

Total No. of Questions : 6]

P44

SEAT No. :

[Total No. of Pages : 2

Oct./TE/Insem.-158

T.E. (Mechanical) (Common to Mech. S/W & Auto)

THEORY OF MACHINES - II

(2015 Pattern) (Semester - I) (302043)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data if necessary.

Q1) a) Define circular pitch, diametral pitch, pressure angle and tooth thickness in connection with the spur gears. [4]

b) Two 20° involute spur gears with module 8 mm are in mesh. Addenda are equal to 1 module. Teeth on gear and pinion are 57 and 23 respectively. Find: [6]

i) Number of Pairs of Teeth in Contact

ii) The angle of action of Pinion and the gear Wheel

OR

Q2) a) Two 20° involute gears with module 10 are in mesh. Addendum is equal to 1 module. Teeth on large gear and pinion are 50 and 13 respectively. Does interference occur? [6]

If yes, what should be the new value of pressure angle to avoid interference?

b) Compare Involute Teeth with Cycloidal Teeth. [4]

P.T.O.

Q3) a) Define Helix angle, Axial pitch, Transverse circular pitch, Normal circular pitch in connection with helical gears. [4]

b) Pair of helical gears with 20 teeth and 40 teeth meshing with each other have 3 mm normal module, 20° pressure angle and 25° helix angle. Find Transverse module, Transverse pressure angle, axial pitch, PCD of pinion and Gear. [6]

OR

Q4) a) Three start worm rotating at 600 rpm drives 40 teeth worm gear. Pitch is 20 mm on PCD 80 mm. Coefficient of friction is 0.05 Find: Helix angle on worm, speed of gear and Center Distance. [6]

b) Explain pitch cone distance, shaft angle, pitch cone angle, back cone for bevel gears. [4]

Q5) a) Name different gear trains and give any specific application of each of them. [4]

b) Two gears A and D with no of teeth 27 and 40 respectively are available. Compound gear B-C is to be manufactured such that after completing gear train A-(B-C)-D, torque at output shaft connected to gear D should be approximately 1075 N-m. [6]

If gear A is to be driven by 7.2 KW prime mover running at 200 rpm, find number of teeth required on gears B and C.

OR

Q6) In an epicyclic gear of the sun and planet type, the PCD of the annular wheel 'A' is to be nearly equal to 216 mm and the module is 4 mm. When the annular wheel is stationary, the spider which carries 3 planet gears 'P' of equal size has to make 1 revolution for every five revolutions of the driving spindle carrying 'S' gear. Determine the Number of teeth on all the wheels and also the exact pitch circle diameter of 'A'. Sketch the arrangement on the basis of given data. [10]

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TE/Insem.-158 2