KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food. Engg) 2011 Admission

Vth Semester Final Examination- December /January -2013

Cat. No: Meen.3107 **Marks: 80**

Title: Machine Design(1+1) **Time: 3 hours**

I. **Fill up the blanks:** **(10x1=10)**

1. To refine the structure after it has been distorted by hammering or working when in the cold state is called _____
2. Surface finish factor for a mirror polished material is _____
3. The ratio of transverse strain to longitudinal strain is called _____
4. _____ is its capacity of a material to absorb potential energy within the elastic range.
5. Creep in belt is due to uneven _____and _____ due to varying tensions.
6. Contact ratio for gear is greater than _____
7. The static tooth load should be _____ the dynamic load.
8. The size of the gear is usually specified by _____
9. A cotter joint is used to connect two _____ rods.
10. In a steam engine, the piston rod is usually connected to the crosshead by means of a _____ Joint.

II. **Write short notes / answers on <u>ANY TEN</u>** **(10x3=30)**

1. What are the principal causes of stress concentration?
2. Explain Power shafting.

3. Briefly explain the torsional stiffness of shaft.

4. What is the function of a coupling?

5. What is nip and express its importance in leaf spring.

6. Expand the following Abbreviations

   a) SAE b) AFBMA c) SKF

7. Why are levers usually tapered.

8. What do you mean by lever and leverage?

9. What is mean by belt rating and ply of belt?

10. Give an example of a machine member subjected to bending and torsional stress

11. Define the terms a) Hardness b) Malleability c) Creep

12. What is interference in gears? How can you overcome it?

III. Write short essays on <u>ANY SIX</u> of the following: (6x5=30)

1. Describe the purpose of gib in cotter joint? What are the applications of cotter joints?

2. What are the different stresses acting in the couplings?

3. Explain the effect of keyways on the strength of a shaft?

4. Derive an expression for ratio of belt tensions Vs Co-efficient of friction ($T1/T2=e^{\mu\theta}$)

5. Explain about the theories of failures.

6. Write short notes on leaf springs.

7. Explain the terms

   a) Ductility b) Resilience c) Fatigue d) Toughness e) Elasticity

8. State the importance of Wahl's stress factor in the design of helical springs.

IV. **Write essay on <u>ANY ONE</u>** **(1x10=10)**

1. Design completely belt drive to drive a winch from an electric motor of 11KW power, speed of motor shaft is 750 rev/min. Speed ratio is 4.Belt position is horizontal and there is considerable variation of load.

2. Find the diameter of solid steel shaft to transmit 20KW at 200rpm.The ultimate shear stress for steel may be taken as 360 N/mm^2 and a FOS as 8. If a hollow shaft is to be used in place of the solid shaft, Find the inside and outside diameter when the ratio of inside to outside diameter is 0.5