## **Assignment 3**

**Q.1** State and prove the law of gearing. Also Derive an expression for the velocity of sliding between a pair of involute teeth.

**Q.2** 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.

**Q.3** Two involute gears of  $20^{\circ}$  pressure angle are in mesh. The number of teeth on pinion is 20 and the gear ratio is 2. If the pitch expressed in module is 5 mm and the pitch line speed is 1.2 m/s, assuming addendum as standard and equal to one module, find: 1. The angle turned through by pinion when one pair of teeth is in mesh ; and 2. The maximum velocity of sliding.

**Q.4** Two gear wheels mesh externally and are to give a velocity ratio of 3 to 1. The teeth are of involute form ; module = 6 mm, addendum = one module, pressure angle =  $20^{\circ}$ . The pinion rotates at 90 r.p.m. Determine : 1. The number of teeth on the pinion to avoid interference on it and the corresponding number of teeth on the wheel, 2. The length of path and arc of contact, 3. The number of pairs of teeth in contact, and 4. The maximum velocity of sliding.

**Q.5** An epicyclic gear consists of three gears A, B and C as shown in Fig. 13.10. The gear A has 72 internal teeth and gear C has 32 external teeth. The gear B meshes with both A and C and is carried on an arm EF which rotates about the centre of A at 18 r.p.m.. If the gear A is fixed, determine the speed of gears B and C.

