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10MR55

Fifth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Marine Machinery and System Design

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the classification of manufacturing process. **(10 Marks)**

b. Explain briefly injection moulding in plastic moulding process. **(10 Marks)**

2 a. Find the diameter of a solid shaft to transmit 20 kN at 200 rpm. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as '8'. If a hollow shaft is used in place of the solid shaft, find the inside and outside diameter. When the ratio of inside and outside diameter is 0.5. **(10 Marks)**

b. A line shaft is driven by means of a motor placed vertically below it. The pulley on the shaft is 1.5 m in diameter and has belt tension 5.4 kN and 1.8 kW on the tight side and slack side of the belt respectively. Both these tension may be assumed to be vertical. If the pulley be overhang from the shaft, the distance of the centre line of the pulley from the centre line of the bearing 400 mm. Find the dia of the shaft assuming max allowable shear stress of 42 MPa. **(10 Marks)**

3 a. Design an I-section of a connecting rod for an IC engine running at 1800 rpm and developing a max pressure of 3.15 N/mm^2. The diameter of the piston is 100 mm mass of the reciprocating parts per cylinder 2.25 kg, length of connecting rod 380 mm and stroke of piston 190 mm and compression ratio 6 : 1. Take a factor of safety of 6 for the design. Take length to diameter ratio for big end bearing as 1 : 3 and small end bearing as 2 and the corresponding bearing pressure as 10 N/mm^2 and 15 N/mm^2. The density of material of the rod may be taken as 8000 kg/m^3 and the allowable stress in the bolt as 60 N/mm^2 and in cap as 80 N/mm^2. The rod is to be of I-section for which you can choose your own proportions. **(10 Marks)**

b. A single cylinder double acting steam engine delivers 185 kW at 100 rpm. The max fluctuation of energy per revolution is 15% of the energy developed per revolution. The speed variation is limited to 1% either way from the mean. The mean diameter of the rim is 2.4 m. Design a cast iron flywheel. **(10 Marks)**

4 a. List down the types of values and explain butterfly value. **(10 Marks)**

b. Sketch and explain gate value. **(10 Marks)**

PART – B

5 a. Sketch and explain thrust block. **(10 Marks)**

b. Explain gear pump with neat sketch. **(10 Marks)**

6 a. Write down any 10 lubricating oil properties. **(10 Marks)**

b. Explain with the aid of neat sketch two ram electro hydraulic steering gear system. **(10 Marks)**

7 a. Sketch and explain the main air starting valve. **(10 Marks)**

b. Draw and explain starting air system of two stroke diesel engine. **(10 Marks)**

8 a. Sketch and explain fuel valve of diesel engine. **(10 Marks)**

b. Explain the types of scavenge system. **(10 Marks)**

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