



**KERALA AGRICULTURAL UNIVERSITY**  
**B.Tech.(Agri. Engg.) 2019 Admission**  
**IV Semester Final Examination- November 2021**

**Fpme. 2207**

**Thermodynamics and Automotive Engines (2+1)**

**Marks: 50**  
**Time: 2 hours**  
**(10x1=10)**

**I Fill in the blanks**

1. Variation of pressure and volume at constant temperature are correlated through \_\_\_\_\_ law.
2. For a non-flow constant pressure process the heat exchange is equal to change in \_\_\_\_\_.
3. In the case of a \_\_\_\_\_ cycle, increasing the cut-off ratio will increase mean effective pressure.
4. In four stroke engines, the camshaft is connected to the crankshaft by gears or chain and rotates at \_\_\_\_\_ the crank speed.
5. A four stroke petrol engine theoretically operates on \_\_\_\_\_ cycle.
6. For a practical petrol engine working on Otto cycle, the compression ratio usually lies in the range \_\_\_\_\_.
7. \_\_\_\_\_ air fuel mixture is required for Cruising.
8. The ignition quality of a petrol engine fuel is expressed as \_\_\_\_\_ number.
9. At the most probable state of a system the entropy of the system is \_\_\_\_\_.
10. Common rail direct injection system is adopted in \_\_\_\_\_ engines.

**II Write short notes on ANY FIVE of the following**

**(5x2=10)**

1. Prove the equivalence of Kelvin-Planck statement with Clausius statement of second law of thermodynamics.
2. Draw petrol cycle on P-v and T-s diagrams.
3. Explain the terms Indicated-, Frictional- and Brake- powers.
4. Draw a typical valve timing diagram for a four stroke diesel engine.
5. Differentiate between 'Detonation' and 'Knocking' phenomenon.
6. List important properties of Coolants used in IC engines.
7. Sketch the Battery Ignition system used in SI engines.

**III Answer ANY FIVE of the following**

**(5x4=20)**

1. What are the higher and lower heating values of fuel? What do you understand by term 'Equivalence Ratio'?
2. What do you understand by supercharging? How is it achieved? What are the effects of supercharging on
  - (i) Power output
  - (ii) Mechanical efficiency and
  - (iii) Fuel consumption
3. Derive an expression for the Air Standard efficiency of Diesel Cycle.
4. Explain the fuel metering system in Diesel engine fuel pumps.
5. Explain a method for measuring IHP and BHP of a Petrol Engine.

6. What is the purpose of Piston Rings?
7. What is the need of Governing an IC engine? List various types of governors.

- IV Write an essay on ANY ONE of the following (1x10=10)**
1. Explain the construction and working of a simple carburetor with the help of a neat sketch.
  2. Sketch and explain the engine lubrication system in IC engines. What are the desirable properties of lubricant for use in IC engines?

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