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**5th Sem / Mech, Prod, Mecatronics (4th Sem), CAD/
CAM, Mech. Engg. (Fabrication 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 In higher pairs, there is (CO1)
a) Line contact b) Sliding contact
c) Surface contact d) none of these
- Q.2 Energy is stored in a flywheel by virtue of its (CO5)
a) Heavy mass
b) Larger diameter
c) High speed
d) Heavy mass and slow speed
- Q.3 The value of contact ratio for gears is (CO4)
a) Less than unity b) More than unity
c) Unity d) none
- Q.4 The period in which there is no movement of follower for cam rotation is called (CO7)
a) ascent b) descent
c) dwell d) None of the above
- Q.5 At pitch point in a cam the pressure angle is (CO7)
a) Maximum b) Minimum
c) Zero d) 90°

(1) 181754/171754/121754
/031751

- Q.6 A hartnell governor is a (CO6)
a) Pendulum type governor
b) spring loaded type governor
c) dead weight type governor
d) Inertia type governor
- Q.7 A belt drive is (CO3)
a) a positive drive b) not a positive drive
c) parallel axis d) none of these
- Q.8 The condition for static balancing of a shaft is (CO8)
a) the resultant dynamic force on the shaft is equal to zero
b) the resultant couple due to dynamic force on the shaft is zero
c) both (a) and (b)
d) None of these
- Q.9 Longitudinal vibrations are those in which particles of body moves (CO9)
a) parallel to axis
b) about the axis
c) perpendicular to the axis
d) none of these
- Q.10 The gears used to connect two intersecting coplanar shafts are (CO4)
a) Spiral gears b) Straight spur gear
c) straight bevel gears d) none of these

SECTION-B

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

- Q.11 Machine is a device which converts mechanical energy into _____ (CO1)

(2) 181754/171754/121754
/031751

- Q.12 Hartnell governor is a _____ type of governor. (CO6)
- Q.13 Working depth of two mating gears is two times of module. (True/False) (CO4)
- Q.14 Coefficient of fluctuation of energy(k_e)= (CO5)
- Q.15 Write classification of cams. (CO7)
- Q.16 The materials for flat belts are _____ (CO3)
- Q.17 The spur gears is used between _____ shafts. (CO4)
- Q.18 Define static balancing. (CO8)
- Q.19 What is resonance? (CO9)
- Q.20 Flywheel in a four stroke engine is heavier than in the two stroke engine of the same power. (True/False) (CO5)

SECTION-C

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

- Q.21 Explain Scotch Yoke mechanism. (CO1)
- Q.22 Write difference between flywheel and governor. (CO6)
- Q.23 Define follower. Name different type of followers. (CO7)
- Q.24 What are the causes of vibrations. (CO9)
- Q.25 Explain the following terms: (CO5)
- 1) Slip
 - 2) Velocity Ratio
 - 3) Crowding of pulley
- Q.26 Discuss the various materials used for ropes and belts. (CO2)
- Q.27 Classify governor. (CO6)
- Q.28 Two gears A & B having teeth of 200 and 400. If the gear A is rotating in clockwise directions at 52 r.p.m. What will be the speed and direction of gear B. (CO3)

- Q.29 Discuss the method of balancing single rotating mass in same plane. (CO4)
- Q.30 Explain different types of kinetic Pairs. (CO1)
- Q.31 Write the advantages of gear drives over belt drive. (CO4)
- Q.32 A flywheel having a mass of 6.5 tonnes has a radius of gyration 1.8 metres. What amount of energy this flywheel will store in it with changing its speed from 118 rpm to 120 rpm (CO2)
- Q.33 Define the following cam terminology (CO7)
- i) Base circle
 - ii) Dwell
 - iii) Angle of ascent
 - iv) Pitch circle
- Q.34 Derive an expression for the condition to transmit maximum power with belt. (CO2)
- Q.35 Explain the construction and working of a watt governor. (CO6)

SECTION-D

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

- Q.36 Derive an expression for the ratio of tensions for flat belt passing over a pulley. (CO3)
- Q.37 Five masses A, B, C, D & E rotate in the same plane at equal radii. The masses A, B and C are 10 kg, 5kg and 8kg respectively. The angular position of masses B, C, D and E measured in the same direction from A are 60°, 135°, 210° and 270° respectively. Find the masses D and E for complete balance.
- Q.38 What are the harmful effects, causes and remedial measures of vibration. (CO9)