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10MR55

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Marine Machining and System Design

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions, selecting
atleast TWO questions from each part.
2. Use of data handbook is permitted.**

PART – A

- 1 a. Write the design consideration during forging. (08 Marks)
b. How the surface finish takes a role in design. (06 Marks)
c. What is tolerance? Define unilateral and bilateral tolerances. (06 Marks)
- 2 a. Define fluctuation of energy in the flywheel and derive the same i.e., $\Delta E = 2EC_s$. (10 Marks)
b. A hallow shaft is subjected to a maximum torque of 15 kN-m and a maximum bending moment of 3 kN-m. It is subjected to an axial load of 10 kN. Assume that the load is applied gradually and the ratio of the inner diameter to the outer diameter is 0.5. If the outer diameter of the shaft is 80 mm, find the shear stress induced in the shaft. (10 Marks)
- 3 a. 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/mm² Mean effective pressure = 0.75 N/mm²
Mechanical efficiency = 80% Fuel consumption = 0.15 kg/BP/hr
Higher calorific value = 42×10^3 kJ/kg Speed = 200 rpm. (15 Marks)
b. Write a short note on Eccentric loading of spring. (05 Marks)
- 4 a. List down the types of valves and explain globe valve. (10 Marks)
b. A helical torsion spring of mean diameter 60 mm is made of a round wire of 6 mm diameter. If a torque of 6 N-m is applied on the spring, find the bending stress induced and the angular deflection of the spring in degrees. The spring index is 10, and modulus of elasticity of the spring material is 2000 kN/mm². The number of effective turns may be taken as 5.5. (10 Marks)

PART – B

- 5 a. With a neat sketch explain heat exchanger used in diesel engine (tube type). (10 Marks)
b. Explain gear pump with neat sketch. (10 Marks)
- 6 a. Explain with neat line diagram, lubricating oil system of marine engine. (10 Marks)
b. Explain with neat sketch working of self-D sludging of lube oil purifiers. (10 Marks)
- 7 a. With a neat sketch explain construction and working of a needle valve type fuel injector. (10 Marks)
b. Sketch and explain two stage reciprocating air compressor (compound type). (10 Marks)
- 8 a. Sketch and explain scavenging and exhaust system of 2-stroke marine diesel engine. (10 Marks)
b. Explain with neat sketch Air-start valve. (10 Marks)

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