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M.TECH

Total Number of Pages : 2

M.TECH 1ST SEMESTER SUPPLE EXAMINATIONS, DECEMBER 2018

INTERNAL COMBUSTION ENGINES

Branch: TE, Subject Code:MTEPE1041

(Regulations 2017)

Time: 3 Hours

Max Marks : 70

Question Code: SD18002070

PART-A (10 X 2=20 Marks)

1. Answer the following questions.

- What do you mean by pumping loss in I.C.Engines?
- Define flash point and fire point of fuel for CI engines.
- What is the effect of turbocharging on SI engine?
- What is the order of efficiencies of Otto, Dual and Diesel cycles for same compression ratio and maximum pressure?
- Write the role of glow plug in CI engine?
- Write down different types of nozzles used.
- Why is over cooling in an engine harmful ?
- Draw time Vs cylinder pressure for combustion with and without knock for both SI & CI engine.
- Why a rich mixture is required for maximum power ?
- List few antiknock agent commonly used to petrol?

PART-B (5 X 10=50 Marks)

Answer any five questions from the following.

- Briefly explain the stages of combustion in SI engines elaborating the flame front propagation. [5]
 - Explain with neat sketch various types of combustion chambers used in CI engines. [5]
- With neat sketch describe the different types of fuel injection system? [5]
 - With neat sketch describe the modern ignition systems? [5]
- Alcohols are the alternate fuels for IC engines enumerate their merits and demerits [5]
 - 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 $\gamma=1.4$ and $R=8.314\text{kJ/kmol K}$. [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) Describe the methods of charge stratification by carburetor alone. [5]
b) An automobile has a 3.2Ltr, 5 cylinder, and 4stroke cycle diesel engine operating at 2400RPM. Fuel injection occurs from 20° bTDC to 5° aTDC. The engine has volumetric efficiency of 0.95 and operates with fuel equivalence ratio of 0.8. light diesel fuel is used. Calculate [5]
i. Time for one injection
ii. Fuel flow rate through an injector
7. a) Discuss about Three way catalytic converter [5]
b) Briefly explain the methods to measure brake power of an engine. [5]
8. Write short notes on
- a) Variable valve timing of engine [5]
b) Dual fuel and multi fuel engines [5]

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