Total No. of Questions :8] *[Total No. of Printed Pages :2*

Roll No .....

AU/ME-228

B.E. IV Semester

Examination, June 2017

Choice Based Credit System (CBCS)

Machine Design - I

Time : Three Hours

Maximum Marks: 60

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) Write and explain the general consideration in machine design.

   b) What do you understand by stress concentration? Why stress concentration factor is ignored for ductile material under static loading?

2. a) What do you mean by fatigue loading? Discuss various types of fatigue stresses generally found in designing.

   b) Discuss the mechanism of fatigue failure.

3. Explain Goodman's and modified goodman's diagram.

4. A circular bar of 500mm length is supported freely at its two ends. It is acted upon by a central concentrated cyclic load having a minimum value of 20kN and a maximum value of 50kN. Determine the diameter of bar by taking factor of safety as 2.0. The material properties of bar are given as

   $\sigma_u = 650\text{MPa}, \sigma_y = 500\text{MPa}$ and $\sigma_e = 350\text{MPa}$.

5. a) What are the various permanent and detachable fastenings? Give a complete list with the different types of each category.

   b) Sketch and discuss the various types of welded joints used in pressure vessels. What are the considerations involved?

6. a) Discuss the design procedure of socket cotter joint.

   b) Discuss hydrodynamic theory of lubrication and derive Reynold's equation of bearing design.

7. a) Explain the stability chart of the Journal bearing.

   b) Find the rating life of the 50mm bore, light series, ball journal bearing under a 6800N radial load at 600rpm. The load is out of balance and therefore rotates with the inner ring. There is no shock loading.

8. a) What do you mean by a leaf spring? Give the expression for stress and deflection in a leaf spring.

   b) Write down the design procedure of a helical spring.

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