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10AU53

Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016
Automotive Engine and Components

Time: 3 hrs. Max. Marks:100

Note: *1. Answer FIVE full questions, selecting at least TWO questions from each part.*
2. Use of Data book is allowed.

PART – A

1 a. Briefly explain the history of automobile. **(06 Marks)**

b. With a neat sketch, explain the working principle of four stroke diesel engine with P.V. diagram. **(10 Marks)**

c. Write the comparison between two stroke and four stroke. **(04 Marks)**

2 a. With a neat sketch explain theoretical scavenging process. **(08 Marks)**

b. With a neat sketch, explain different scavenging system. **(12 Marks)**

3 a. With a neat sketch, explain different types of cylinder head. **(06 Marks)**

b. Compare wet liners and dry liners. **(04 Marks)**

c. A four stroke diesel engine has the following specifications:
Brake power = 5 kW, speed = 1200 rpm, I_{mep} = 0.35 MPa, mechanical efficiency = 80%.
Determine: (i) Bore and length of the cylinder, (ii) thickness of the cylinder head. **(10 Marks)**

4 a. With a neat sketch, explain any two types of mufflers. **(10 Marks)**

b. Describe the construction and functions of engine inlet and exhaust manifolds with a neat sketch. **(10 Marks)**

PART – B

5 a. Explain with the help of simple sketches the working of the compression and the oil control rings. **(08 Marks)**

b. Design cast iron piston for a single acting HS engine for the following specification:
i) Cylinder bore = 100 mm ii) Stroke = 120 mm
iii) Brake mean effective pressure = 0.65 MPa iv) Maximum gas pressure = 5 MPa
v) Fuel consumption = 0.227 Kg/KW-hr vi) Speed = 2200 rpm
vii) Calorific value = 41870 kJ/kg **(12 Marks)**

6 a. With a neat sketch describe the function, material and construction of a connecting rod. **(08 Marks)**

b. With a neat sketch, explain offset connecting rod. **(06 Marks)**

c. A reciprocating pump is used to raise the water against a heap of 165 kg. Pump diameter is 450 mm and piston rod is 1400 mm long. Calculate the diameter of the piston rod. Use Rankine constant, $a = \frac{1}{7500}$, FoS = 10, pressure on the piston = 1.61 MPa. **(06 Marks)**

7 a. With a neat sketch explain the function and constructional details of vibration dampers. **(08 Marks)**

b. A force of 120 kN acts tangentially on the crank pin of an overhang crank. The axial distance between the centre of the crankshaft journal and the crank pin is 400 mm and the crank is 500 mm long. Determine: (i) diameter and length of the crankpin journal, (ii) diameter of the shaft journal. **(12 Marks)**

8 a. With a neat sketch, explain any two types of value actuating mechanism with side camshaft. **(10 Marks)**

b. With a neat sketch explain the construction and working of positive type value rotator. **(10 Marks)**

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