

Total No. of Questions :10]

SEAT No. :

P2852

[Total No. of Pages :4

[4958] - 1033

T. E. (Automobile)

DESIGN OF ENGINE COMPONENTS

(Semester - II) (2012 Pattern) (316484)

Time : 3 Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) Answer any five questions from the following.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right side indicate full marks.*
- 4) Use of Logarithmic tables, slide rule, electronic pocket calculator is allowed.*
- 5) Assume suitable data if necessary.*

Q1) a) Write design considerations for combustion chamber. **[4]**

b) A 42.5 kW engine has mechanical efficiency 85%. Find indicated and frictional power. If frictional power is assumed to be constant with load, what will be the mechanical efficiency at 60% of load? **[6]**

OR

Q2) a) Write note on water pump used in IC engine. **[4]**

b) Write note on engine balancing. **[6]**

Q3) a) What will be the criteria for selecting the lubricating oil for an IC engine? **[2]**

b) Determine the dimensions of cross-section of connecting rod for a diesel engine with following data. **[8]**

Cylinder bore = 100 mm

Maximum gas pressure = 4MPa

Factor of safety = 6, Length of con.rod = 350 mm.

OR

P.T.O.

Q4) a) Write properties of lubricating oil. [2]

b) The following data is given for piston of a four stroke diesel engine. Cylinder bore 250 mm, material of piston ring = gray cast iron, allowable tensile stress 100 N/mm^2 , allowable radial pressure on cylinder wall = 0.03 MPa , Thickness piston head = 42 mm, no. of piston rings = 4. [8]

Calculate:

- i) Radial width of piston ring
- ii) Axial thickness of piston ring
- iii) Gap between free ends of piston ring before assembly
- iv) Gap between free ends of piston ring after assembly
- v) Width of top land
- vi) Width of ring grooves
- vii) Thickness of piston barrel and
- viii) Thickness of piston barrel at open end.

Q5) a) What are the functions of cylinder head and cylinder liner? [4]

b) Write the design procedure for center crankshaft at top dead center position? [12]

OR

Q6) a) The cylinder of four stroke diesel engine has following specification:[8]

Brake power = 3.75 kW

Speed = 1000rpm

Indicated mean effective pressure = 0.35 MPa

Mechanical Efficiency = 80%

Determine the bore and length of cylinder liner.

b) Design an exhaust valve for a horizontal diesel engine using following data, [8]

Length of Stroke = 275mm

Cylinder bore = 150mm

Engine speed = 500rpm

Maximum gas pressure = 3.5 MPa

Seat angle 45°

Calculate:-

- i) The Diameter of Valve port,
- ii) Diameter of valve head,
- iii) Thickness of valve head,
- iv) Diameter of valve stem,
- v) Maximum lift of the valve.

- Q7)** a) How will you measure HC and CO emission of IC engine? [8]
b) Explain cylinder leakage test. [8]

OR

- Q8)** Write short note on (any four) [16]
a) Vacuum gauge test.
b) Cylinder power balance
c) Cylinder compression test
d) HC and CO analyzer
e) Selection of ignition timing

- Q9)** a) What is Digital Twin Spark - ignition (DTS-i) engine explain with advantages and disadvantages. [9]
b) Give application, advantages and disadvantages of four valve engine and dual fuel engine? [9]

OR

- Q10)** a) Write note on Wankel engine. [9]
b) What is homogenous charge compression ignition engine (HCCI)? [9]

