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10AU53

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Automotive Engines and Components

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Classify the heat engines, on different modes. **(04 Marks)**

b. Compare SI engines with CI engines. **(08 Marks)**

c. Discuss the working procedure of 4 stroke SI engine with simple line diagrams. **(08 Marks)**

2 a. Explain the applications of IC engines. **(04 Marks)**

b. Analyse the port timing of two stroke SI engine, with diagram. **(10 Marks)**

c. What is scavenging process? List the different methods. **(06 Marks)**

3 a. Explain the functions of following components of cylinder block:
(i) Gaskets
(ii) Water jacket
(iii) Cylinder liners
(iv) Valve seats. **(12 Marks)**

b. A four stroke diesel engine has the following specifications:
Brake power : 5 kW Speed : 1200 rpm
Indicated mean effective pressure : 0.35 N/mm^2 Mechanical efficiency : 80%
Determine : (i) Bore and length of cylinder
(ii) Thickness of the cylinder head
(iii) Size of the studs for the cylinder head **(08 Marks)**

4 a. Discuss the purpose of following in engines:
(i) Crank case (ii) Oil sump (iii) Fly wheel (iv) Manifolds **(12 Marks)**

b. List out the general design considerations in the design of mufflers. **(08 Marks)**

PART – B

5 a. What is piston sleep? Explain. **(04 Marks)**

b. List the functions of piston rings. **(04 Marks)**

c. Design a cast iron piston for a single acting four stroke engine for the following data:
Cylinder bore : 100 mm ; Max. gas pressure : 5 N/mm^2
Stroke : 125 mm ; I_{mep} : 0.75 N/mm^2
Mech efficiency : 80% ; Fuel consumption : 0.15 kg/bb/hr
HCV = 42 × 10^3 kJ/kg ; Speed = 2000 rpm
Any other data required may be assumed. **(12 Marks)**

6 a. With the aid of sketch, explain the construction of a connecting rod. Also list the functions and materials required. **(10 Marks)**

b. Discuss the lubrication in connecting rod. **(06 Marks)**

c. List the forces acting on the connecting rod. **(04 Marks)**

7 a. Draw and show the components of a crankshaft and wrote the applications in engine operation. **(08 Marks)**

b. Design a plane carbon steel centre crankshaft for a single acting four stroke single cylinder engine for the following data:
Bore = 400 mm ; Stroke = 600 mm ; Engine speed = 200 rpm ; mep = 0.5 N/mm^2
Maximum combustion pressure = 2.5 N/mm^2 ; Wt. of the flywheel used as a pulley = 50 kN
Total belt pull = 6.5 kN. Assume any other data, if required. **(12 Marks)**

8 a. List out the types of valve mechanisms and explain any one type with figure. **(10 Marks)**

b. Explain the following terms:
(i) Valve seats
(ii) Sodium cooled valves
(iii) Cam shaft applications. **(10 Marks)**

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