P17AU53 *Page No...* 1

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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)
Fifth Semester, B.E. - Automobile Engineering
Semester End Examination; Dec. - 2019

Automotive Engines and Components

Time: 3 hrs Max. Marks: 100 *Note*: Answer *FIVE* full questions, selecting *ONE* full question from each unit. UNIT - I List the important parts of reciprocating IC engine and materials used. 10 Discuss the comparison of SI and CI engines. 10 Compare different scavenging systems and discuss their merits and demerits. 2 a. 10 With sketch, illustrate the valve timing diagram for four stroke engine and its signature. 10 **UNIT-II** 3 a. What is firing order? Discuss the influence of firing orders on IC engines. 6 Explain briefly different types of mufflers and their influence on engine performance. 8 c. Compare wet and dry liners. 6 4 a. Discuss the importance of dual manifolds and illustrate the features of manifolds. 10 List the types of cooling in IC engines. Why is it necessary? 5 List the functions of flywheel and its mountings. 5 **UNIT - III** List the functions of Piston rings and material used. 6 Discuss the different types of piston pins and their impact on piston design. 6 With neat sketch, discuss piston heads used in petrol and diesel engines. 8 6 a. Design a cast iron piston for a single cylinder four stroke engine. Find the thickness of piston head and dimensions of piston rings. Take three compression and one oil ring. The specifications for the engine are given below: Cylinder bore = 10 cm, Stroke = 12 cm. 12 Gas pressure (maximum) = 5×10^6 pascals, BMEP = 65×10^4 pascals, Fuel Consumption = 0.227 kg/kW/hr, Speed = 2200 rpm. Assume suitable data. b. For a vertical stroke CI engine, find the dimension of the cylinder using the following data: Brake Power = 4.5 kW, Speed = 1200 rpm, 8 IMEP = 35×10^4 pascals, Mechanical efficiency = 0.8**UNIT-IV** 7 a. Explain the different balancing methods used for crank shaft balancing. 10

P17AU53 Page No... 2

b. Using the following data for a single cylinder four stroke engine, find the diameter and length of crank pin considering the crank at dead center. Assume suitable data as required.

Bore diameter = 400 mm,

Stroke = 600 mm,

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 $MEP = 0.5 \text{ N/mm}^2$,

Max Combustion Pressure = 2.5 N/mm^2 ,

Weight of flywheel/pulley = 50 kN,

Belt-pull/tension = 6.5 kN

8. From the given data, find the dimensions of 'I' section of connecting rod. Assume suitable data as required.

Piston diameter = 100 mm,

Speed =1800 rpm,

Maximum pressure = 3.15 N/mm^2 ,

Stroke = 190 mm,

Mass of reciprocating parts = 2.25 kg,

Length of rod = 380 mm,

Compression ratio = 6:1

UNIT - V

9 a. Explain different types of cams and roller used in valve gear mechanism.

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b. Sketch and explain a typical valve gear mechanism and its components.

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10. Using the data given for an IC engine (Horizontal), find the dimensions of exhaust valve, load on fulcrum and fulcrum pin dimensions. Assume the exhaust-valve to be vertically operated as shown.

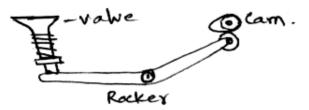
Power = 8.25 kW,

Bore = 0.143 m,

Stroke = 0.267 m,

Speed = 475 rpm,

Max Gas Pressure = 3.5 N/mm^2



Valve opens at 33° before outer dead center and closes at 1° after inner dead center. The length of rocker arm is 0.15 m at each side and included angle is 160°. The weight of valve is 3 N. Assume suitable data as required.

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