

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. - SEMESTER – VIII EXAMINATION – OCTOBER 2012

Subject Code: 181103**Date: 25/10/2012****Subject Name: Radar Navigational and Aids****Time: 02.30pm - 05.00pm****Total Marks: 70****Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

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| Q-1 Answer the following: | 14 |
| a Briefly explain the basic principle of radar. | 3 |
| b Write and explain the three radar range equations. | 4 |
| c Maximum range of the radar is inversely proportional to the square-root of wavelength, Justify. | 4 |
| d What are the main types of navigation aids? | 3 |
| Q-2 a What is radar cross section? Differentiate between rayleigh, mie and optical regions. | 7 |
| b Explain the block diagram of MTI radar with neat sketch in detail. | 7 |
| OR | |
| b Distinguish scanning and tracking. Explain any one method of tracking in detail. | 7 |
| Q-3 a 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. | 7 |
| b Define receiver noise. Explain radar range equation in terms of receiver noise figure, bandwidth and other related parameters. For radar receiver having NF of 4dB with IF bandwidth of 3MHz, find minimum detectable power. | 7 |
| OR | |
| Q-3 a Define blind speed and calculate two lowest blind speed for MTI radar operating at 15GHz with PRF of 1KHz. | 5 |
| b Explain the radar set with appropriate block diagram | 5 |
| c What is Doppler Effect? List advantages of pulse Doppler radar over CW radar. | 4 |
| Q-4 a Distinguish between COHO and STALO. | 3 |
| b Explain the principle and operation of FM-CW radar in brief. | 5 |
| c Write a short note on Sea clutter. | 6 |
| OR | |
| Q-4 a Briefly discuss the features of TACAN. | 4 |
| b Explain automatic direction finder through a block diagram | 5 |
| c Explain Global Positioning system. | 5 |
| Q-5 a What is DME? Explain the operation of DME inside the aircraft. | 7 |
| b Write short note on Instrument landing system. | 7 |
| OR | |
| Q-5 a Why loop antennas are used in direction finding? Derive an expression for induced output voltage of loop antenna having N turns. | 7 |
| b Briefly describe the DECCA receiver with neat sketch. | 7 |
