

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO-2022)

CLASS: M.TECH/PRE-PHD
BRANCH: SER

SEMESTER : I
SESSION : MO/2022

TIME: 03 HOURS
SUBJECT: SR514 ROCKET AND MISSILE STRUCTURE

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.

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- Q.1(a) Why air to air missiles are generally said to be more challenging missile compared to the surface to surface to missiles? [2]
- Q.1(b) Write in brief about NASP? [3]
- Q.1(c) How the missiles are classified based on the target? Explain in details about two of them. [5]
- Q.2(a) Why turbojet engine is less preferred engine for the missile application? [2]
- Q.2(b) Write in brief about various performance parameters that govern the development of rocket engine to be used for missile applications. [4]
- Q.2(c) How homing guidance are utilized for the missile applications? Explain in brief along with suitable figures. [4]
- Q.3(a) What are the problems associated with glass fiber reinforcements? How can it be rectified? Why are fillers used in the processing of composites? What are the various types of fillers used? [5]
- Q.3(b) Which method of manufacturing of composites is best suited for the manufacture of cylindrical objects? Use diagrams for explaining the process. What are the advantages and disadvantages of this method? [5]
- Q.4(a) What would be the weight prediction for a missile wing if the wing is designed by strength considerations? What is the Q factor in the different types of wing designs? [5]
- Q.4(b) Which component of the missile has the maximum weight consideration? If a solid rocket motor or a liquid rocket motor is used to power the missile, what are the weight considerations used? [5]
- Q.5(a) Why strain analysis of solid propellant grain is so important from the design point of view? [2]
- Q.5(b) How fragmentation warhead is utilized for destructive missile applications? [3]
- Q.5(c) Write all the main design criteria to be taken care considering its operation during powered flight, in space and reentry of the missiles. [5]

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