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

**Subject:- Theory of Machines**

Time : 3Hrs. M.M. : 100

**SECTION-A**

**Note:** Multiple choice questions. All questions are compulsory (10x1=10)

Q.1 _____ is that branch of theory of machine which deals with the relative motion between the various parts of the machine. (CO1)

a) kinematics b) Dynamics
c) Kinetics d) Statics

Q.2 The lead screw of a lathe with nut forms a _____ (CO1)

a) Sliding pair b) Rolling pair
c) Screw pair d) Turning pair

Q.3 The mechanism forms a structure when the number of degrees of freedom (n) is equal to (CO1)

a) 0 b) 1
c) 2 d) -2

Q.4 A kinematics chain is known a mechanism when (CO1)

a) one of the links is fixed
b) two links of the links are fixed
c) three of the links are fixed
d) none of these



Q.5 Due to slip of the belt, velocity ratio of the belt drive _____ (CO3)

a) increases
b) decreases
c) does not effect
d) first increases then decreases

Q.6 The centrifugal tensions in belts_____ power transmitted (CO3)

a) increases b) decreases
c) have no effect on d) none of these

Q.7 When the axis of first and last gear are coaxial then gear train is known as (CO4)

a) Simple gear train b) Compound gear train
c) Reverted gear train d) Epicyclic gear train

Q.8 An imaginary circle which by pure rolling action, gives the same motion as the actual gear, is called (CO4)

a) Addendum circle b) Dedendum circle
c) Pitch circle d) Clearance circle

Q.9 Which of the following is a Dead weight type governor? (CO6)

a) Porter Governor
b) Hartnell Governor
c) Wilson-Hartnell Governor
d) Hartung Governor

Q.10 When the body vibrates under the influence of external force, then the body is said to be under_____ (CO9)

a) free vibrations b) natural vibrations
c) damped vibrations d) forced vibrations

## SECTION-B

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

**Define the following term:-**

Q.11 Kinematics chain (CO1)
Q.12 Velocity ratio (CO3)
Q.13 Gear drive (CO4)
Q.14 Flywheel (CO5)
Q.15 Fluctuation of energy (CO5)
Q.16 Governor (CO6)
Q.17 Follower (CO7)
Q.18 Hunting of Governor. (CO7)
Q.19 Statics. (CO8)
Q.20 Longitudinal vibration (CO9)

## SECTION-C

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

Q.21 Explain different types of kinematics pair. (CO1)
Q.22 Explain Oldham's coupling with suitable diagram. (CO1)
Q.23 Explain the types of free vibrations. (CO1)
Q.24 Find the power transmitted by a belt moving with a velocity of 6.28 m/s. The coefficient of friction between the belt and the pulley is 2.5, angle of lap 160 degree and maximum tension in the belt is 2500 N. (CO2)
Q.25 Enlist various modes of power transmission. Explain anyone with suitable diagram. (CO2)
Q.26 Two gears A & B having teeth of 200 and 400. If the gear A is rotating in clockwise direction at 52 RPM, what will be the speed and direction of gear B. (CO2)



Q.27 Explain the concept of slip and creep. (CO3)
Q.28 Write any four advantages of gear drive. (CO4)
Q.29 Differentiate between Flywheel and Governor. (any four) (CO5)
Q.30 Explain turning moment diagram. (CO5)
Q.31 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.32 Write various steps to draw displacement diagram when the flower moves with simple harmonic motion. (CO7)
Q.33 Define cam and explain various types of cams.(CO7)
Q.34 Explain the concept of static and dynamic balancing. (CO8)
Q.35 Write any four harmful effects of vibrations in machines. (CO9)

## SECTION-D

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

Q.36 Explain Compound and reverted gear train with suitable diagram. (CO4)
Q.37 The mass of a flywheel is 4000 kg, which has a radius of gyration of 2m. Calculate the amount of energy the flywheel will store in changing it's speed from 460 rpm to 462 rpm? (CO5)
Q.38 Explain the construction and working of Hartnel governor with neat diagram. (Co6)