

B.E., DEGREE EXAMINATIONS: JUNE/ JULY 2013

Seventh Semester

AERONAUTICAL ENGINEERING

AER129: Combustion Techniques

Time: Three Hours

Maximum Marks: 100

Answer ALL Questions:-

PART A (10x1=10 Marks)

1. Rankine – Hugoniot relation between
 - A. Mach wave
 - B. Expansion fan
 - C. Shock wave
 - D. Oblique shock
2. Smokeless powder used in
 - A. Firearms
 - B. Amendments
 - C. Propellants
 - D. All the above
3. Diffusion flame obtained only in
 - A. Solid
 - B. Gases
 - C. Liquid
 - D. Hybrid
4. Flow velocity increases and _____ is introduced
 - A. Turbulence
 - B. Reaction rate
 - C. Turbulent burning
 - D. Flame zone
5. Combustion depends on
 - A. Mass flow
 - B. Burning rate
 - C. Molar flow rate
 - D. All the above
6. Internal combustion engines produces
 - A. Air pollution
 - B. Mechanical Energy
 - C. Particulate matter
 - D. All the above
7. Dieseling means
 - A. incandescence
 - B. run-on
 - C. spark knock
 - D. pinging
8. Can combustors are _____ combustion chamber
 - A. self contained cylindrical
 - B. self contained circular
 - C. self contained annular
 - D. None of the above
9. combustion of a fuel spray controlled by droplets means
 - A. Primary combustion
 - B. Secondary combustion
 - C. Tertiary combustion
 - D. Droplet combustion
10. Chugging is
 - A. Combustion instability
 - B. Combustion stability
 - C. Combustion
 - D. Oxidizer

PART B (10 x 2 = 20 Marks)

11. Define Chemical kinetics.
12. List out the different types of mixtures
13. What is meant by diffusion of flame?
14. Differentiate between jet flame and diffusion flame.
15. Define combustion efficiency.
16. List out the detonation preventive methods.
17. What are preliminary requirements of combustion?
18. What is meant by after burner?
19. Define boundary layer combustion.
20. Differentiate liquid and solid propellants

PART C (5 x 14 = 70 Marks)

21. a) Briefly explain about ideas of deflagration and detonation
(OR)
b) Discuss about Reaction mechanism and chain reactions

22. a) With help of a neat diagram, explain the working principle of Burke Schumann flames
(OR)
b) Discuss about Experimental methods of measuring burning velocity and its limitations

23. a) Explain the working principle of combustion process in piston engines.
(OR)
b) Discuss about the detonation in reciprocating engines and suggest the preventive methods

24. a) What are the factors affecting the combustion and explain briefly.
(OR)
b) Discuss about after burner systems and its advantages.

25. a) Explain about the solid propellants and its limitations
(OR)
b) Discuss about combustion of liquid propellant rockets.
