·2062

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) What is inertia couple and correction couple?
2) Differentiate between reverted and epicyclic gear train
3) What is meant by undercutting of gears?
4) Differentiate between radial and offset follower.
5) Draw all inversions of a double slider crank chain.

(5x2=10)

PART A

Q-2)

1) In a Davis steering gear, the length of the car between axles is 2.4m and steering pivots are 1.35m apart. Determine the inclination of the track arms to the longitudinal axis of the car when the card moves in a straight path.

2) How do you show that a Watt mechanism traces an approximate straight line?

(5,5)

Q-3)

The angle between axes of 2 shafts connected by a universal joint is 20⁰. The driving shaft rotates at uniform speed of 240rpm. The driven shaft carries a steady load of 9kW. Calculate the radius of gyration of the flywheel of the driven shaft having mass 50kg and output torque of the driven shaft assuming output toque dos not vary by more than 20% of input torque.

(10)

Q-4)

1) Define the terms prime circle, trace point, pitch curve and pitch circle for cams.

2) Design a pantograph for an indicator to be used to obtain an indicator diagram of an engine. The distance between the fixed point and tracing point is 160mm. The indicator diagram should be 4 times the gas pressure inside the cylinder of the engine.

(5,5)

PART B

Q-5)

1) Differentiate between simple and compound gear train with the help of diagrams

2) 2 spiral gears have a normal module of 12mm and angle between shaft axes is 60^0. The driver has 16 teeth and helix angle is 25^0. If the velocity ratio is 1/2 and driver and follower both are left handed, then find the centre distance between shafts.

(4,6)

Q-6)

4 masses A, B, C, D are completely balanced. Masses C and D make angles 900 and 1950 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 if A and its angular position with mass B

2) Position of all planes relative to the plane of mass A.

(5,5)

Q-7)

Write short notes on any 2 of the following:-

1) Epicycloid and Hypocycloid

2) Sun and Planet gears.

3) Couple polygon and force polygon

(5,5)

x-x-x