[Total No. of Printed Pages:1] **CODE NO:- U-249**

FACULTY OF ENGINEERING AND TECHNOLOGY

Third Engg (Mechanical) Examination - *DEC – 2014*

Theory of Machines-II (revised)

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

"Please check whether you have got the right question paper."

N.B
1) *Solve any three questions from each section.*
2) *Use of non-programmable electronic calculator is permitted.*
3) *Assume suitable data wherever necessary.*

SECTION A

Q.1 a) Give the comparison between spur and helical gears. 05

b) A pair of spur gear has 16 and 18 teeth, a module of 13mm, addendum of 13mm, and pressure angle of 14.5^0. Determine whether interference will occur or not. If it occurs, determine the amount by which the addendum must be reduced to eliminate the interference. 08

Q.2 a) Give the comparison between a simple gear train and compound of gear train. 04

b) The center distance between two meshing spiral gears is 260mm and the angle between the shaft is 65^0. The normal circular pitch is 14mm and the gear ratio is 2.5. The driven gear has a helix angle of 35^0. Find the, 09
i)Number teeth on each wheel ii) Exact center distance iii) Efficiency assuming the friction angle to be 5.5^0.

Q.3 a) Explain sensitiveness, stability and isochronisms for a governor. 06

b) A hartNell governor has each ball of weight15 N. The lengths of vertical &horizontal arms of the bell crank lever are 120mm and 60mm respectively. The fulcrum of the bell crank lever is at a distance of 100mm from the axis of rotation. The maximum and minimum radii of rotation of the balls are 120mm and 80mm and the corresponding equilibrium speeds are 325 and 300 rpm respectively. Find the equilibrium speed when the radius of rotation is 100mm and stiffness of the spring is 25N/mm. 07

Q.4 a) Differentiate between the functions of a flywheel and a governor. 05

b) Explain in detail the fluctuation of energy and maximum fluctuation of energy in case of a flywheel. 08

Q.5 Write a short notes on

a) Gyroscopic effects on an aero plane 05

b) Stability of vehicles 05

c) Worm and worm gears. 04

SECTION B

Q.6 a) Explain the working of single plate clutch with neat sketch. 06

b) A single plate clutch transmits 25kw at 900 rpm. The maximum pressure intensity between the plates is 85KN/m^2. The outer diameter of the plate is 360mm. both sides of the plate are effective and the coefficient of friction is 0.25. determine the 07
i) Inner diameter of the plate ii) Axial force to engage the clutch.

Q.7 a) Discuss the effect of initial tension on power transmission in a belt drive. 05

b) A pulley is driven by a flat belt drive. The flat belt is 100mm wide 6mm thick. The angle of lap is 120^0 and the coefficient of friction is 0.3. Consider the density of material as 1000 kg/m^3. The maximum stress in the belt does not exceed 2MPa. Find the maximum power that can be transmitted and the corresponding speed of the belt. 08

Q.8 a) What do you mean by viscous damping? 05

b) Derive equation of motion and natural frequency for a simple pendulum using energy method. 08

Q.9 a) Find out the frequency ratio for which the amplitude in forced vibration will be maximum. Also determine the peak amplitude and the corresponding phase angle. 09

b) Explain the function of vibrometer. 04

Q.10 Write short notes on:

a) Chain drive 05

b) Cone clutch 05

c) Slip and creep 04

6136abda993afe6b85c52d700b7379ab