

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL - 2025**

RADAR AND NAVIGATION

[Maximum marks: 100]

[Time: 3 Hours]

PART – A

Maximum marks: 10

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

1. Define minimum detectable signal.
2. What is Doppler effect in Radar system?
3. List any two applications of FM-CW Radar.
4. State limitations of DME.
5. List any two types of landing system.

(5 x 2 = 10)

PART – B

Maximum marks: 30

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

1. Describe different frequency ranges used in Radar.
2. Compare a pulse radar with a CW Radar.
3. Explain the operation of PPI display used in Radar.
4. Describe four methods of Navigation.
5. With the help of neat diagram explain the principle of operation of Goniometer.
6. Describe Differential Global positioning system.
7. Briefly explain Inertial navigation 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 the Radar range equation. Explain the factors that affect the maximum range of Radar. (9)
- (b) Explain applications of Radar. (6)

OR

- IV.** (a) Describe the basic block diagram of Radar. (10)
(b) Write short notes on:
(i) Signal to noise ratio
(ii) Radar cross section (5)

UNIT – II

- V.** (a) With the help of neat diagram explain various types of radar displays. (10)
(b) Draw the block diagram of MTI signal processor. (5)

OR

- VI.** (a) With the help of block diagram explain the operation of FM-CW radar. (10)
(b) Explain the Doppler effect. (5)

UNIT - III

- VII.** (a) Explain the working principle of OMEGA and DECCA hyperbolic navigation system. (9)
(b) Describe the working principle of loop antenna. (6)

OR

- VIII.** (a) With the help of a neat diagram, explain the LORAN navigation system. (8)
(b) Draw the block diagram of VOR receiver and explain its operation. (7)

UNIT – IV

- IX.** (a) Explain the operation of Instrument Landing system. (9)
(b) List the advantages and disadvantages of microwave landing system. (6)

OR

- X.** (a) Explain the principle of operation of GPS navigation system. (9)
(b) Write short notes on:
(i) DORIS
(ii) GALILEO (6)
