Menoufia Univeresity
Faculty of Engineering
Shebin El- Kom.
Dept. of Production Eng.
& Mechanical Design.

MENOFIA UNIVERSITY

Level: 500
Subject: M/c Tool Design
(PRE 516)
Time Allowed: 3 Hours
Date : 31-5-2015
Total marks : 100

==========

Design tables & charts are allowed

==========

Answer all the followeng questions :

Question (1)

A spindle of a cylinderical grinding machine has the following data :

- Front bearing stiffness = 300 N / μm.
- Rear bearing stiffness = 150 N / μm.
- Over hanged length = 49 mm.
- Mean spindle diameter = 70 mm.

Evaluate $L_{opt.}$ and C_n .

(25 Marks)

Question (2)

A lathe has two flat cast-iron slideway of equal width and height of half the width . While turning a 150 mm. diameter workpiece, the tangential , radial & axial components of the cutting forces were found to be 330 ; 250 ; 166 K_p respectively. The lathe carriage weighs 180 K_p and is 200 mm. long. Design the slideway assuming any required data. Cast-iron slideways can withstand a max. pressure of 10 K_p / cm^2. Consider that K_s (Min.) = 50 $K_p / \mu m$; W = 22 cm & h = 18 cm.

(25 Marks)

Good Luck !!!

Dr. : Gaber M. SHEHA .

Q_3 (25 Marks):

An electric motor 5 Kw 1500/750 r.p.m. attached to a gearbox to drive a turning machine, the gear box has the following specifications:

. No. of the carried out speeds = 2x 6 = 12 speed

. Max. speed carried out from the gearbox = 1200 r.p.m.

- f= 1.26

Find:

- The kinematic diagram for the best arrangement.
- Choose the best probability and construct the speed chart.
- Calculate the actual speeds.
- Design the gears of the first stage.

Q_4 (25 Marks):

In a turning operation the cutting conditions were:

Max. $K_s = 15X10^4$ lb/in^2

S = 0.06 in /rev.

V = 800 ft/min.

a= 0.025 in

d= 4 in

Req.

V, T, P_1, and N

If:

$P_2 = 0.2\ P_1$ and $P_3 = 0.4\ P_1$

Assuming a suitable data for turning machine dimensions>

Find the forces and moments distribution on the bed of the machine.