

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:2181103

Date:22-11-2024

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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Explain different types of duplexers used in RADAR. **03**
(b) What is Navigation and Explain different types of Navigation Aids. **04**
(c) Derive the fundamental form of Radar range equation. Give other form of equation. **07**
Discuss the factors affecting the maximum Radar range.
- Q.2** (a) Differentiate tracking and scanning radar. **03**
(b) Define the following parameters: **04**
i) Pulse repetition frequency
ii) receiver noise
(c) What is radar cross section? Differentiate between rayleigh, mie and optical regions. **07**
- OR**
- (c) Draw neat block diagram of FMCW radar and enlist its distinguished features. **07**
- Q.3** (a) Explain different types of displays used in Radar **03**
(b) Explain in brief the Distance Measuring Equipment. **04**
(c) What do you mean by term tracking radar? Explain the working of monopulse radar with the help of block diagram. **07**
- OR**
- Q.3** (a) State Different applications of RADAR. **03**
(b) Explain the principle of RADAR with the help of block diagram. **04**
(c) Explain MTI radar operation with the help of block diagram. How moving objects are recognized on an A Scope? **07**
- Q.4** (a) Explain the principle of working of LORAN A. **03**
(b) Define and explain radar clutter. **04**
(c) Explain the principle of GPS receiver. **07**
- OR**
- Q.4** (a) What is the need for Instrument Landing System at the airport? **03**
(b) Describe Frequency band used for various RADAR applications. **04**
(c) Explain operation of VHF Omni directional radio range (VOR) receiver. Write advantages and limitations of VOR. **07**
- Q.5** (a) What is Principle of Hyperbolic Navigation. **03**
(b) What is a multiple-time-around echoes and how it is related to radar's PRF? **04**
(c) Explain the principle of phased array for electronic scanning. **07**

OR

- Q.5** **(a)** Define: **03**
- i) Minimum Detectable signal
 - ii) Blind speed
 - iii) Doppler effect
- (b)** Draw the block diagram of pulse radar and explain its operation describing the function of all modules. **04**
- (c)** What is the principle of TACAN? Explain working of TACAN with the help of simple block diagram. **07**
