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10AU53

Fifth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Automotive Engines 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 DDH book may be allowed.

PART – A

1 a. Give a brief history of the development of automobile. **(08 Marks)**
b. Discuss the relative merits and demerits of petrol and diesel engine. **(08 Marks)**
c. Write a brief note on application of IC engine. **(04 Marks)**

2 a. How the valve timings of a two stroke cycle engine differ from that of a four stroke cycle engine? **(08 Marks)**
b. Discuss the three theoretical scavenging processes. **(06 Marks)**
c. Define : i) Delivery ratio ii) Scavengering efficiency iii) Trapping efficiency **(06 Marks)**

3 a. What are the advantages of (i) cast iron cylinder block and (ii) aluminium cylinder block. **(08 Marks)**
b. What is the function of a gasket? What are the essential requirements of a gasket? Name any four gaskets. **(08 Marks)**
c. The cylinder of a four stroke diesel engine has the following specifications:
Cylinder bore = 150 mm
Maximum gas pressure = 3.5 MPa
Cylinder material = grey cast iron with allowable stress $\sigma_t = 40$ N/mm^2
Allowance for reboring = 4 mm
Determine the thickness of cylinder wall. **(04 Marks)**

4 a. What are the functions of sump? Explain the constructional features of an oil sump with sketch. **(10 Marks)**
b. Explain the design consideration of an inlet manifold. **(06 Marks)**
c. Name the types of Silencers. **(04 Marks)**

PART – B

5 a. Name the commonly used materials for IC engine piston. Compare the advantages of cast iron piston over aluminium alloy pistons. **(08 Marks)**
b. Differentiate between full floating and semifloating connections of piston pin. **(04 Marks)**
c. Following data is given for the piston of a four stroke diesel engine:
Cylinder bore = 250 mm
Allowable tensile stress = 100 N/mm^2
Radial pressure on cylinder wall = 0.03 MPa
Number of piston rings = 4
Calculate : (i) Radial width of piston rings (ii) Axial thickess of Piston rings **(08 Marks)**

6 a. Illustrate with suitable sketch the buckling of connecting rod. **(08 Marks)**

b. Determine the cross section of a connecting rod (I-section) for a high speed IC engine using following data :

Cylinder bore = 125 mm
Maximum gas pressure = 3.5 MPa
Factor of safety = 5.
Length of connecting rod = 300 mm
Assume compressive stress $\sigma_c = 330$ MPa. **(12 Marks)**

7 a. Discuss the proportion dimensions of a crank shaft. **(06 Marks)**

b. Write a note on selection of materials and heat treatment of a crank shaft. **(08 Marks)**

c. What are the types of bearing associated with crank shaft? Explain each. **(06 Marks)**

8 a. Explain with neat sketch a overhead valve operating mechanism. **(10 Marks)**

b. Explain the following in brief:

i) Valve cooling
ii) Valve rotators
iii) Valve guides
iv) Valve seats
v) Rocker arm

(10 Marks)

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