

Roll No



**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023**

Semester : Semester VI - 2020

Course Code : MEC4009

Course Name : Sem VI - MEC4009 - I C Engines and Fuels

Program : MEC

Date : 16-JUN-2023

Time : 9.30AM - 12.30PM

Max Marks : 100

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS

(10 X 2 = 20M)

1. What is the ratio of cylinder volumes called? Provide its expression and state its effect on performance of engines. (CO1) [Knowledge]
2. List any four additives used in LPG (CO2) [Knowledge]
3. Define and say whether HOT SPOT affects combustion or not. (CO3) [Knowledge]
4. Explain why modern day petrol engines don't have a carburetor. (CO3) [Knowledge]
5. Define and list the different types of abnormal combustion in SI engines. (CO3) [Knowledge]
6. Are biofuels and biodiesels same? Explain. (CO2) [Knowledge]
7. Are emission norms applicable to only vehicles? explain. (CO4) [Knowledge]
8. Emission norms are generally applied more to cities and not village areas. Is it logical? Comment. (CO4) [Knowledge]
9. How is the piston held tight against the cylinder wall? Explain about its types. (CO1) [Knowledge]
10. Comment on the essentiality of emission norms. (CO4) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(5 X 8 = 40M)

11. Combustion in SI engines is characterized by initiation and smooth movement of the flame. Explain combustion phenomenon in SI engine with proper sketches.
(CO3) [Comprehension]
12. Fuels used in petrol and diesel engines differ in their qualities and have different requirements. Draw a neat sketch and explain the process of petroleum distillation.
(CO1) [Comprehension]
13. Combustion in CI engines is by auto-ignition. But still the phenomenon of Knocking occurs in it leading to disasters. Explain the different factors that affect knocking in CI engines.
(CO3) [Comprehension]
14. Explain the formation of Particulate matter and NO_x with equations.
(CO4) [Comprehension]
15. Generally vegetable oils are thicker than neat diesel and hence they will create problems for injection system. Hence reducing its viscosity is an important requirement. Explain Transesterification process with a neat diagram.
(CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

(4 X 10 = 40M)

16. Liquid Petroleum Gas is one of the alternate fuels in demand. Define it and list the advantages and disadvantages of using LPG as a fuel.
(CO2) [Application]
17. A combustion chamber is the place where combustion happens and has to account for combustion process that satisfies the requirements. Hence different designs are tried to eliminate faults. Properly sketch various combustion chamber designs of SI engines and explain.
(CO3) [Application]
18. Thermal Reactor Package is one of the important methods in reducing pollution levels. Explain with diagram.
(CO4) [Application]
19. What is Morse Test? Find the IP of each cylinder and the total IP for a six-cylinder petrol engine the measured brake power outputs when one cylinder is cutoff and load is reduced to keep the speed constant are given below. At the full load with all cylinders working, the brake output was found to be 65kW. Also find the Mechanical Efficiency.
BPcylinder one cutoff = 50 kW
BPcylinder two cutoff = 49.5 kW
BPcylinder three cutoff = 49 kW
BPcylinder four cutoff = 49.8 kW
BPcylinder five cutoff = 49.6 kW
BPcylinder six cutoff = 55.2 kW
(CO1) [Application]