Sanjay Ghodawat University, Kolhapur

2020-21

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EXM/P/09/00

Year and Program: **T. Y. B. Tech**	**School of Technology**	**Department:** **Mechanical Engineering**
Course Code: **MET 303**	**Course Title:** **Dynamics of Machines**	**Semester :** **V**
Day: Wdnesday **Date: 16.12.2020**	**End Semester Examination**	**Time:2 Hrs.** **Max Marks:50**

Question Paper

Instructions: 1) All Questions are compulsory.
2) Assume the data suitably

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)**–			
a)	Derive the expression for the maximum efficiency in case of spiral Gears	8	L1	CO 303.1
b)	An epicyclic gear train of sun and planet type has fixed outer annular(A) sun wheel(S) rotates at speed of 600rpm and the spider (arm-C) carriers three planet (P) wheels are to driven. Given Ts: 18; Tp=27 and the diametral pitch is sane for all the mating gears. Find the required number of teeth on annular wheel and speed of the planet wheels(fig 1.b)	8	L2	CO 303.1

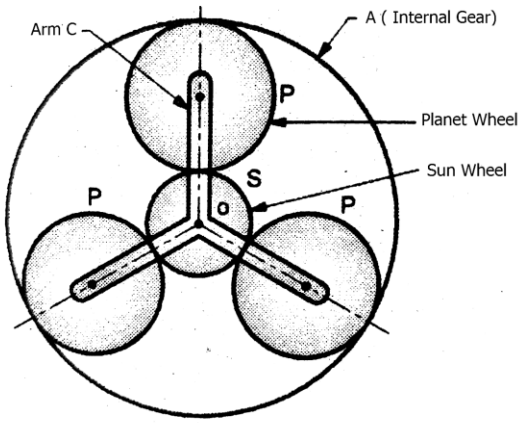


fig. 1. b

c)	The turning moment diagram for a multi cylinder engine has been drawn to the scale of 1 mm to 500 N-m torque and 1 mm to 6^o of the crank displacement. The Intercepted areas between output torque curve and mean resistance line taken in order from one end in sq.mm are -30, +410, -280, +320, -330, +250, -360, +280, -260when the engine is running at 800rpm. The engine has a stroke of 300mm and the fluctuation of speed is not exceeding $\pm$2% of the mean speed. Determine a suitable diameter and cross section of the flywheel rim	8	L2	CO 303.2

for a limiting value of the safe centrifugal stress of 7 MPa. The material density may be assumed as 7200 Kg/ m^3. The width of rim to be 5 times the thickness

Q.2 Answer the following (any two) –

a)	Derive an expression for velocity and acceleration ofthe slider of slidercrank mechanism	8	L1	CO 303.3
b)	Explain direct and reverse crank method for balancing of the radial engine	8	L3	CO 303.4
c)	An aero plane makes a complete half circle of 50 m radius, towards left when flying at 200 km/hr. The rotating engine and the propeller of the plane have a mass 400 kg with a radius of gyration of 400mm. The engine runs at 2400 rpm. clockwise when viewed from the rear. Find the gyroscopic couple on the plane and state its effect on it. What will be the effect if the aero plane turnsto its right instead of the left?	8	L3	CO 303.5

Q.3 Answer the following (any two) –

a)	Four masses attached to the shaft at planes A, B, C, and D at equal radii. The distance of planes B, C and D from A are 500mm, 600mm and 1300 mm respectively. The masses at A, B and C are 60kg, 55kg and 80kg respectively. If the system is in complete balance determine the mass at D the position of masses B, C and D with respect to 'A'	9	L4	CO 303.4
b)	The pressure angle of two gears in mesh is 20^o and have a module of 10mm. The number of teeth on pinion are 24 and on gear 60. The addendum of pinion and gear is same and equal to one module. Determine: i. the number of pairs of teeth in contact ii. the angle of action of pinion and gear, and iii. the ratio of sliding to rolling velocity at the beginning of contact and at the end of contact	9	L2	CO 303.1
c)	Derive the expression for the stability condition of two-wheel vehicle moving in a curved path	9	L3	CO 303.5

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