

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-VIII (NEW) EXAMINATION – WINTER 2020****Subject Code:2181103****Date:19/01/2021****Subject Name:Radar & Navigational Aids****Time:02:00 PM TO 04:00 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain the principle of RADAR with the help of block diagram. **03**
(b) Explain Radar range equation and its significance. **04**
(c) Define the following parameters: **07**
i) Delay line canceler ii) Duplexer iii) Blind Speed iv) Pulse repetition frequency
- Q.2** (a) Enlist the important applications of Radar? **03**
(b) What is Navigation and Explain different types of navigational aids. **04**
(c) What is the peak power of a radar pulse if the pulse width is 1μsec, the PRF is 1500Hz and the average power is 500Watts? What is the duty cycle? Calculate the unambiguous range in nautical miles. **07**
- Q.3** (a) Explain Radar Cross section. **03**
(b) Define radar clutter & prove that clutter power is inversely proportional to the square of the range **04**
(c) How Loop antenna can be used for direction finding? What is the problem of direction ambiguity? How can we solve this problem? **07**
- Q.4** (a) Derive the Radar range equation in terms of bandwidth. **03**
(b) Draw the block diagram of pulse radar and explain its operation describing the function of all modules **04**
(c) Explain MTI radar operation with the help of block diagram. How moving objects are recognized on an A Scope? **07**
- Q.5** (a) Give the point difference between STALO and COHO **03**
(b) What is Doppler Effect? List advantages of Pulse Doppler radar over CW radar. **04**
(c) Explain working of Microwave landing system (MLS). Also mention its advantage and disadvantage. **07**
- Q.6** (a) What is meant by Satellite Constellations? **03**
(b) Enlist different types of displays used in Radar? Explain any one in detail. **04**
(c) Discuss FM-CW radar with block diagram. **07**
- Q.7** (a) How do tracking and scanning radar differ? **03**
(b) Write short notes on Doppler Navigation. **04**
(c) Explain Global Positioning system. **07**

- Q.8** (a) Enlist various errors in direction finding. **03**
(b) Explain Synthetic Aperture radar **04**
(c) Explain the principle of working of LORAN A. Discuss the sequence of transmission and reception of pulses. How absolute delay τ is measured? **07**

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