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National Institute of Technology, Hamirpur (HP)
Name of Examination: B.Tech. END Semester Examination (Nov.-2023)

Branch: ECE
Subject: Radar & Navigational Aids
Time: 3 Hours

Semester: VII
Subject Code: EC-452
Maximum Marks: 50

Note: All Questions are compulsory. Use of scientific calculator is permitted. Assume missing data.

- Q. 1 Explain and derive the radar range equation with suitable diagram. [5]
- Q. 2 A pulsed radar operating at 8 GHz has an antenna with a gain of 10 dB and a transmitter power of 1 KW. If it is defined to detect a target with a cross-section of 12 square meters, and the minimum detectable signal is $S_{min} = -80$ dBm. What is the maximum range of the target? [5]
- Q. 3 Draw a block diagram of the FMCW radar and explain its operation to accomplish the measurement of range. [5]
- Q. 4 Explain MTI radars with a block diagram. Highlight the differences between MTI radar and Pulse doppler radar? [5]
- Q. 5 Two MTI radars have the same PRF but their operating frequencies are different. Determine the ratio of operating frequencies of these two MTI radars, if the first MTI radar's first blind speed and second MTI radar's third blind speed are the same. [5]
- Q. 6 Explain with the help of a block diagram amplitude comparison monopulse radars for extracting error signals in both elevation and azimuth. [5]
- Q. 7 How to accomplish the detection of radar signals in noise? Discuss different procedures for establishing the decision threshold. [5]
- Q. 8 What do you mean by a radar clutter? Describe the characteristics of clutter as well as the various methods for reducing their harmful effects when they interfere with the detection of desired targets. [5]
- Q. 9 What is radio direction finding? Discuss the operation of loop antenna in direction finding. [5]
- Q. 10 Elucidate the working of VOR ground and receiving equipment using its block diagrams. [5]