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10MR55

Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016
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. Write short notes on the compression moulding of plastic. **(10 Marks)**

2 a. A shaft is supported by 2 bearings placed 1m apart. A 600 mm diameter pulley is mounted at a distance of 300 mm to the right of left hand bearing and this drives a pulley directly below it with the help of belt having max tension of 2.25 kN. Another pulley 400 mm dia is placed 200 mm to the lift of right hand bearing and is driven with the help of electric motor and belt, which is placed horizontally to the right. The angle of contact for both pulleys is 180° and $\mu = 0.24$. Determine the suitable diameter for a solid shaft allowable working stress of 63 MPa in tension and 42 MPa in shear for the material of shaft. Assume that the torque on one pulley is equal to that on the other pulley. **(10 Marks)**

b. A hollow shaft of 0.5 m outside diameter and 0.3 m inside diameter is used to drive a propeller of a marine vessel. The shaft is mounted on bearings 6 m apart and it transmits 5600 KW at 150 rpm. The max axial propeller thrust is 500 kN and the shaft weights 70 kN. Determine: i) The max stress developed in the shaft, ii) The angular twist between the bearings. **(10 Marks)**

3 a. A single cylinder double acting steam engine develops 150 kW at a mean speed of 80 rpm, the coefficient of fluctuation of energy is 0.1 and the fluctuation of speed is ±2% of mean speed. If the mean diameter of the fly wheel rim is 2m and the hub and spokes provide 5% of the rotational inertia of the wheel, find the mass of the flywheel and cross sectional area of the rim. Assume the density of the flywheel material as 7200 kg/m^3. **(10 Marks)**

b. Design a cast iron piston for a single acting four stroke engine for the following data:

Cylinder bore = 100 mm	Stroke = 125 mm
Max gas pressure = 5 N/mm^2	Mean effective pressure = 0.75 N/mm^2
Mechanical efficiency = 80%	Fuel consumption = 0.15 kg/BP/hr
Higher calorific value = 42×10^3 kJ/kg	Speed = 200 rpm

(10 Marks)

4 a. Write short notes on inspection and maintenance of engine room crane. **(10 Marks)**

b. List down the types of valves and explain globe valve. **(10 Marks)**

PART – B

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

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

6 a. Write down any 15 properties of lube oil and explain. **(10 Marks)**

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

7 a. Explain starting air system of two stroke diesel engine. **(10 Marks)**

b. Sketch and explain two stage reciprocating air compressor. (compound type). **(10 Marks)**

8 a. Write short notes on helix control fuel pump in marine diesel engine. **(10 Marks)**

b. Explain types of scavenging with neat sketch. **(10 Marks)**

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