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Roll No.

Semester : 5 th

Branch :Mech, Prod, Mecatronics (4th Sem),

CAD/CAM, Mech Engg (Fabrication Tech)

Mechanical Engg. (CAD/CAM Design & Robotics)

Time : 3Hrs. **Subject:- Theory of Machines** M.M. : 100

SECTION-A

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

- Q.1 For a kinematic chain which relation is true.
a) $L=2P-4$ b) $L=2P+4$
c) $L=P-4$ d) None
- Q.2 The value of contact ratio for gears is
a) Less than unity b) More than unity
c) Unity d)
- Q.3 Value of gears train is
a) Always less than unity
b) Always greater than unity
c) Equal to reciprocal of speed ratio of gear train
d) Equal to speed ratio of gear train
- Q.4 Energy is stored in a flywheel by virtue of its
a) Heavy mass
b) Large diameter
c) High speed
d) Heavy mass and slow speed
- Q.5 A hunting governor is
a) More stable b) Less sensitive
c) More sensitive d) None of the above
- Q.6 The cam follower generally used in automobile industry is
a) Knit energy follower
b) Flat faced follower

- c) Spherical face follower
d) Roller follower

- Q.7 In order to have a complete balance of the several revolving masses in different planes
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.8 Identify the wrong statement
a) Vibration in machine may be due to loose fitting and lack of balance
b) Free vibration leave external force applied at the ends
c) Force vibration are independent of the natural frequency of vibrations
d) A vibration system is said to be stable if the amplitude of vibration decreases with time
- Q.9 At pitch point in a cam the pressure angle is
a) Maximum b) Minimum
c) Zero d) 90°
- Q.10 The links of the structure transmit
a) Focus Only b) Motion only
c) Focus & Motion d) None of the above

SECTION-B

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

- Q.11 What is a structure?
Q.12 What are miter gears ?
Q.13 What is diametral pitch, module and their relationship with circular pitch ?
Q.14 Flywheel in a four stroke engine is heavier than in the two stroke engine of the same power. (True/False)

- Q.15 Hartnell governor is a type of governor.
- Q.16 When several masses rotate in a single plane and the resultant of the all the centrifugal forces is Zero, the system is said to be
- Q.17 What is resonance ?
- Q.18 Theory of machine is mainly divided into and
- Q.19 Angle of contact on the diameter pulley is used in the tension ratio equation for the open belt drive.
- Q.20 Working depth of two mating gears is two times of module. (True/False)

SECTION-C

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

- Q.21 Explain crank and slotted lever quick return motion mechanism.
- Q.22 Explain Scotch Yoke mechanism.
- Q.23 Explain clearly the terms slip and creep as applied to belt drives.
- Q.24 Obtain an expression for power transmitted by a belt, Also obtain the condition for the max power transmitted by a belt
- Q.25 Enumerate various advantages of epi-cyclic gear train.
- Q.26 Explain turning moment diagram for a four stroke cycle I.C engine.
- Q.27 Compare flywheel and a governor.
- Q.28 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

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- Q.29 Explain the method of balancing for static unbalanced loads.
- Q.30 How will you proceed to balance several rotation masses in different planes ?
- Q.31 What are causes of vibrations?
- Q.32 What are remedies of vibrations?
- Q.33 Give relations between the circular pitch, diameter pitch and module of a gear wheel
- Q.34 Discuss the effect of initial belt tensions on the maximum power transmitted by the belt
- Q.35 Define follower of CAM and different type of followers.

SECTION-D

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

- Q.36 For a V-belt drive, derive the expression for tensions ratio of tight side and slack side.
- Q.37 Flywheel of steam engine has a radius of gyration of 1.5m and mass 3500 Kg. the starting torque of steam engine is 1500 NM and may be assumed constant. Determine angular acceleration and kinetic energy of flywheel after 10 second from the start.
- Q.38 Explain the balancing of different masses A,B,C,D, rotating at R1, R2, R3,R4 radius respectively in different planes at a distance L1,L2,L3 from plane A.

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