B. Tech Degree VI Semester Examination in Marine Engineering May 2012

MRE 606 MACHINE DESIGN AND DRAWING

Time : 3 Hours   Maximum Marks : 100

(Use of Data handbook is permitted)

I.	(a)	Explain the importance of standardization in machine design with suitable examples.	(8)
	(b)	Explain the design considerations in casting.	(8)
	(c)	How do we evaluate heat treatment?	(4)

OR

II.	(a)	What is meant by preferred size? Explain.	(7)
	(b)	Explain any three theories of failure.	(9)
	(c)	Discuss various ferrous based materials and applications in designing.	(4)

III.	(a)	Draw the SF and BM diagrams of a cantilever beam with a point load at the free end.	(8)
	(b)	What is meant by fatigue failure? Explain.	(4)
	(c)	Derive simple bending equation.	(8)

OR

IV.	(a)	Explain the principles in selection of materials in machine design.	(10)
	(b)	What is meant by dynamic stress? Explain.	(10)

V.	(a)	Explain the term "surface finish" with necessary illustrations.	(12)
	(b)	Explain the design considerations of an interference fit.	(8)

OR

VI.	(a)	Explain interchangeable manufacture and selective assembly.	(12)
	(b)	Explain the types of fits.	(8)

VII.		Derive an expression for the length of a belt in	(20)
	(i)	open belt drive	
	(ii)	cross left drive	

OR

VIII.	Design a single plate clutch with friction lining on both sides to transmit 20kw at 1500rpm. Assume six springs are provided around the plate. Three toggle levers at equal angular distance are provided to with draw the halves and part the friction surfaces. The coefficient of friction is given as 0.25 to avoid over loading of the clutch. The ratio of mean radius to radial width is 4.5. Pressure intensity between friction surface should not exceed 0.07 N/cm².	(20)

IX.	Design a suitable gear drive to run a vacuum cleaner at 40 rpm from a motor running at 1440 rpm. Select suitable materials.	(20)

OR

X.	A non metallic pinion is to transmit 50hp at 600 rpm. The allowable static stress is 40N/cm². Determine the module and face width for $14\frac{1}{2}''$ involute full depth feet. Taking Y factor $= \prod\left(0.124 - \dfrac{0.684}{n}\right)$ and velocity factor $\dfrac{45}{60+v}+0.25$.	(20)

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