KERALA AGRICULTURAL UNIVERSITY

B.Tech. (Agrl. Engg.) 2015 Admission

3rd Semester Final Examination-January- 2017

Cat. No: Fpme 2107

Marks: 50

Title:Thermodynamics and Heat engine(2+1)

Time : 2 hours

I. Fill up the blanks: **(10 x 1=10)**

1. The perfect gas obeys --------- and ---------laws.
2. Temperature is ---------property of the steam.
3. Ports are provided in --------- type of engine.
4. Compressor capacity is expressed in terms of ---------
5. --------- is used to supply mixture of fuel and air in correct proportion in a petrol engine.
6. Ignition quality of diesel is represented by ---------
7. Gas turbine plant is an example for --------- cycle.
8. The constant volume cycle is also called ---------
9. During adiabatic process --------- remains constant.
10. The Lancashire boiler is a --------- type of boiler.

II. Write short note on ANY FIVE: **(5x 2=10)**

1. Define Cetane number and cut off rate.
2. Classify the air compressor and explain.
3. Write short note on fuel injector and spark plug.
4. Why cooling is necessary for IC engine.
5. Compare petrol engine with diesel engine.
6. Explain valve timing diagram of two stroke engine.
7. Explain the laws of thermodynamics.

III Write answers on ANY FIVE: **(5x 4=20)**

1. Calculate the thermal efficiency of an engine working in the Otto cycle. The bore and stroke of the cylinder are 20cm and 38cm respectively. The clearance volume is $0.0032m^3$.assume g=14.
2. Explain the working two stroke SI engine with neat sketching.
3. Derive an expression for air standard efficiency of diesel cycle.
4. Derive an expression for thermal efficiency of Otto cycle.
5. Find the enthalpy, internal energy and entropy of 1 kg of steam at a pressure of 10 bar.
   d. When steam is dry saturated
   e. When steam is 0.75 dry and
   f. When steam is super heated to 250°C

6. Derive an expression for the workdone during polytropic process.
7. A four stroke four cylinder gas engine has cylinder diameter of 25 cm, stroke bore ratio is 1.8, clearance volume is 45 cm^3, engine speed 240rpm, mean effective pressure 6.8kg/cm^2 and mechanical efficiency is 75% calculate 1HP, BHP, swept tolerance and compression ratio.

IV. Write essay on any ONE **(1 x 10=10)**

1. (a) List the desirable properties of the fluid used in lubrication system and explain splash type lubrication system.

   (b) Define a governor and mention the classification of governor and explain any one.

2. (a) What do you mean by reversible adiabatic process? Derive the expression PV^{γ}= Constant. (γ= ratio of specific heat).

   (b) Explain with a neat sketch the working of a forced circulation water cooling system.

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