

ASSIGNMENT NO.3

SUBJECT:- Dynamics of Machines
ME-505

UNIT-3

- Q1) What do you understand by balancing of rotating masses.
- Q2) What do you understand by balancing of reciprocating masses.
- Q3) Define the effects of partial balancing of unbalanced reciprocating masses along the line of stroke.
- Q4) Explain the effects of partial balancing of reciprocating masses perpendicular to the line of stroke.
- Q5) Write short notes on the practical examples for balancing of rotating and reciprocating masses.
- Q6) A rotating shaft carries four unbalanced masses 18 kg, 14 kg, 16 kg and 12 kg at a radii of 50 mm, 60 mm, 70 mm and 60 mm respectively. The second, third and fourth masses revolve in planes 80 mm, 160 mm and 280 mm respectively measured from the plane of first mass and are angularly located at 60° , 135° , 270° respectively measured clockwise from the mass. The shaft has to be balanced by 2 masses both located at 50 mm and revolve in the planes midway between those of first & second mass and midway between those of third & fourth mass. Find the

magnitude and angular positions of the masses.

Q7) Four masses A,B,C,D are completely balanced. The masses C and D makes 90° and 195° respectively from that of mass B in counter-clockwise direction. The masses of B,C and D are 25 kg,40 kg,35 kg. The radii of rotation of A,B,C,D are 150 mm,200 mm,100 mm, 180 mm. The planes of B & C are 250 mm apart. Determine the mass and angular position of A with Respect to B, also find position of all the planes.

Q8) Four masses A,B,C,D carried by a rotating shaft at radii of 80 mm,100 mm,160 mm,120 mm respectively are to be completely balanced. The masses B,C and D are 8 kg,4 kg,3 kg respectively. Determine the mass A and its angular position if the planes are spaced 500 mm apart.

Q9) The following data refers to a 2 cylinder locomotive:
Reciprocating masses per cylinder = 300 kg
Crank radius = 0.3 m
Driving wheel diameter = 1.8 m
Distance between cylinder centre lines = 0.65 m
Distance between driving wheel centre planes = 1.55 m
Determine :

- a) The fraction of the reciprocating masses to be balanced if hammer blow is not to exceed 46 kN at 96.5 km/hr.
- b) Variation in Tractive Effort
- c) Maximum Swaying Couple

Q10) The following data refers to an outside cylinder locomotive :

Mass of rotating parts per cylinder = 360 kg

Mass of reciprocating parts per cylinder = 300kg

Stroke = 0.6 m

Cylinder centre lines = 1.75 m

Radius of balanced masses = 0.75 m

Wheel centres = 1.45 m

If whole of the rotating and $\frac{2}{3}$ rd of reciprocating parts are to be balanced .

Find:

- a) Magnitude and angular position of balanced masses
- b) Speed in km/hr at which the wheel will lift off the rails. When the load on each driving wheel is 30 KN and diameter of tread of driving wheels is 1.8 m.
- c) Swaying Couple

