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**5 Sem. / Mech. Prod, Mechatronics (4th Sem),
CAD/CAM, Mech Engg. (Fabrication Tech) Mechanical
Engg. (CAD/CAM Design & Robotics)**

Subject : Theory of Machines

Time : 3 Hrs. M.M. : 100

SECTION-A

Note: Multiple type Questions. All Questions are compulsory. (10x1=10)

- Q.1 In lower pairs, there is (CO1)
a) Line Contact b) Sliding Contact
c) Surface contact d) None of there
- Q.2 For a Kinematic chain which relation is true (CO1)
a) $L - 2P - 4$ b) $L = 2P + 4$
c) $L = p - 4$ d) None
- Q.3 A hunting governor is (CO6)
a) More stable b) Less sensitive
c) More sensitive d) None of the above
- Q.4 In order to have a complete balance of the several revolving masses in different planes. (CO8)
a) The resultant force must be zero
b) The resultant couple must be zero
c) Both the resultant force and couple must be zero.
d) None of the above
- Q.5 The links of the structure transmit (CO1)
a) Force only b) Motion only
c) Forces & Motion d) None of these

- Q.6 In structure the degree of freedom is (CO1)
a) Zero b) One
c) Two d) None of these
- Q.7 The maximum fluctuation of energy of flywheel is (CO5)
a) Directly proportional to coefficient of fluctuation of speed
b) Directly proportional to moment of inertia of flywheel
c) Directly proportional to square of angular velocity of flywheel
d) All of these
- Q.8 The minimum radius circle draw to the cam profile is knows as. (CO7)
a) Base circle b) Prime circle
c) Pitch circle d) None of these
- Q.9 The crowing of the pulley is done to (CO3)
a) Prevent the belt running off the pulley
b) Improve the shape of pulley from safety consideration
c) Improve the strength of the pulley
d) Improve the torque transmitted by the pulley
- Q.10 The vibrations in which amplitude reduces over every cycle of vibration, the vibrations are know as (CO9)
a) Free vibration b) Forced vibrations
c) Damped Vibration d) None of these

Section-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

- Q.11 Oldham's Coupling is the inversion of _____. (CO1)
- Q.12 Flywheel is a four stroke engine is heavier than in the two stroke engine of the same power (True/False) (CO5)
- Q.13 Watt governor is suitable for high speed. (True/False) (CO6)
- Q.14 Hartnell governor is a spring loaded type governor (True/False) (CO6)
- Q.15 Define Cam. (CO7)
- Q.16 Define Coefficient of Fluctuation of speed. (CO1)
- Q.17 The ratio of Pitch circle diameter to the no. of teeth of a gear is known as _____. (CO7)
- Q.18 Define Dynamic Balancing. (CO8)
- Q.19 What is a structure? (CO1)
- Q.20 Theory of machine mainly divided into _____ and _____. (CO1)

Section-C

Note: Short answer type Question. Attempt any twelve questions out of fifteen Questions. (12x5=60)

- Q.21 Explain Crank slotted lever quick return motion mechanism. (CO1)
- Q.22 In a watt governor the length of each arm is 300 mm and they are pivoted on the axis of rotation. Determine the height of governor and radii of rotation of the balls when the speed of governor is 80 rpm. (CO6)
- Q.23 What are the remedies of vibrations. (CO6)
- Q.24 Explain turning moment diagram for a four stroke cycle I./C. Engine. (CO3)

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- Q.25 Explain clearly the terms slip and creep as applied to belt drives. (CO3)
- Q.26 Write short note on longitudinal vibrations. (CO9)
- Q.27 Differentiate between structure and machine. (CO1)
- Q.28 Explain the working of Oldham's Coupling. (CO1)
- Q.29 Explain any five types of Followers. (CO6)
- Q.30 Write the functions of flywheel. (CO5)
- Q.31 Write a short note on materials used for belt and rope drives. (CO3)
- Q.32 Explain the advantages and disadvantages of Gear Drive over belt drive. (CO4)
- Q.33 Explain the concept of static & Dynamic Balancing. (CO8)
- Q.34 Define different types of free vibrations. (CO9)
- Q.35 Explain the construction and working of a Porter governor. (CO6)

Section-D

Note: Long answer questions. Attempt any two question out of three Questions. (2x10=20)

- Q.36 Derive an expression for the ratio of tensions for a flat belt passing over a pulley. (CO3)
- Q.37 A shaft carries four masses A, B, C, and D of 12N, 10N, 18N and 15N respectively are attached to a shaft and revolve in the same plane and their radii of rotations are 40mm, 50mm, 60mm, and 30mm. The angular positions of masses B, C and D are 60°, 135° and 270° from the mass A. Determine the magnitude and position of the balancing mass at a radius of 100mm. (CO8)
- Q.38 Explain Double slider crank chain. Also explain any two inversions of Double Slider Crank chain. (CO1)

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