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12MTP24

Second Semester M.Tech. Degree Examination, June/July 2013
Theory of I.C. Engines

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Explain the relationships between engine performance parameters. **(08 Marks)**

b. Explain why the brake mean effective pressure of a naturally aspirated diesel engine is lower than that of a naturally aspirated SI engine. **(04 Marks)**

c. The indicated thermal efficiency of four stroke engine is 32% and its me chemical efficiency is 78%. The fuel consumption rate is 20 kg/h running at a fixed speed. The brake mean pressure developed is 6 bar and the mean piston speed is 12 m/s. Assuming it to be a single cylinder sequence engine, calculate the crank radius and the speed of the engine. Take CV = 42000 kJ/kg. **(08 Marks)**

2 a. What is natural gas? What are the advantages and disadvantages of using natural gas as alternative fuels? **(10 Marks)**

b. Compare LPG and petrol as fuel for SI engines. **(10 Marks)**

3 a. What are the overall engine operating parameters of greatest interest which can be determined from a thermodynamic analysis? **(12 Marks)**

b. What is the difference between ideal cycle and fuel-air-cycle? What are the assumptions in fuel air cycle? **(08 Marks)**

4 a. What are the deficiencies of the elementary carburetor? **(06 Marks)**

b. List the major advantages and disadvantages of fuel metering with port fuel injection relative to carburetion. **(07 Marks)**

c. What are the factors should be considered in analyzing the flow through the throttle plate. **(07 Marks)**

5 a. Discuss the effect of engine variables on flame propagation. **(10 Marks)**

b. What is the importance of delay period? Discuss the variables affecting the delay period. **(10 Marks)**

6 a. Briefly discuss the major operating variables that affect SI engine performance, efficiency and emissions. **(10 Marks)**

b. Discuss the SI engine combustion chamber design objectives and options. **(10 Marks)**

7 a. What are the different methods used to measure the pressure in engine cylinder? Explain with sketch a Piston indicator. **(10 Marks)**

b. What are the methods for measurement of pollutants? Explain any one method. **(10 Marks)**

8 a. Describe the exhaust gas recirculation device for the control of oxides of nitrogen. **(10 Marks)**

b. Explain with a neat sketch:
   i) Thermal converters.
   ii) Catalytic converters. **(10 Marks)**

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