B.Tech. (ME) 4th Semester F-Scheme

Examination, May-2019

KINEMATICS OF MACHINE

Paper-ME-204-F

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt* ***one*** *question from each section.* ***Question No. 1 is compulsory.*** *All question carry equal marks.*

1. Explain the following terms : 5×4=20

(a) Kinematic Inversion

(b) DISC Cam nomenclature

(c) Non standard gear teeth

(d) Function generation and path generation

(e) Friction circle and friction axis

Section-A

2. Explain pantograph in detail with its diagram of original position and displaced position. Also mention the uses of pantograph. 20

3. Explain four bar mechanism with ternary link alongwith velocity and acceleration diagram. 20

Section-B

4. A cam of base circle 50 mm is to operate a roller follower of 20 mm diameter. The follower is to have SHM. The angular speed of the cam is 360 RPM. Draw the cam profile for the cam lift of 40 mm, angle of ascent= 60^{o}, angle of dwell = 40^{o}, angle of descent= 90^{o} followed by dwell again. Also calculate maximum velocity and acceleration during ascent and descent. 20

5. Two 15 mm module, 20^{o} pressure spur gears have addendum equal to one module. The pinion has 25 teeth and gear 50 teeth. Determine whether interference will occur or not. If it occurs, to what value should the pressure angle be changed to eliminate interference. 20

Section-C

6. An epicyclic gear train consist of three gears 1, 2 and 3 as shown in fig. A. The internal gear 1 has 72 teeth and gear 3 has 32 teeth. The gear 2 meshes with both gears, gear 1 and gear 3 and is carried on an arm A which rotates about the centre O_2 at 20 RPM. If gear 'I' is fixed, determine the speed of gears 2 and 3. 20

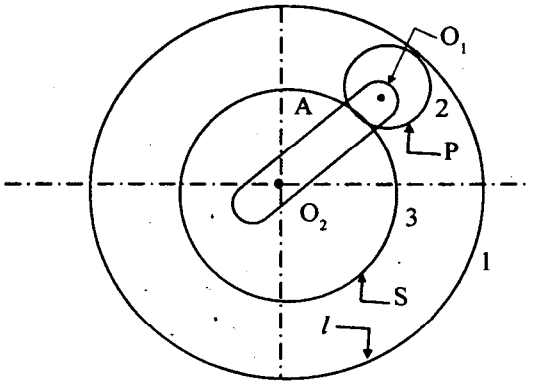

Fig. A

7. Derive Freudenstein's equation. 20

Section-D

8. A vertical shaft of 140 mm diameter rotating at 120 RPM rest on a flat end foot step bearing. The shaft carries a vertical load of 30 KN. The coefficient of friction is .06. Estimate the power lost in friction assuming uniform pressure and uniform wear. 20

9. State and explain law of belting. Also find out the length of open belt and cross belt drive. 20

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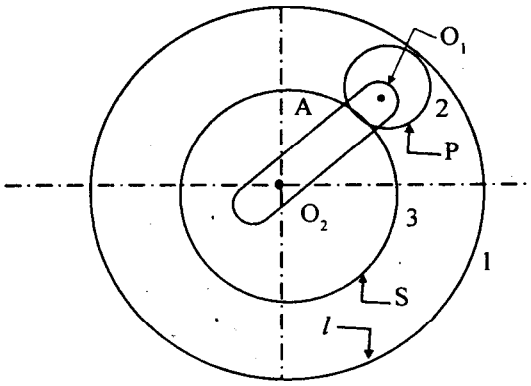

Fig. A

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