Reg. No.



## SEVENTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION DECEMBER 2021-JANUARY 2022 SUBJECT: RADAR AND NAVIGATION SYSTEMS (ECE -4084)

## **TIME: 75 minutes**

## MAX. MARKS: 20

## Instructions to candidates

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

Q. No.	Questions	Marks
1A.	Starting from fundamentals, derive an expression for a radar range, while	5
	considering the receiver noise, and discuss the factors affecting the maximum	
	range of a radar	
1B.	A radar transmitter has a peak pulse power of 300kW, a PRF of 1200pps and a	3
	pulse width of 0.9µS. Calculate (i) the maximum unambiguous range (ii) the duty	
	cycle (iii) the average transmitted power	
1C.	A Doppler radar operating at 12GHz, is intended to detect target velocities	2
	ranging from 14.4km/hr to 108km/hr. What is the required passband of the	
	Doppler filter?	
2A.	With neat diagrams, explain instrument landing system used in aircraft landing.	5
	Compare it with GAGAN system	
2B	An earth station with a transmitter power of 120W, a frequency of 6GHz, and an	3
	antenna gain of 42dB transmits to a satellite repeater. The receiver antenna on the	
	satellite has a gain of 31 dB, and the satellite is in a synchronous orbit 35900 km	
	above the earth. What is the received power, in dBm?	
2C	An FM CW Radar working at 4GHz has frequency excursions of 60MHz, a	2
	modulating frequency of 100Hz, and a range of 300 meters. Find the beat note	
	frequency	