Total No. of Printed Pages:2

SUBJECT CODE NO: E-186
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(MECH/PROD) Examination Nov/Dec 2017
Theory of Machines-II
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Solve any three questions from each section.
ii) Assume suitable data wherever necessary.
iii) Use of non – programmable electronic calculator is permitted.

Section A

Q.1 A) Explain the term interference & undercutting. 05

B) 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 & 10 mm addendum 08
Find:- 1) length of path contact
2) Arc of contact
3) Contact ratio

Q.2 A) Explain helical gear & clearly define normal pitch & axial pitch in connection With helical gear. 05

B) In a spiral gear drive connecting two shafts, the approximate centre distance is 400mm & speed ratio =3. The angle between the two shaft is 50^0 & the normal pitch is 18mm. The spiral angle for the driving and driven wheels are equal 08
Find :- 1) Number of teeth on each wheel
2) Exact centre distance.
3) Efficiency of the drive, if friction angle = 6°

Q.3 A) What is the function of governor? Give detail classification of governor. 05

B) A Porter governor has all four equal arms 250mm long. The upper arm is attached on the Axis of rotation and the lower arms are attached to the sleeve at a distance of 30 mm from the axis. The mass of each ball is 5kg & a Sleeve has a mass of 50 Kg. The extreme Radii of rotation are 150 mm & 200 mm. Determine the range of speed of the governor. 09

Q.4 A) What are the different important term used in governor? 05

B) Explain fluctuation of energy & fluctuation of speed in case of fly wheel. 08

Q.5 A) Explain the effect of gyroscopic couple on aeroplane. 05

B) The turbine rotor of a ship has a mass of 3500kg. It has radius of gyration of 0.45m & a speed of 3000 rpm clockwise when 100 King from stern. Determine the gyroscopic couple and its effect upon ship: 08

1. When ship steering to the left on a curved of 100m radius at a speed of 36 Km/h.
2. When ship pitching in a simple harmonic motion, the bow falling with its Maximum velocity. The period of pitching is 40 seconds and total angular Displacement between two extreme positions of pitching is 12 degrees.

SECTION B

Q.6 A) Derive the expression for torque transmitting capacity of single plate clutch considering Uniform wear theory. 06

B) A multi – disc clutch has three discs on the driving shaft and two on the driven-shaft. The outside diameter of the contact surface is 240mm and inside diameter120 mm. Assuming uniform wear & coefficient of friction as 0.3, finds the maximum axial intensity of pressure between the discs for transmitting 25 Kw at 1575 r.p.m. 08

Q.7 A) What are the different factors upon which the selection of belt drive depends? Give The types of belt drive. 05

B) A shaft rotating at 200 r.p.m. drives another shaft at 300 r. p. m. and transmit 6Kw Through a belt. The belt is 100 mm wide & 10 mm. thick. The distance between the shaft is 4m. the smaller pulley is 0.5 m in diameter. Calculate the stress in the belt if it is (i) an open belt drive (ii) a cross belt drive Take $\mu = 0.3$. 08

Q.8 A) Explain the working of seismic instrument for measurement of vibration. 05

B) Determine the undamped natural frequency of a spring mass system. 08

Q.9 A) What are the different causes & effects of vibration 05

B) Derive the equation of motion & natural frequency for a simple pendulum using energy method. 08

Q.10 Write a short note on:

A) Slip & Creep of belt 04

B) Friction laws 05

C) Multiplate clutch. 04