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M.TECH

Total Number of Pages : 2

M.TECH 1ST SEMESTER REGULAR EXAMINATIONS, DECEMBER 2018

INTERNAL COMBUSTION ENGINES

Branch: TE, Subject Code:MTEPE1031

(Regulations 2018)

Time: 3 Hours

Max Marks : 70

Question Code: RD18002058

PART-A (10 X 2=20 Marks)

1. Answer the following questions.
 - a. What is the importance of specific fuel consumption?
 - b. Sketch the idling system in carburetor?
 - c. What is the order of efficiencies of Otto, Dual and Diesel cycles for same compression ratio and maximum pressure?
 - d. Show the variation of pressure with A/F ratio at different compression ratios for an SI engine.
 - e. Write down the firing orders for a four cylinder and six cylinder I.C.engine.
 - f. Write two methods to measure the frictional power loss of an engine.
 - g. What do you mean term like Squish, Swirl and Tumble in combustion chamber?
 - h. What do you mean by multi fuel and dual fuel? Give examples.
 - i. Why over-cooling in an engine is harmful?
 - j. Justify, rich mixture is required for maximum power?

PART-B (5 X 10=50 Marks)

Answer any five questions from the following.

- 2.a)What are the various methods of measurement of brake power? Describe with sketch how brake power is measured by Rope brake method? [5]
b) Describe the phenomenon of knocking in SI engine. On what factors do knocking depends? [5]
- 3.a) With neat sketch describe different types of fuel injection system? [5]
b) With a neat sketch describe the modern ignition systems? [5]
- 4.a)A spark ignition engine working on Otto cycle has the compression ratio 6.The initial pressure and temperature of air are 1 bar and 37 °C. The maximum pressure in the cycle is 30 bar. For unit mass flow calculate (i) p, V and T at various point of the cycle and (ii) the ratio of heat supplied to heat rejected. Assume $\gamma=1.4$ and $R=8.314\text{kJ/kmol K}$. [8]
b) Compare air-standard and actual cycles. [2]
5. An experimental four stroke petrol engine of 1710 cm³ capacity is to develop maximum power at 5400 revolutions per minute. The volumetric efficiency at this speed is assumed to be 70 per cent and the air fuel ratio is 13. Two carburettors are to be fitted and it is expected that at peak power the air speed at the choke will be 107m/s. The coefficient of discharge for the venture is assumed to be 0.85 and that of the main petrol jet is 0.66. An allowance should be made for the emulsion tube, the diameter of which can be taken as 1/2.5 of the choke diameter. The petrol surface is 6 mm below the choke at this engine condition. Calculate the sizes of a suitable choke and main jet. The specific gravity of petrol is 0.75. Atmospheric pressure and temperature 1.013 bar and 27⁰C respectively. [5+5]



- 6.a) Explain the phenomenon of pre-ignition. How pre-ignition leads to detonation and vice versa? [5]
b) Show with suitable graphs the effect of dissociation on maximum temperature and horse power. Explain the effect of presence of CO on dissociation. [5]
- 7.a) Describe the methods of charge stratification by carburetor. [5]
b) After injection the fuel must go through a series of events to assure the proper combustion process: Describe all those in detail. [5]
- 8 Write short answer on :
a) Exhaust Gas Recirculation [5]
b) Scavenging of two stroke engines [5]

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