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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2024

RADAR AND NAVIGATION

[Maximum Marks: **100**] [Time: **3** Hours]

PART-A

[Maximum Marks: **10**]

I. (Answer ***all*** questions in one or two sentences. Each question carries ***2*** marks)

1. List the limitations of RADAR.
2. Define minimum detectable signal.
3. State the limitations of DME.
4. Write the expression for Doppler shift in frequency.
5. List any four applications of GPS navigation system. (5 x 2 = 10)

PART-B

[Maximum Marks: **30**]

II. (Answer ***any five*** of the following questions. Each question carries ***6*** marks)

1. Explain the basic principle of radar with the help of simple diagram.
2. Describe the four methods of navigation.
3. Explain the working of delay line canceller with the help of block diagram.
4. Draw the block diagram of Distance measuring equipment. Explain its operation.
5. Draw the block diagram of tracking radar and explain.
6. With the help of diagram explain the principle of Goniometer.
7. Explain briefly the differential GPS system. (5 x 6 = 30)

PART-C

[Maximum Marks: **60**]

(Answer ***one*** full question from each Unit. Each full question carries **15** marks)

UNIT – I

III. a. Derive radar range equation. Explain the factors that affect the Maximum range of radar. (9)

b. Describe the frequency ranges used in radar systems. (6)

OR

IV. a. Explain the following terms with reference to the radar system.

(i) Receiver noise (ii) Radar cross section of targets (10)

b. Explain the applications of radar system. (5)

UNIT – II

V. a. Describe different radar displays (any three). (9)

b. Draw the block diagram of MTI signal processer. (6)

OR

VI. a. With the help of a block diagram explain the operation of a FM-CW radar. (9)

b. Explain the Doppler Effect in radar system. (6)

UNIT- III

VII. a. With the help of a suitable diagram explain the LORAN navigation system. (9)

b. Describe the working principle of loop antenna. (6)

OR

VIII. a. Draw the block diagram of ground equipment used in VOR and explains its working. (9)

b. Describe radio compass ADF with the help of neat diagram. (6)

UNIT - IV

IX. a. Briefly explain Microwave Landing System. (9)

b. Write short notes on GALILEO, QZSS, and IRNSS. (6)

OR

X. a. Explain the operation of instrument landing system. (10)

b. Briefly explain inertial navigation system. (5)

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