



KERALA AGRICULTURAL UNIVERSITY

B.Tech.(Agri. Engg) 2017 Admission

IV Semester Final Examination- June 2019

Fpme. 2207

Thermodynamics and Automotive Engines (2+1)

Marks: 50

Time: 2 hours

(10x1=10)

I Fill in the blanks.

- 1 If each molecule is described in a system, then it is _____ approach.
- 2 A system whose chemical composition and physical properties are the same in all parts of the system is _____.
- 3 Specific volume is an _____.
- 4 If the atmospheric pressure is 760 mm of Hg and gauge pressure is 2 bar, then, the Absolute pressure will be _____ bar.
- 5 Heat is a _____ function.

State True or False

- 6 A process which permits transfer of mass across the boundary of the system is known as Flow process.
- 7 The absolute pressure of a given mass of a perfect gas varies inversely as its volume, when the temperature remains constant. This is Charles's Law.
- 8 If the value of specific heat at constant pressure 'Cp' = 1.0325 and R = 297 J/kgK, The value of Adiabatic index γ is 0.7355 kJ/kgK.
- 9 First law of thermodynamics deals with conservation of momentum.
- 10 The change in internal energy during Isothermal process will be equal to the work done.

II Write short notes/answers etc on ANY FIVE

(5x2=10)

- 1 Kelvin-Planck's and Clausius statement of second law of thermodynamics
- 2 Represent general law of expansion or compression of gas in a PV diagram and what happens when the value of 'n' varies from 0 to ∞
- 3 'Entropy' of a gas
- 4 An inventor claims to have developed an efficient heat engine which would have a heat source at 1000°C and reject heat to a sink at 50°C and gives an efficiency of 90%. Justify whether his claim is possible
- 5 Fuel injectors.
- 6 Function of a governor.
- 7 SAE scales and API scales

III Answer any FIVE of the following.

(5x4=20)

- 1 A certain gas occupies a space of 0.3 m³ at a pressure of 2 bar and a temperature of 77°C. It is heated at a constant volume, until the pressure is 7 bar. Determine: 1.temperature at the end of the process; 2. mass of the gas; 3.change in internal energy; and 4.change in enthalpy during the process. Assume Cp=1.005 kJ/kg K; Cv =0.712 kJ/kg K

P.T.O

- 2 Derive an expression for ideal efficiency of a diesel cycle, using ideal air as the working fluid.
- 3 Properties of fuel used in IC engines.
- 4 What is meant by heat balance? What are the factors to be considered?
- 5 Different types of lubricating systems.
- 6 Electrical system of an IC engine.
- 7 Knocking and the methods to prevent it.

IV Answer any ONE of the following

- 1 Application of valve timing diagram. With neat sketch, explain about the valve timing diagram of petrol and diesel engines. (1x10=10)
- 2 Engine cooling systems.
