time **03**  
(b) Explain various application of radar. **04**  
(c) Briefly explain the basic principle of radar and draw the block diagram of the radar setup. **07**
- Q.2** (a) What is doppler effect? Write an equation for doppler frequency. **03**  
(b) Write short note on sea clutter. **04**  
(c) What is radar cross section? Discuss the relation between effective aperture and aperture efficiency of radar antenna. **07**
- OR**
- (c) Write short note on types of radar antennas. **07**
- Q.3** (a) Describe briefly delay lines cancellers for MTI radar. **03**  
(b) Briefly discuss the propagation effects in radar. **04**  
(c) Doppler CW radar? Explain the principle and operation of FM-CW radar in brief. **07**
- OR**
- Q.3** (a) Write a short note on radar duplexer. **03**  
(b) Explain the pulse doppler radar with neat block diagram. **04**  
(c) Explain the block diagram of MTI radar with neat sketch in detail. **07**
- Q.4** (a) How do tracking and scanning radar differ? **03**  
(b) Discuss pulse modulator mechanism for radar transmitter in brief. **04**  
(c) Explain working of the LORAN system. **07**
- OR**
- Q.4** (a) Explain in brief principle of phase array for electronic scanning. **03**  
(b) Write a short note on mono pulse tracking radar. **04**  
(c) Briefly describe the DECCA navigation system with neat sketch. **07**
- Q.5** (a) Explain in brief: Navigation satellites of different countries. **03**  
(b) List the four methods of navigation. Describe any one in detail. **04**  
(c) Write a short note on GPS. **07**
- OR**
- Q.5** (a) Explain the working of Goniometer. **03**  
(b) Explain global satellite navigation system in detail. **04**  
(c) Draw the block diagram and discuss the operation of electronic scanning system. **07**

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