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

Total No. of Questions : 09

B.Tech (ME-2011 Batch) (Sem.–4th)

THEORY OF MACHINES-II

Subject Code : BTME-402

Paper ID : [A1212]

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) Differentiate between crank pin effort and crank effort.

   (ii) Write the various sources of forces in mechanism briefly.

   (iii) Why is the reciprocating mass not completely balanced? Explain briefly.

   (iv) Write the function of idler in simple gear train with suitable diagram.

   (v) Differentiate between module pitch and diametral pitch of a gear.

   (vi) How is epicyclic gear train different from simple gear train? Explain briefly.

   (vii) Write the gyroscopic couple equation explaining all its terms.

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

   (ix) Explain the transmission angle in reference to kinematic synthesis of mechanism.

   (x) Explain the hammer blow.

SECTION-B

2. Explain how an equivalent dynamical system ca method.

3. Write the advantages and disadvantages of in profile of tooth gearing.

4. Explain the tabular method to analyze epicy example. Why is this method preferred to ana

5. A pair of locomotive driving wheels with t inertia of 180 kg-m². The diameter of the wh distance between wheel centres is 1.5 m. Whe on a level track at 95 km/h, defective ballast 6 mm and to rise again in a total time of 0.1 wheel takes place with simple harmonic motio

   (a) The gyroscopic couple set up.

   (b) The reaction between the wheel and rail d

6. Write the equilibrium of force in horizontal sli

   (a) out stroke

   (b) in stroke along with suitable diagrams.

SECTION-C

7. The following data relate to a pair of 20° Module = 6 mm, Number of teeth on pinion gear = 49; Addenda on pinion and gear whee

   (a) The number of pairs of teeth in contact

   (b) The angle turned through by the pinion an pair of teeth is in contact

   (c) The ratio of sliding to rolling motion wh larger wheel

      (i) is just making contact

      (ii) is just leaving contact with its mating

      (iii) is at the pitch point.

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8. Determine the proportions of four bar mechanism, by using three precision points, to generate $y = x^{1.5}$, where x varies between 1 and 4. Assume $\theta_S = 30°$; $\Delta\theta = 90°$; $\varphi_s = 90°$; and $\Delta\varphi = 90°$. Take length of the fixed link AD as 25 mm.

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.