BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MTECH/PRE-PHD **SEMESTER: I**
BRANCH: SER/MECH **SESSION: MO/2025**

SUBJECT: SR514 ROCKET AND MISSILE STRUCTURE

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**

			CO	BL
Q.1(a)	Which air breathing engine is most preferred in the missile application and why?	[2]	CO1	L2
Q.1(b)	How missiles are classified based on their range? Also provide ranges for each type.	[3]	CO1	L3
Q.1(c)	Explain in brief about the working of a command guidance system? Also write its advantages and disadvantages.	[5]	CO1	L4
Q.2(a)	What is the main function of a missile control system?	[2]	CO2	L2
Q.2(b)	Explain in brief how an aerodynamic control system is used in the missiles?	[3]	CO2	L2
Q.2(c)	What are the main features that are considered while designing a wing for the missiles? How the wings utilized in missile is different from that used in an aircraft? Explain in brief.	[5]	CO2	L3
Q.3(a)	What are the problems associated with glass fiber reinforcements and how it is rectified?	[2]	CO3	L2
Q.3(b)	What properties of composite materials make them a better choice as compared to conventional materials? Which component of the composite materials provides strength and stiffness to the composite?	[3]	CO3	L3
Q.3(c)	What are the methods of composite manufacturing used for the manufacture of cylindrical objects? Use diagrams for explaining the process. What are the advantages and disadvantages?	[5]	CO3	L3
Q.4(a)	What types of insulations are used in a missile and why?	[2]	CO4	L2
Q.4(b)	Describe the flow sheet for the weight prediction for a missile? Which components of the missile have the maximum weight consideration and why?	[3]	CO4	L3
Q.4(b)	Describe the design considerations of airframe materials? What airframe material is used for operation at subsonic and low supersonic Mach number? What is the failure modes of composite materials used for airframe structures?	[5]	CO4	L4
Q.5(a)	What is the function of a warhead used in the missiles?	[2]	CO5	L2
Q.5(b)	What are the main components that are analyzed while considering the system requirements of a missile for any particular application? Explain in brief.	[4]	CO5	L4
Q.5(c)	How system integration and their optimization play an important role in the overall performance of the missile? Explain in brief.	[4]	CO5	L3

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