Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject Code: 710902N **Date: 17-06-2014**

Subject Name: Dynamics of Machinery

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Discuss about the auto correlation functions and their properties. **07**

(b) Explain Johnsonôs numerical analysis method used for cam dynamics. **07**

Q.2 **(a)** Explain the advantages of closed-loop control system over opened-loop control system. Also discuss about the óunity feed back loopô. **07**

(b) What do you mean by óvibration isolationõ? Explain about the vibration isolation of single degree freedom system. **07**

OR

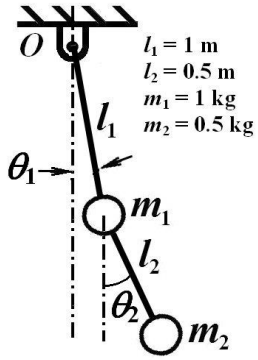
(b) Write a short note on ónoise controlô. **07**

Q.3 **(a)** With neat sketch, explain the phase plane method for analysis of the jump phenomenon in case of cam-follower system. **07**

(b) What do you mean by stability of a control system? State the different criteria used to investigate the stability of the control system. Explain any one of them. **07**

OR

Q.3 **(a)** Two simple pendulums are connected in series as shown in figure. Determine the natural frequencies of the free-undamped vibrations of the system. **07**



(b) What is the difference between sound and noise? Derive the governing equation of acoustic wave propagation. **07**

Q.4 **(a)** Write a short note on óRoot locus methodô. **07**

(b) Explain óRayleighôs methodô by giving the suitable example to determine the natural frequencies of the multi degrees of freedom system. **07**

OR

Q.4 **(a)** Derive the suitable expression of transverse vibration for the beam of length *l* with uniform cross section carrying a uniformly distributed load and fixed at both the ends in usual notations. Also derive the natural frequency relationship for the same. **07**

	(b)	Define the following terms: (i) Position error, (ii) Follower command, (iii) Follower response, (iv) Jump speed, (v) Cross over shock, (vi) Spring surge, (vii) Spring wind up.	**07**
Q.5	**(a)**	Define ôTransfer functionâ What are the properties of transfer function? Also discuss about the advantages of transfer function.	**07**
	(b)	Compare the step response of first and second order system.	**07**
		OR	
Q.5	**(a)**	Derive the equation of motion of torsional vibrations of a shaft of uniform cross section in standard notations.	**07**
	(b)	Explain the random aspects of noise and spectral density.	**07**

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