

The Assam Royal Global University, Guwahati
Royal School of Engineering and Technology
B.Tech., 6th Semester
Semester End Examination, August, 2021
Course Title: Internal Combustion Engines
Course Code: MEE022C602

Time: 3 Hours

Maximum Marks: 70

Note: Attempt all questions as per instructions given.
The figures in the right-hand margin indicate marks.

Section –A

Q.1. Attempt all questions. (Maximum word limit 50)

2 x 8=16

- a. Define compression ratio.
- b. Name the constituent hydrocarbon in LPG.
- c. Knock in CI Engines is caused by the _____ of injected fuel.
- d. What is the function of pre combustion chamber in CI engines?
- e. What are the sources of non-exhaust emission from IC engines?
- f. What is supercharging?
- g. Name the different types of Ignition system.
- h. Define mechanical efficiency.

Q.2. Answer any two of the following.

6 x 2=12

- a. Explain the valve timing for low speed and high speed engines with suitable diagrams.
- b. Name the reference fuels used in the determination of Octane Number. With suitable diagram, explain the phenomenon of knock in SI engines.
- c. Differentiate between Port injection and Throttle-body injection with suitable diagram.

Q.3. Answer any two of the following.

7 x 2=14

- a. With suitable diagram, explain the stages of combustion in CI engines.
- b. What is delay period and what are the factors that affect it?
- c. Discuss the factors on which the design of combustion chamber for IC engines depend.

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Section –B

Q.4. Answer any two of the following.

7 x 2=14

- Define volumetric efficiency. Differentiate between supercharging and turbocharging.
- What is a thermal converter? How does it help to reduce emissions from engines?
- Describe the working of a magneto ignition system.

P.T.O

Q.5. Answer any two of the following.

7 x 2=14

- For an ideal Otto cycle the temperatures at the beginning and end of compression are 50°C and 373°C respectively. Determine the compression ratio and air standard efficiency of the engine. Assume $\gamma = 1.4$.
- A single cylinder 4-stroke diesel engine develops 25 kW at 2500 rpm. Its bsfc is 0.3 kg/kW h. The fuel is injected at a pressure of 150 bar over a crank travel of 25° . The pressure in the combustion chamber is 40 bar. Calculate the diameter of fuel orifice if the density of fuel is 850 kg/m^3 .
- An engine working on Otto cycle consumes 10 liters of petrol per hour and develops 25 kW. If the density and CV of petrol are 750 kg/m^3 and 44 MJ/kg, determine the indicated thermal efficiency of the engine.

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