

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-VIII (OLD) EXAMINATION – WINTER 2020****Subject Code:181103****Date:25/01/2021****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) Enlist and explain the applications of RADAR **07**  
(b) Briefly explain the basic principle of radar. Also explain and draw the appropriate block diagram of the radar set. **07**
- Q.2** (a) List the four methods of navigation. Describe any one in detail **07**  
(b) Define Normalized RCS. Derive Surface clutter RADAR equation. **07**
- Q.3** (a) What is Doppler Effect? What is its application in MTI radar? Explain it in terms of Doppler frequency fd. **07**  
(b) What is a multiple-time-around echoes and how it is related to radar's PRF? Considering three targets at different distances, explain a method of distinguishing MTA echoes from unambiguous echoes, using A scope. **07**
- Q.4** (a) What do you mean by Blind phase? Differentiate between blind speed and blind speed with neat waveforms. With the help of necessary block diagram explain the working of a digital MTI Doppler signal processor. **07**  
(b) What is DME? Explain the operation of DME inside the aircraft. **07**
- Q.5** (a) Why the conical scan is more preferable over the sequential lobing? Justify it. **07**  
(b) How Loop antenna can be used for direction finding? What is the problem of direction ambiguity? Give the solutions for this problem **07**
- Q.6** (a) How N-pulse Delay line cancelers are effective for MTI RADAR? **07**  
(b) List the three different radar range equations. Discuss their significance and Justify "Maximum range of the radar is inversely proportional to the square-root of wavelength" **07**
- Q.7** (a) What do you mean by VOR? Explain VOR receiving equipment **07**  
(b) With a neat sketch describe the TACAN beacon equipment. Explain how the desired antenna pattern is obtained and timing of the reference pulse groups is ensured. **07**
- Q.8** (a) Write short note on Navstar GPS Receiver system **07**  
(b) Write short note on Instrument landing system. **07**