Roll No. [ ] Total No. of Pages : 03

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B.Tech. (AE/ME) / (IE-2008 Batch) (Sem.–4th)

THEORY OF MACHINES-II

Subject Code : ME-204

Paper ID : [A0809]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

(i) State D'Alembert principle.

(ii) Differentiate between inertia force and inertia torque.

(iii) Explain the need for the balancing a system briefly.

(iv) Define pitch circle in reference to toothed gearing.

(v) Differentiate between speed ratio and train value.

(vi) When shall reverted gear train be preferred over compound gear train?

(vii) Explain swaying couple briefly.

(viii) Write the effect of gyroscopic couple on an aeroplane when viewed from rear and taking right turn.

(ix) Draw the three planes of a gyroscopic motion along with its name.

(x) Explain the word synthesis in reference to mechanism.

SECTION-B

2. Two parallel shafts, about 600 mm apart are gears. One shaft is to run at 360 rpm and the the gears, if the circular pitch is to be 25 mm. distance and train value.

3. Write the classification of kinematic synthesis them in detail.

4. What do you understand by interference phe suitable diagram for the same. Also explain vari

5. Describe the graphical method for determini horizontal reciprocating engine.

6. Write the equilibrium of force in horizontal slide

(a) out stroke

(b) in stroke along with suitable diagrams.

SECTION-C

7. A drive on a machine tool is to be made by t spirals of which are of the same hand and has The wheels are of equal diameter and the ce axes of the shafts is approximately 134 mm. Th is 80° and the speed ratio 1.25. Determine:

(a) the spiral angle of each wheel.

(b) the number of teeth on each wheel.

(c) the efficiency of the drive, if the friction ang

(d) the maximum efficiency.

8. A rear engine automobile is travelling alon radius. Each of the four road wheels has 2.5 kg-m² and an effective diameter of 0.6 m. engine have a moment of inertia of 1.2 kg-m².

to the rear axle and the crankshaft rotates in the same sense as the road wheels. The ratio of engine speed to back axle speed is 3:1. The automobile has a mass of 1600 kg and has its centre of gravity 0.5 m above road level. The width of the track of the vehicle is 1.5 m. Determine the limiting speed of the vehicle around the curve for all four wheels to maintain contact with the road surface. Assume that the road surface is not cambered and centre of gravity of the automobile lies centrally with respect to the four wheels.

9. A shaft carries four masses in parallel planes A, B, C and D in this order along its length. The masses at B and C are 18 kg and 12.5 kg respectively, and each has an eccentricity of 60 mm. The masses at A and D have an eccentricity of 80 mm. The angle between the masses at B and C is 100° and that between the masses at B and A is 190°, both being measured in the same direction. The axial distance between the planes A and B is 100 mm and that between B and C is 200 mm. If the shaft is in complete dynamic balance, determine :

(a) The magnitude of the masses at A and D.

(b) the distance between planes A and D.

(c) the angular position of the mass at D.