Q.P. Code: 18ME0310 **R18**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations February-2022

THEORY OF MACHINES

(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	**a**	Define Co efficient of fluctuation of energy.	**2M**
	b	Write different types bearings	**2M**
	c	Distinguish between a Governor and a flywheel.	**2M**
	d	List out the assumptions for complete balancing of reciprocating masses.	**2M**
	e	Distinguish between a traverse and torsional vibration.	**2M**

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2		Each paddle wheel of a steamer have a mass of 1600kg and a radius of gyration of 1.2meters.The steamer turns to port in a circle of 160meters radius at 24Km/hr.The speed of the paddle is 90rpm.Find the magnitude and effect of the gyroscopic couple acting on the steamer.	**10M**

OR

3		A horizontal gas engine running at 210rpm has a bore of 220mm and a stroke of 440mm. The connecting rod is 924mm long the reciprocating parts weight 20kg.When the crank has turned through an angle of 30° from IDC, the gas pressure on the cover and the crank sidesare 500KN/m2 and 60KN/m2 respectively. Diameter of the piston rod is 40mm.Determine,1. Turning moment on the crank shaft 2.Thrust on bearing 3. Acceleration of the flywheel which has a mass of 8kg and radius of gyration of 600mm while the power of the engine is 22KW.	**10M**

UNIT-II

4	**a**	Describe with neat sketch the lope brake dynamometer.	**5M**
	b	A multi clutch internal and external diameter as 300 and 450mm. maximum intensity pressure as 0.075 N/mm².the first disc had three plates and second disc had two disc the coefficient of frictional surface shaft and plate surfaces as 0.02 N/mm².power absorbed by disc is 5kw. Assuming uniform wear. shaft rotating with speed of 580 rpm. then find out torque developed on the plate.	**5M**

OR

5		In a horizontsl belt transmission dynamometer the diameter of the driving pulley rotating at 1800rpm is 90mm. The centre distance of the intermediate pulleys from the fulcrum is also 70mm each. The weighing pan on the lever is at a distance as 250mm. Find the power Transmitted when a mass of 30kg is required in the pan, including its own mass.	**10M**

UNIT-III

6	Calculate the rage of speed of a porter governor which has equal arms of each 200mm long and pivoted on the axis of rotation .The mass of each ball is 4kg and the central load of the sleeve is 20kg.The radius of rotation of the ball is 100mm when the governor being to lift and 130mm when the governor is at maximum speed.	**10M**

OR

7	A governor of hartnell type has equal balls of mass 3kg, set initially at a radius of 200mm.The arms of the bell crank lever are 110mm vertically and 150mm horizontally Find (i) the initial compressive force on the spring at a radius of 200mm at240rpm and (ii) the stiffness of the spring required to permit a sleeve movement of 4mm on a fluctuation of 7.5 percent in the engine speed.	**10M**

UNIT-IV

8	A, B, C and D are four masses carried by a rotating shaft at radii 100mm,125mm,200mm and 150mm respectively. The planes in which the masses revolve are spaced 600mm apart and the masses of B,C and D are 10kg,5kg and 4kgrespectively.Find the required mass A and relative angular setting of the four masses so that the shaft be in complete balance	**10M**

OR

9	Derive the following expression of effects of partial balancing in two cylinder locomotive engine (i) Variation of attractive force (ii) Swaying couple (iii) Hammer blow.	**10M**

UNIT-V

10	Four masses A, B, C, and D are completely balanced masses C and D makes angles of 90° and 195° respectively with B in the same sense. The rotating masses have the following properties: mA=25kg rA=150mm mB=40kg rB=200mm mC=35kg rC=100mm rD=180mm Planes B and C are 250mm apart. Determine (i) the mass A and its angular position (ii) the position of planes A and D.	**10M**

OR

11	A, B, C and D are four masses carried by a rotating shaft at radii 100mm,125mm,200mm and 150mm respectively. The planes in which the masses revolve are spaced 600mm apart and the masses of B,C and D are 10kg,5kg and 4kgrespectively.Find the required mass A and relative angular setting of the four masses so that the shaft be in complete balance.	**10M**

END