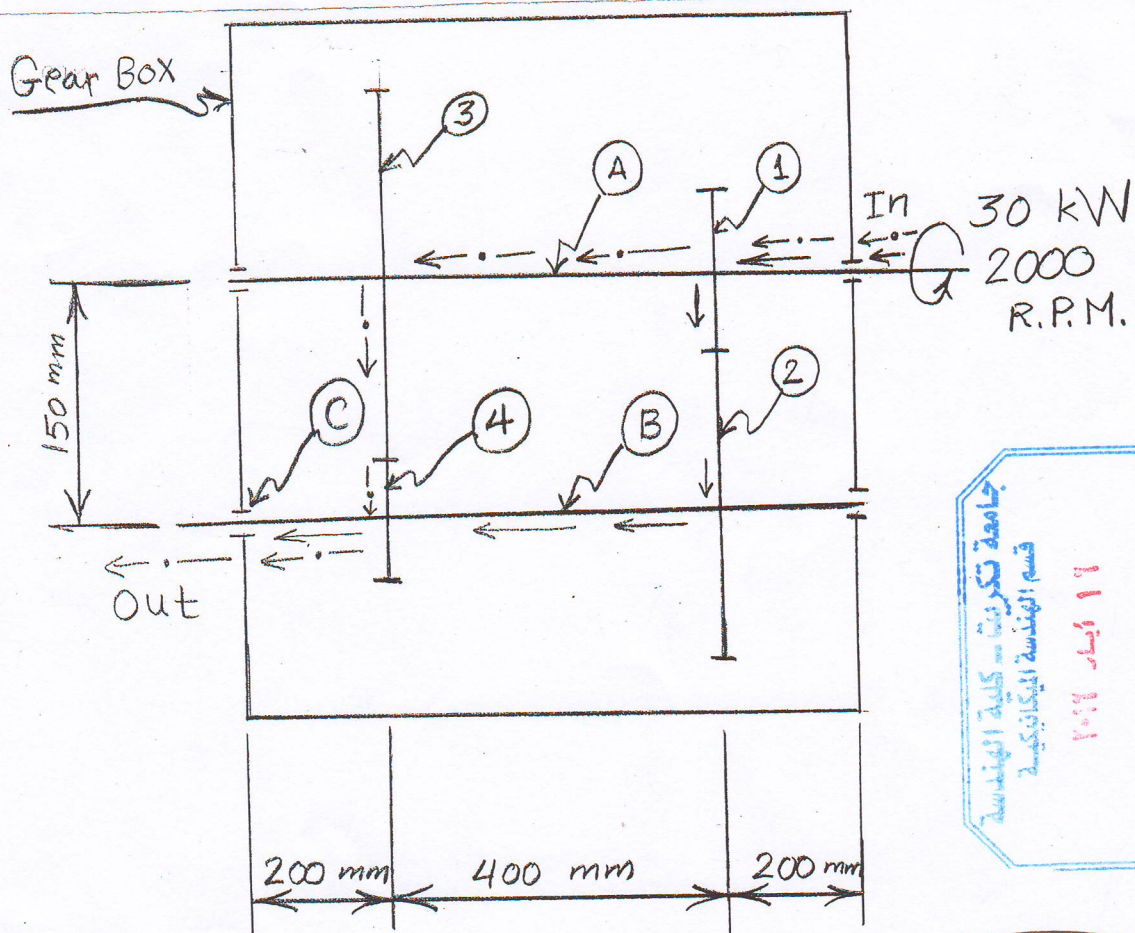


Hints: Assume any thing you need

Design project: open books and notes

For the gear box shown on the figure below, the motion is transmitted from shaft (A) to shaft (B), either by engaging gear (1 & 2) or engaging gear (3 & 4). The width of all the used gears (spur, pressure, angle, $\phi=21^\circ$) are the same and equal (20) mm. gears speed ratios are $(N_1/N_2)=(2/1)$ & $(N_3/N_4)=(1/4)$. gears (1) & (3) are fixed to shaft (A) by keys, (rectangular cross section), while gears (2) & (4) are fixed to shaft (B) by splines (not slide under load). Keys & splines cover the whole width of the gear. the diameters of shafts (A) & (B) are the same and equal (50) mm.

- calculate shear stress on the key that connecting gear (3) & the bearing stress on the spline that connecting gear (2). (25 M)
- find the ball bearing (C) (No. 110) life in revolutions. This is based on engagement of gear 3 & 4 (25 M)
- find the maximum shear stress on shaft (B) this stress is based on engaging gear (3 & 4) (25 M)
- Draw a sectional view showing ball bearing (C) fixing and sealing. (25 M)



Lecturer

Dr. Ibrahim A. Muhsin

Head of Dept. Dr. Hameed J. Khalaf

Dr. Hameed J. Khalaf