AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD
DEPARTMENT OF MECHANICAL ENGINEERING
SESSIONAL TEST-2

Course: B.Tech	**Semester** : V
Session: 2017-18	**Section** : ME- 1, 2, 3
Subject: Kinematics of Machines	**Subject Code : NME-502**
Max. Marks : 50	**Time** : 2 hr.

Note: All questions are compulsory.

Section – A

A. Attempt all parts.   5×2 =10

1. What is the Coriolis component of acceleration? Also give the direction sense.
2. Name the different mechanism which are used for exact and approximate straight line motion.
3. Define the terms:
   a) module   b) pressure angle   c) circular pitch   d) addendum
4. The driving and driven shafts connected by Hook's joint are inclined an angle α, write the condition for maximum, minimum and equal speed.
5. Explain the term Interference and how it is prevented.

Section – B

B. Attempt all parts.   5×5 =25

6. What is the condition for correct steering ? Sketch and show the two main types of steering gears and discuss their relative advantages.
7. Two shafts are connected by a Hooke's joint. The driving shaft revolves uniformly at 500 r.p.m. If the total permissible variation in speed of the driven shaft is not to exceed ± 6% of the mean speed, find the greatest permissible angle between the centre lines of the shafts.
8. State and prove the law of gearing. Derive an expression for the velocity of sliding.
9. Derive an expression for the minimum number of teeth required on the pinion in order to avoid interference in involute gear teeth when it meshes with wheel.
10. A pinion having 30 teeth drives a gear having 80 teeth. The profile of the gears is involute with 20° pressure angle, 12 mm module and 10 mm addendum. Find the length of path of contact, arc of contact and the contact ratio.

Section – C

C. Attempt all parts.   **7.5×2 =15**

11. In the mechanism shown in figure 1, the slider C is moving to the right with a velocity of 1 m/s and an acceleration of 2.5 m/s2. The dimensions of various links are AB = 3 m inclined at 45° with the vertical and BC = 1.5 m inclined at 45° with the horizontal. Determine: **1.** the magnitude of vertical and horizontal component of the acceleration of the point B, and **2.** the angular acceleration of the links AB and BC.
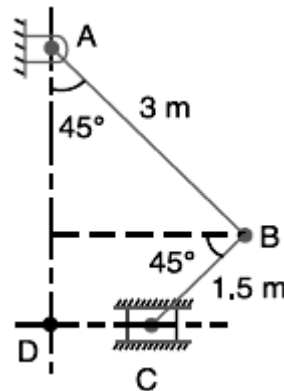

Figure 1

12. In an epicyclic gear train as shown in figure 2, the internal wheels A and B and compound wheels C and D rotate independently about axis O. The wheels E and F rotate on pins fixed to the arm G. E gears with A and C and F gears with B and D. All the wheels have the same module and the number of teeth are : TC = 28; TD = 26; TE = TF = 18. **1.** Sketch the arrangement ; **2.** Find the number of teeth on A and B ; **3.** If the arm G makes 100 r.p.m. clockwise and A is fixed, find the speed of B ; and **4.** If the arm G makes 100 r.p.m. clockwise and wheel A makes 10 r.p.m. counter clockwise ; find the speed of wheel B.
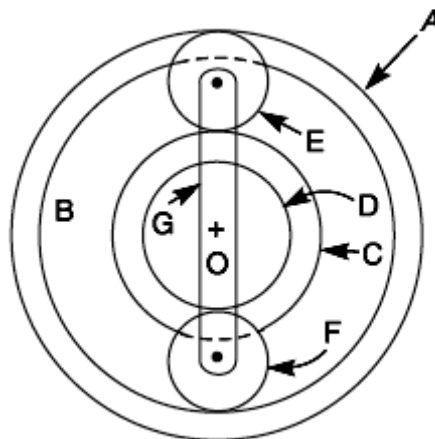

Figure 2