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CBCS SCHEME

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15AU72

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Automotive Engine Components Design and Auxiliary Systems

Time: 3 hrs. Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume missing data suitably.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. What is need of cylinder liner? Briefly explain dry type liners. **(06 Marks)**

b. The cylinder of a four stroke diesel engine has the following specifications:
Brake power = 5kW, Speed = 600rpm, Indicated mean effective pressure = 0.5MPa, Mechanical Efficiency = 80%, Stroke length to cylinder diameter ratio = 1.5, Allowable circumferential stress for cylinder liner = 50MPa, Maximum gas pressure = 5N/mm^2, Reboring allowance = 3.36mm, Allowable circumferential stress for cylinder head = 40MPa. Calculate:
i) Bore and length of the cylinder liner
ii) Thickness of cylinder lines
iii) Thickness of cylinder head. **(10 Marks)**

OR

2 a. With a neat sketch, explain two methods of compensation of thermal expansion in piston. **(08 Marks)**

b. The following data is given for the piston of a 4 stroke Diesel Engine:
Cylinder bore = 250mm ; Maximum gas pressure = 4MPa ; Bearing pressure at small end of connecting rod = 15MPa ; Length of piston pin in bush of small end of connecting rod = 0.45 × bore ; Ratio of inner diameter to outer diameter of piston pin = 84N/mm^2. Calculate:
i) Outer diameter for the piston pin.
ii) Inner diameter of the piston pin.
iii) Check the design for bending. **(08 Marks)**

Module-2

3 Design the connecting rod for the petrol engine from the following data:
Cylinder bore diameter of piston = 100mm; Length of connecting rod = 350mm; Maximum gas pressure / Explosion pressure = 3N/mm^2 ; Length of stroke = 150mm ; Engine speed = 1500rpm ; Weight of Reciprocating parts = 25N ; Compression Ratio = 4:1. Assume any further data required for the design. **(16 Marks)**

OR

4 Write short notes:
a. Crank shaft function and its advantages
b. Design the centre crank shaft
c. Name the material used for crank-shaft. **(16 Marks)**

Module-3

5 a. With neat sketch. Explain single row overhead valve (side cam shaft) mechanism. (08 Marks)
b. State the necessity of valve rotators. With a neat sketch, explain free type of valve rotators. (08 Marks)

OR

6 a. With neat sketch. Explain different scavenging system. (08 Marks)
b. With suitable notations, define the following scavenging parameter:
i) Delivery Ratio
ii) Trapping Efficiency
iii) Scavenging Efficiency. (08 Marks)

Module-4

7 a. Briefly explain component's of an intake system of engine. (08 Marks)
b. With a neat sketch, explain any two type of Mufflers. (08 Marks)

OR

8 a. With a neat sketch, explain Pressurized water cooling system. (08 Marks)
b. State the advantages and limitation of air cooling system. (08 Marks)

Module-5

9 a. With neat sketch, explain pressure type of wet Sump Lubrication system used in Automotive engine. (08 Marks)
b. With a neat sketch, explain cartridge type oil filter used in lubrication system. (08 Marks)

OR

10 a. State the limitations of super charging for petrol and diesel engines. (08 Marks)
b. With a neat sketch, explain turbo charger with an inter cooler for Automotive engine. (08 Marks)

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