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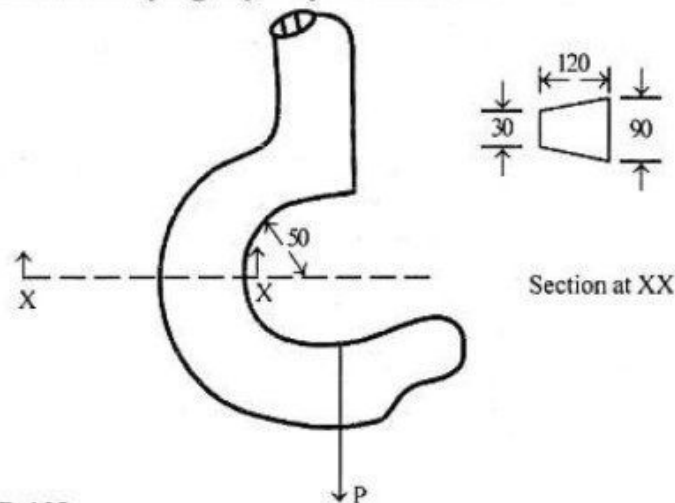
MMPD-102**M.E/M.Tech., I Semester**

Examination, December 2013

Advance Machine Design**Time : Three Hours****Maximum Marks : 70**

- Note:** 1. Attempt any five questions out of Eight.
2. All questions carry equal marks.

1. a) What are three basic modes of failure of mechanical components.
b) What is factor of safety. How do you decide its value for cast iron component.
2. A crane hook having an trapezoidal cross section is shown in Fig.1. It is made of plain carbon steel 45CS (yield strength = 380 N/mm^2) and factor of safety 3.5. Determine the load carrying capacity of the hook.



3. a) What is fatigue failure. Explain the importance of S-N curve in fatigue design.
b) Discuss the design criteria against corrosion.
4. a) What is creep. Explain the situations where creep is a serious problem with examples.
b) Discuss the theory of failure most suited for sliding contact bearing.
5. a) What are the advantages of cycloidal teeth gears.
b) Discuss the lubricant requirement of gear trains.
6. A pair of spur gears consists of a 24 teeth pinion, rotating at 1000 rpm and transmitting power to a 48 teeth gear. The module is 6mm while the face width is 60mm. Both gears are made of steel with an ultimate tensile strength of 450 N/mm^2 . They are heat treated to a surface hardness of 250BHN. Assume that velocity factor accounts for the Dynamic load.
Calculate :
i) Beam strength ii) Wear strength
iii) Rated power that gear can transmit if service factor and factor of safety are 1.5 and 2 respectively.
7. a) Derive Freudenstein's Equation for dimensional synthesis of four bar linkage.
b) A circular disc cam of diameter 120mm with its centre displaced 40mm from the camshaft is used with flat surface follower. The line of action of follower is vertical and passes through the shaft axis. The mass of the follower is 3kg and is pressed downwards with a spring of stiffness 5 N/mm . In the lower position, the spring force is 60N.
8. Write short notes on any two:
i) Theory of failures
ii) Preferred number and its application
iii) Spiral springs-advantage and limitation.
