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B.Tech. (Sem. - 3rd)
THEORY OF MACHINES - I
SUBJECT CODE : ME-203
Paper ID : [A0802]

[Note: Please fill subject code and paper ID on OMR]

Time : 03 Hours   Maximum Marks : 60

Instruction to Candidates:

1) Section - A is **Compulsory**.

2) Attempt any **Four** questions from Section - B.

3) Attempt any **Two** questions from Section - C.

Section - A

Q1)   (10 × 2 = 20)

a) What do you mean by kinematics pair?

b) What are the functions of governors?

c) What is the higher pair give suitable example?

d) What do you mean by inversion?

e) What do you mean by coefficient of fluctuation of speed?

f) Explain the term hunting of governors.

g) Explain the conditions of correct steering.

h) Explain briefly tangent cam profile.

i) Give the types of cam and followers.

j) What do you mean by isochronisms?

Section - B

                                                        (4 × 5 = 20)

Q2) Discuss the functions of double slider crank chain.

Q3) Explain the effect of slip on velocity ratio during relative motion between pulley and belt.

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Q4) Derive the expression for torque in simple plate clutch assuming uniform wear Condition

Q5) Briefly explain the belt transmission dynamometers.

Q6) Two parallel shafts, connected by a crossed belt, are provided with pulleys 460 mm and 620 mm in diameters. The distance between the centre lines of the shaft is 3 m. Find by how much the length of the belt should be changed if it is desired to alter the direction of rotation of the driven shaft?

Section - C

(2 × 10 = 20)

Q7) Each ball of a porter governor has a mass of 3 kg and the mass of the sleeve is 15 kg. the governor has equal arms each 200 mm long and pivoted on the axis of rotation. When the radius of rotation of the balls is 120 mm, the sleeve begins to rise and 160 mm at the maximum speed. Determine
(a) the range of speed
(b) the lift of the sleeve
(c) the effort of the governor
(d) the power of the governor

Q8) A cam with a minimum radius of 25 mm is to be designed of a knife edge follower with the following data:
- To raise the follower through 35 mm during 60° rotation of the cam.
- Dwell for next 40° of the cam rotation.
- Descending of the follower during the next 90° of the cam rotation.
- Dwell during the rest of the cam rotation.

Draw the profile of the cam if the ascending and descending of the cam is with simple harmonic motion and the line of stroke of the follower is offset 10 mm from the axis of the cam shaft.

What is the maximum velocity and acceleration of the follower during the ascent and the descent if the cam rotates at 150 rpm?

Q9) The centre to centre distance between the two sprockets of a chain drive is 600 mm. The chain drive is used to reduce the speed from 180 rpm to 90 rpm. The driving sprocket has 18 teeth and a pitch circle diameter of 480 mm Determine
(a) number of teeth on the driven sprocket
(b) pitch and the length of the chain.

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