Q.P. Code: 16ME308 **R16**

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

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

DYNAMICS OF MACHINERY

(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Define coefficient of fluctuation of speed and coefficient of fluctuation of energy.	**5M**
	b	The radius of gyration of a fly wheel is 1meter and fluctuation of speed is not to exceed 1% of the mean speed of the flywheel. If the mass of the flywheel is 3340 kg and the steam develops 150 KW at 135 rpm, then find (a).Maximum fluctuation of energy (b). Coefficient of fluctuation of energy	**7M**

OR

2		Racing car weights 20 KN it has wheel base of 2m track width 1m and height 9 of center of gravity 300 mm above the ground level & lies midway between the front and rear axle. The engine flywheel rotates at 3000 rpm clockwise, when viewed from the front view the moment of inertia of flywheel is 4 Kg-m^2 & moment of inertia of each wheel is 3 Kgm^2 .Find the reactions between the each wheels, the ground when the car takes the curve of 16M radius towards right at 30 Km/hr taking in to consideration the Gyroscopic and centrifugal effects. Each wheel radius is 400 mm.	**12M**

UNIT-II

3	a	Describe with neat sketch the lope brake dynamometer	**6M**
	b	Derive the expression for Uniform Pressure and uniform wear any one of the Bearing	**6M**

OR

4		A single disc clutch internal and external diameter as 200 and 300 mm. maximum intensity pressure as 0.06 N/mm^2.the coefficient of frictional surface shaft and plate surfaces as 0.03 N/mm^2.determine power lost in to the shaft. Assuming uniform wear. shaft speed rotating with speed of 1200 rpm.	**12M**

UNIT-III

5		Calculate the rage of speed of a porter governor which has equal arms of each 200 mm long and pivoted on the axis of rotation .The mass of each ball is 4 kg and the central load of the sleeve is 20 kg.The radius of rotation of the ball is 100 mm when the governor being to lift and 130 mm when the governor is at maximum speed.	**12M**

OR

6		A hartnell governor having a central sleeve spring and two right angled bell crank lever operates between 290rpm and 310rpm for a sleeve lift of 16Mm. The sleeve and ball arms are 80mm and 120mm respectively. The levers are pivoted at 120mm from the governor axis and mass of the ball is 2.5kg.The ball arms are parallel at lowest equilibrium speed. Determine (i) load on the spring at maximum and minimum speeds and (ii) Stiffness of the spring.	**12M**

UNIT-IV

7		A four cylinder vertical engine has cranks 150mm long. The plane of rotation of the first, second and fourth cranks are 400mm,200mm and 200mm respectively from that of the third crank and their reciprocating masses are 50kg,60kg and 50kg respectively. Find the mass of the reciprocating parts for the third cylinder and relative angular position of the cranks in order that the engine may be in complete balance.	**12M**

OR

8 The data for three rotating masses are given below:- M1=4kg r1=76Mm θ =45 M2=3kg r2=86Mm θ2= M =2. kg r = 0mm θ =2 0 Determine the amount of counter mass at a radial distance of 66Mm required for their static balance. **12M**

UNIT-V

9 In a single degree of damped vibration system a suspended mass of 8kg makes 30 oscillations in 18 seconds. The amplitude decreases in 18 seconds. The amplitude decreases to 0.25 of the initial value after 5 oscillations. Determine (i) the spring stiffness (ii) logarithmic decrement (iii) damping factor (iv) Damping coefficient. **12M**

OR

10 Derive an expression for the natural frequency of the free longitudinal vibration by (i) Equilibrium method (ii) Energy method (iii) Rayleigh's method **12M**

*** END ***