static strength for pinion material 40 MPa and for cast iron as 53 MPa. Check the pair in wear.

9. Discuss the design steps of worm and worm wheel with suitable example, choose the appropriate value.

Roll No. ....

24355

B. Tech. 6th Semester (Mechanical Engineering) Examination – May, 2012

MECHANICAL MACHINE DESIGN-II

Paper : ME-304-F

Time : Four Hours]   *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is *compulsory*. Students will have to attempt *one* question from each Section. Attempt *five* questions out of *nine*.

1. Write short notes on the following :

   (i)   Lubrication and its types,

   (ii) Surging phenomena,

   (iii) Miner's equation.

SECTION – A

2. Define Ergonomics and discuss role of design consideration in casting forging and machining.

3. Discuss the Goodman and Soderberg's criterion for combined variable stress with suitable example.

SECTION – B

4. A cylindrical shaft made of steel of yield strength 700 MPa, is subjected to static load consisting of a bending moment of 10 KN m and a torsional moment of 30 KN m. Determine the dia. of the shaft using two different theories of failure and assuming a factor of safety of 2.

5. Design a helical compression spring for a maximum load of 1000 N for a deflection of 25 mm using the value of spring index as 5.

The max. permissible shear stress for spring wire is 420 MPa and $G = 84 \text{ KN/mm}^2$.

Take appropriate value of Wahl's factor.

SECTION – C

6. A journal bearing is to be designed for a centrifugal pump for the following data :

Load on the journal = 12 KN, Diameter of the journal = 75 mm, Speed = 1440 r.p.m., Atm. temp. of the oil = 160°C, operating temp. of the oil = 60°C. Absolute viscosity of oil at 60°C – 0.023 Kg/m.s.

7. A footstep bearing supports a shaft of 150 mm diameter which is counter bored at the end with a hole diameter of 50 mm, if the bearing press is limited to 0.8 N/mm^2 and the speed is 100 r.p.m. Find : (1) The load to be supported ; (2) The power lost in friction. (3) The heat generated at the bearing & $\mu = 0.015$.

SECTION – D

8. A pinion rotating at 1200 r.p.m is to transmit 1 KW to a cast iron gear at a speed of 192 r.p.m. Assuming a starting overload of 20% and using 20° full depth involutes teeth, determine the module, no. of teeth on the pinion and gear and face width. Take allowable