

2054
B.E. (Mechanical Engineering)
Fourth Semester
MEC-403: Dynamics of Machines

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

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Q-1)

- 1) What is meant by undercutting of gears?
- 2) What is the significance of a reference plane in balancing of rotating masses?
- 3) Differentiate between radial and offset follower.
- 4) What is the difference between Hammer Blow and Swaying Couple?
- 5) What is correction couple in dynamically equivalent mass systems?

(5x2=10)

PART A

Q-2)

For a symmetrical circular cam operating on a flat faced follower, least radius=16mm, nose radius=3.2mm, distance between cam shaft centre and nose centre=25mm, angle of action of cam=150° and cam shaft speed=600rpm. Assuming no dwell between ascent and descent, determine lift of the valve and flank radius.

(10)

Q-3)

A Hooke's joint is used to connect two shafts. Driving shaft is rotating uniformly with a speed of 400rpm. Maximum speed of the driven shaft is 420rpm. Determine greatest permissible angle between the two shafts. Find minimum speed of the driven shaft.

(10)

Q-4)

A marine turbine rotor of inertia $750\text{kg}\cdot\text{m}^2$ rotates at 3000 rpm clockwise when viewed from left. It ship pitches with S.H.M. with a period of 6 seconds and amplitude of 0.1 rad, then find maximum angular velocity of rotor, maximum gyroscopic couple and gyroscopic effect as the bow dips.

(10)

P.T.O.

(2)

PART B

Q-5)

4 masses A, B, C, D are completely balanced. Masses C and D make angles 90° and 195° respectively with that of mass B in counterclockwise direction. The rotating mass of B is 25kg, C is 40kg and D is 35kg. Radius of rotation of B is 200mm, C is 100mm and D is 180mm. Planes B and C are 250mm apart. Determine the following:-

- 1) Mass of A and its angular position with mass B
- 2) Position of all planes relative to the plane of mass A.

(5,5)

Q-6)

Two parallel shafts are connected with the help of two gears, with one gear on each shaft. Number of teeth on one gear is 40 and speed of shaft is 500rpm. If speed ratio is 2.5 and circular pitch of gears is 24mm, then find (a) Number of teeth and speed of other shaft. (b) Centre distance between the two shafts.

(10)

Q-7)

2 spiral gears have a normal module of 12mm and angle between shaft axes is 60° . The driver has 16 teeth and helix angle is 25° . If the velocity ratio is 1/2 and driver and follower both are left handed, then find the centre distance between shafts.

(10)

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