Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Supplementary Examinations July-2021
THEORY OF MACHINES
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 60

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

1	a	Explain the Gyroscopic couple on rolling of ship.Why?	2M
	b	Define centrifugal clutch.	2M
	c	What is mean by hunting of governor.	2M
	d	What are the different types of balancing machines?	2M
	e	What are the causes of critical speed? Or why critical speed encountered?	2M

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

UNIT-I

2   A vertical double acting steam engine has a cylinder 300mm diameter and 450mm   **10M**
stroke and runs at 200rpm.The reciprocating parts has a mass of 225kg and the piston
rod is 50mm diameter.The connecting rod is 1.2m long. When the crank has turned
125°from IDC the steam pressure above the piston is 30KN/m2.calculate,(i)Crank-
pin effort (ii)The effective turning moment on the crank shaft.

OR

3   A horizontal single acting steam engine has a cylinder 400mm diameter and 550mm   **10M**
stroke and runs at 180rpm.The reciprocating parts has a mass of 225kg and the piston
rod is 50mm diameter.The connecting rod is 1.2m long. When the crank has turned
125°from IDC the steam pressure above the piston is 30KN/m2.calculate,(i)Crank-
pin effort(ii)The effective turning moment on the crank shaft.

UNIT-II

4	a	Explain function of absorption type dynamometer.	5M
	b	Derive the expression for Uniform Pressure and uniform wear any one of the Bearing.	5M

OR

5	a	Describe with sketches one form of torsion dynamometer and explain in detail the calculations involved in finding the power transmitted.	5M
	b	In a vertical belt transmission dynamometer the diameter of the driving pulley rotating at 1500rpm is 80mm. The centre distance of the intermediate pulleys from the fulcrum is also 80mm each. The weighing pan on the lever is at a distance as 250mm. Find the power Transmitted when a mass of 20kg is required in the pan, including its own mass.	5M

UNIT-III

6   Explain Hartung spring controlled governor. drive their expression and how is it   **10M**
varies from hartnell type ?

OR

7   A governor of hartnell type has equal balls of mass 3kg, set initially at a radius of   **10M**
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.

UNIT-IV

8 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. **10M**

OR

9 Derive the following expression of effects of partial balancing in two cylinder locomotive engine. **10M**

  (i) Variation of attractive force   (ii) Swaying couple   (iii) Hammer blow.

UNIT-V

10 The barrel of a large gun recoils against a spring on firing. At the end of the firing, a dashpot is engaged that allows the barrel to return to its original position in minimum time without oscillation. Gun barrel mass is 400kg and initial velocity of recoils 1m.Determine spring stuffiness and critical damping coefficient of dashpot. **10M**

OR

11 An two 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. **10M**

END