

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022****Subject Code:3171110****Date:16-01-2023****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) (1) Radar is an acronym of \_\_\_\_\_. **03**  
 (2) Define Echo signal in Radar  
 (3) Define Range of Radar.  
 (b) List down the types of Radar. Explain any one. **04**  
 (c) Derive the simple form of radar range equation. **07**
- Q.2** (a) Define Navigation, Celestial Navigation, Radio Navigation **03**  
 (b) Write a brief note on Doppler Effect. **04**  
 (c) Explain the working of FMCW Radar with the help of block diagram. **07**
- OR**
- (c) Using a block diagram, describe the operation of a Simple CW Radar and a CW Radar with IF amplification. **07**
- Q.3** (a) What are the drawbacks and applications of CW Radar. **03**  
 (b) Explain Blind Speed. How you can avoid it? **04**  
 (c) Using a block diagram of MTI radar with delay line canceller, explain MTI Radar. **07**
- OR**
- Q.3** (a) A MTI radar is operating at a PRF of 1 KHz, find the lowest blind speed, if it is operating at 2 cm wavelengths. **03**  
 (b) Briefly describe sequential lobbing. **04**  
 (c) Explain the working of mono pulse radar with the help of a block diagram. **07**
- Q.4** (a) Using simple block diagram, explain Radar transmitter. **03**  
 (b) Write a brief note on conical scanning **04**  
 (c) What are the different types of Radar display? Explain PPI scope. **07**
- OR**
- Q.4** (a) List down different types of Radar antennas. Give brief idea about half wave antenna. **03**  
 (b) Explain Pilotage in navigation. **04**  
 (c) Explain the principle of Phased array for electronic scanning. Give the advantages of electronic scanning. **07**
- Q.5** (a) How radio range signals are received? What is cone of silence? **03**  
 (b) Define the purpose of VOR in navigation. **04**  
 (c) Explain the working of loop antenna as a direction finder and enumerate the error occurs in direction finding. **07**

**OR**

- Q.5** (a) Define Glide slope, Localiser, and outer marker in ILS. **03**  
(b) Explain briefly the principle of hyperbolic electronic navigation system. **04**  
(c) Write a short note on Global Positioning system. **07**

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