

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (S), AUGUST 2023

MECHANICAL ENGINEERING

(2020 SCHEME)

Course Code : 20MET342

Course Name: IC Engine Combustion And Pollution

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Define the term “residual fraction” associated with combustion in I.C. engines.
2. List the working fluid constituents in S.I and C.I. engines during compression stroke.
3. How S.I. engine is different from C.I. engines?
4. Draw the ideal P-θ diagram of combustion in C.I. engine.
5. What are the factors that affect the physical delay in the case of combustion in C.I. engines?
6. Explain the term “Diesel knock”
7. What are the disadvantages of using natural gas in internal combustion engines?
8. List the advantages of using hydrogen as a fuel.
9. How a catalytic converter controls air pollution?
10. List the major pollutants from S.I. engines.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Explain about different design and operating parameters that affect the performance of an I.C. engine. (10)
b) Define the term “Specific emissions” (4)

OR

12. a) Define the terms (i) Compression ratio (ii) bmep (iii) Fuel/Air ratio (iv) Specific Fuel consumption. (10)
b) Write the combustion stoichiometry equation for the fuel C_aH_b . (4)

MODULE II

13. a) With the help of a P- θ diagram explain the stages of combustion process happening in S.I. engines. (10)
b) Why a S.I. engine requires a rich mixture at Full load? (4)

OR

14. a) Explain abnormal combustion in SI Engine (10)
b) What are the types of combustion chambers used in S.I. engines? (4)

MODULE III

15. a) With the help of a P- θ diagram explain the stages of combustion in C.I. engine. (10)
b) What is a "Pre-chamber"? (4)

OR

16. a) Explain about various combustion chambers used in C.I. engines. (10)
b) List any four factors that affect the ignition delay in C.I. engines. (4)

MODULE IV

17. a) List and explain about any four alternative fuels that can be used in an Internal Combustion engine. (10)
b) What are the benefits of alternative fuels? (4)

OR

18. a) With the help of a suitable diagram explain about HCCI combustion. (10)
b) What are the advantages of HCCI engines? (4)

MODULE V

19. a) Explain in detail about the genesis and formation of pollutants in S.I and C.I engines. (10)
b) Define Octane number. (4)

OR

20. a) With the help of neat sketches explain about any two emission control methods used in I.C engines. (10)
b) Explain how knocking tendency is related to fuel quality in C.I engines? (4)
