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**JAYA GROUP OF INSTITUTION-THIRUNINRAVUR**  
**8<sup>TH</sup> SEMESTER – B.E. /B.Tech**  
**INTERNAL ASSESSMENT-II (MODEL EXAMINATION-II)**

**Sub. Name:** ROCKETS & MISSILE  
**Sub. Code:** AE 2033  
**Duration:** 180Minutes

Date: 09/03/2015  
Branch: **Aeronautical**  
Max.Marks: 100

**PART-A (10\*2=20)**

1. What are the difference types of drag produced on a missile?
2. Mention the aerodynamic characteristics of Air-Air missiles.
3. What are the three parameters defining  $c_l$  and  $c_d$  coefficients?
4. Distinguish between subsonic leading edge and supersonic leading edge of a missile airframe?
5. How do you classify missiles based on aerodynamic control?
6. Define ignition system.
7. What is propellant slosh in a liquid rocket engine?
8. What is the role of cavitation in propellant tank outlet design?
9. What is chugging in solid propellant burning?
10. What are the methods of cooling in liquid rockets?

**PART-B (5\*16=80)**

11.A) i) Derive the relation for forces, moments and acceleration acting on a missile vehicle passing through atmosphere. (10)

ii) Explain the role of fins in the flight stability of rockets and missiles. (6)  
(or)

B) With a neat sketch, explain the airframe components of rockets and missiles. (16)

12.A) i) What are the various types of rocket dispersion? What are the possible reasons behind the dispersion of rockets. (6)

ii) What are different types of drag acting on a missile. Explain in detail. (10)  
(or)

B) What is a missile? Explain the different types of missiles. (16)

13.A) i) Explain the forces acting on a missiles in flight. (6)

ii) Derive the following relation  
Lateral aerodynamic moment of the rocket (4),  
Longitudinal moment of the rocket (4).  
(or)

B) What is the use of an igniter? List out the types of igniters used in rocket propulsion system. Explain with a neat sketch pyrotechnic type igniter and jelly roll with advantages and disadvantages. (16)

14.A) i) What are the main design consideration in igniter of a rocket propulsion system.

ii) Explain the design consideration of a combustion chamber in rocket engines.  
(or)

B) What is the function of an injector? Explain the various types of injectors in liquid propellant rocket engine. (16)

15.A) i) Explain with a neat sketch working of gas pressure fuel system. (8)

ii) Explain the combustion of liquid propellants in rockets. (8)  
(or)

B) i) Explain with a neat sketch working of turbo pump fuel system. (8)

ii) What is combustion instability and what are its causes. Explain the types of combustion instabilities. (8)