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Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025

Guidance and Navigation

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1			M	L	C
Q.1	a.	Explain the basic principle of radar with the help of a drawing.	8	L1	CO1
	b.	Explain what is Geonoid.	5	L3	CO1
	c.	Define navigation and guidance.	7	L3	CO2
OR					
Q.2	a.	Derive the expression for the range of a radar.	8	L3	CO1
	b.	Explain the various electro magnetic waves that are emitted by the radar.	5	L2	CO1
	c.	Draw the schematic system to include various elements in the radar system.	7	L1	CO2
Module – 2					
Q.3	a.	Explain MTI and pulse Doppler radar. Mention the advantages of each.	8	L3	CO3
	b.	Derive that equation for the maximum range of a pulse radar.	7	L2	CO2
	c.	Calculate the maximum range of a radar for the following specification: Peak power transmitted by the radar $P_t = 250$ kW, gain of transmitting antenna $G = 4000$. Effective aperture of the receiving antenna $A_e = 4\text{m}^2$, Radar cross-section of the target $\sigma = 25\text{m}^2$. Power of minimum detectable signal $S_{\min} = 10^{-12}\text{W}$.	5	L1	CO1
OR					
Q.4	a.	Explain conical scanning and sequential lobbing in radar.	8	L3	CO3
	b.	Explain automatic tracking with surveillance radar.	7	L2	CO2
	c.	What is G.P.S and explain the system.	5	L1	CO1
Module – 3					
Q.5	a.	Explain closed loop and open loop system with examples. Give the advantages of them.	5	L3	CO2
	b.	How is roll stabilization carried out in a missile?	8	L3	CO3
	c.	Write about missile aerodynamics with a neat sketch.	7	L3	CO2

OR

Q.6	a.	What is the advantage of open loop system?	5	L1	CO1
	b.	Describe with a neat diagram, the acceleration command control.	8	L2	CO2
	c.	Draw a neat sketch of a missile, mark the various elements and describe them.	7	L3	CO3

Module – 4

Q.7		Write short notes on:			
	a.	Proportional navigation system	10	L1	CO4
	b.	Bank to turn missile guidance.	10	L3	CO2

OR

Q.8	a.	What are the different types of guidance system in a missile?	5	L1	CO1
	b.	Compare the various guidance system of a missile.	8	L2	CO3
	c.	Draw the configuration of a missile for low weight and cost to have Bank to Turn Maneuver.	7	L3	CO2

Module – 5

Q.9	a.	Explain director of fire control system.	10	L1	CO1
	b.	With a neat diagram, explain the autopilot in a missile.	10	L2	CO3

OR

Q.10	a.	Explain missile longitudinal flight control system.	10	L3	CO3
	b.	Explain lateral flight control of a missile.	10	L2	CO2
