

Examination May-2014
Theory of Machines - II
Paper Code (BTME-402)
Paper Id:A-1212

Time : 03 Hrs.

Max. Marks:60

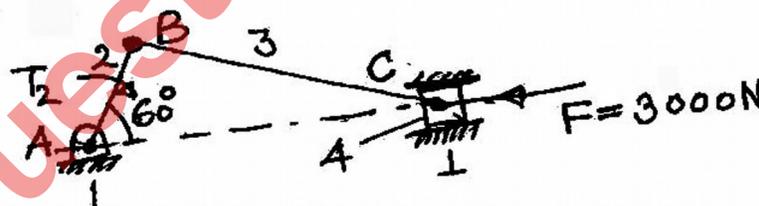
Note: 1) Section A is compulsory. Attempt any four and two questions from Section-B and Sections-C respectively. Each Section is of 20 marks.

SECTION-A**10x2=20**

- Q. 1 a) Write the equation of equilibrium.
 b) Explain the term point of concurrency.
 c) Explain the term equivalent offset inertia force.
 d) Explain Balancing of reciprocating mass.
 e) Explain hammer blow.
 f) What is the advantage of double helical gear over single helical gear?
 g) What is the difference between involute and cycloidal tooth profile?
 h) Explain the effect of gyroscopic couple on ship during rolling.
 i) Explain the term type synthesis.
 j) Explain the term transmission angle.

SECTION-B**4x5=20**

- Q. 2: Calculate the driving torque T_2 in Fig.-1



$AB = 10\text{cm}, \quad BC = 30\text{cm}.$

Fig :1.

- Q. 3: A connecting rod is suspended from a point 25 mm above the centre of small end and 650 mm above its C.G. Its mass being 37.5 kg. When permitted to oscillate, the time periods is found to be 1.87 seconds.
 Find the dynamical equivalent system constituted of two masses, one of which is located at the small end centre.
- Q. 4: Prove that the resultant unbalanced force is minimum when half of the reciprocating masses are balanced by rotating masses.

- Q. 5: Two gear wheels of 10cm and 15 cm pitch diameters have involutes teeth of 1.6 DP and pressure angle 20° . The addenda are 3mm. Determine length of path of contact.
- Q. 6: Two parallel shafts are to be connected by spur gearing. The approximate. Distance between the shafts is 600 mm. If one shaft runs at 120 r.p.m. and another at 360 r.p.m. find number of teeth on each wheel if module is 8mm. Also determine the exact distance between the shafts.

SECTION-C

2x10=20

- Q. 7 The wheels of a motor cycle have a total moment of inertia of 2.5 kg-m^2 and the engine parts have a moment of inertia of 0.14 kg-m^2 . The gear ratio is 5 to 1 and the axis of rotation of the engine crank shaft is parallel to that of rear wheel which have a diameter of 65 cm. Determine the magnitude and direction of the gyroscopic couple when motor cycle rounds a curve of 25 m radius at a speed of 50 km/hr. total mass of the system is 180 kg and $h = 0.6 \text{ m}$.
- Q. 8: A four-bar function generator is used to generate the function $y = \frac{1}{3}$ between the input angle of a crank and the angle of the follower made with the frame. Find the three precession points from chebyshev spacing if the initial values of input ie the crank angle and output ie the follower angle are 30° and 200° respectively. The differences between the final and initial values of the crank and follower angles are each equal to 90° .
- Q. 9: The following data refer to an uncoupled locomotive in which the cranks are 90° apart, wheel centres 1.25m, cylinder centres 0.5m, diameter of tread of driving wheel 1.5 m, radius of centre of gravity of balance mass 0.7m, crank radius 0.35 m, reciprocating parts per cylinder 300 kg, revolving parts per cylinder 250 kg. Find the balancing mass both in magnitude and position in planes of driving wheel to balance all the revolving and two third of reciprocating parts.

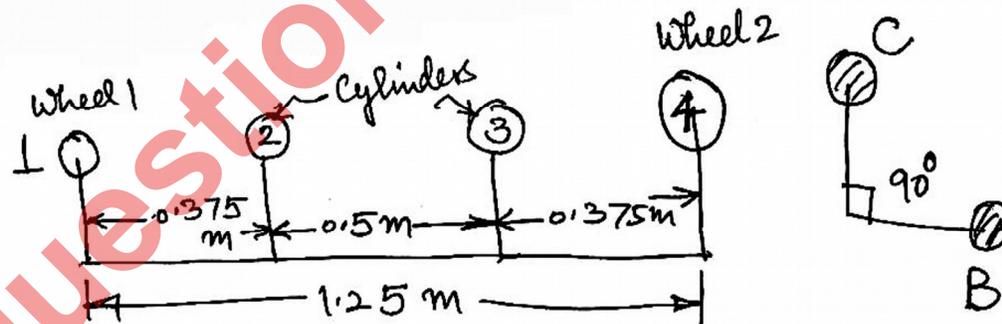


Fig :-02.

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