Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER B. TECH. (E & C) DEGREE END SEMESTER EXAMINATION
DECEMBER 2018/ JANUARY 2019
SUBJECT: RADAR AND NAVIGATION (ECE - 4032)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. Starting from fundamentals, derive an expression for a radar range while considering the receiver noise, and discuss the factors affecting the maximum range of a Radar.

1B. With a neat block diagram, explain the working of pulse radar system.

(6+4)

2A. With neat diagrams, discuss the working principle of branch type duplexer.

2B. Explain different types of displays used in radar.

2C. A low power, short range radar has an overall noise factor 3. If the antenna diameter is 1 meter, the IF bandwidth is 500kHz,the operating frequency is 8GHz and the radar set is supposed to be capable of detecting targets of $5m^2$ cross-sectional area at a maximum distance of 12km, what must be the peak transmitted pulse power?

(3+3+4)

3A. With necessary diagrams and equations, explain:

i. the working principle of MTI Radar
ii. Butterfly effect
iii. Single delay line canceller

3B. Explain the triangulation in GPS system and discuss the applications of GPS.

(6+4)

4A. With neat diagrams explain array beamforming. Also compare passive phased array radar with active phased array radar.

4B. With a neat block diagram, explain CW radar with nonzero IF receiver.

(6+4)

5A. With neat diagrams, explain MLS.

5B. With a neat block diagram, explain pulse Doppler radar.

(6+4)