

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018

RADAR AND NAVIGATION

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

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

1. Define pulse repetition frequency in radar system.
2. Write the expression for Doppler shift in frequency.
3. State the use of MTI radar.
4. State the principle of hyperbolic navigation system.
5. List any four applications of GPS navigation system.

(5 × 2 = 10)

PART — B

(Maximum marks : 30)

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

1. With the help of a simple diagram explain the basic principle of radar.
2. Explain how a confusion in range arises due to the pulse repetition frequency.
3. With the help of a simple block diagram explain the operation of delay line canceller.
4. Explain various types of tracking radars.
5. With the help of diagrams explain the principle of operation of loop antenna.
6. Draw the block diagram of Distance Measuring Equipment. Explain its operation.
7. Briefly explain the Differential GPS system.

(5 × 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 a radar. 9
- (b) Explain the applications of radar system. 6

OR

- IV Explain the significance of the following with reference to a radar system.
- (i) Radar cross section of targets (ii) Minimum detectable signal
- (iii) Receiver Noise 15

UNIT — II

- V (a) With the help of diagrams explain various types of radar displays. 10
- (b) Draw the block diagram of simple MTI Signal Processor. 5

OR

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

UNIT — III

- VII (a) Draw and explain the block diagram of ground equipment used in VOR. 8
- (b) With the help of diagrams explain the principle of operation of goniometer. 7

OR

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

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) Briefly explain the IRNSS navigation system. 7
- (b) Briefly explain the GNSS navigation system. 8