Exam. Code: 0940
Sub. Code: 33857

2055
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. I which is compulsory and selecting two questions from each Part.***

x-x-x

Q-1)

1) Differentiate between radial and offset follower.
2) What are helical gear forces?
3) Differentiate between radial and offset follower.
4) What is the difference between Hammer Blow and Swaying Couple?
5) How does gyroscopic couple affect rolling of a naval ship?

(5x2=10)

PART A

Q-2)

1) Derive the expressions for effects of gyroscopic and centrifugal couples on the stability of a two wheeler whole taking a turn.
2) A marine turbine rotor of inertia 750kg-m2 rotates at 3000 rpm clockwise when viewed from left. If 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.

(5,5)

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 if 420rpm. Determine greatest permissible angle between the two shafts. Find minimum speed of the driven shaft.

(10)

Q-4)

A tangent cam with a base circle diameter 50mm operates a roller follower 20mm in diameter. The line of stroke of the roller follower passes through the axis of cam. Angle between tangential faces of the cam is 60^0, speed of the shaft is 200r.p.m. and lift of the follower is 15mm. Calculate main dimensions of the cam, acceleration of the follower at beginning of lift and at the apex of the circular nose.

(10)

P.T.O.

PART B

Q-5) A pinion and a rack are in mesh. Rack is driven by pinion of 125mm pitch circle diameter. The number of involute teeth on the pinion are 20. Addendum of both pinion and rack is 6.25mm. Find least pressure angle, if interference is to be avoided.

(10)

Q-6)

1) A pinion having 30 teeth drives a gear with 80 teeth. Profile of the gears is involute with 20^0 pressure angle, 12mm module and 10mm addendum. Find length of path of contact, arc of contact and contact ratio.
2) Explain the working a Humpage reduction gear.

(5,5)

Q-7) Write short notes on any 2 of the following:-

1) Simple and compound gear train.
2) Sun and Planet gears.
3) Couple polygon and force polygon

(10)

x-x-x