Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 710902N **Date: 02-12-2014**

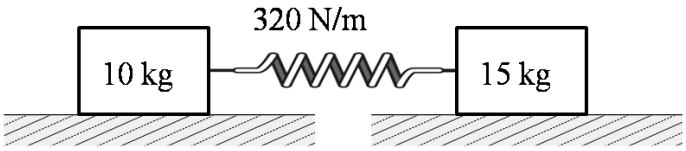
Subject Name: Dynamics of Machinery

Time: 10:30 am - 01:00 pm **Total Marks: 70**

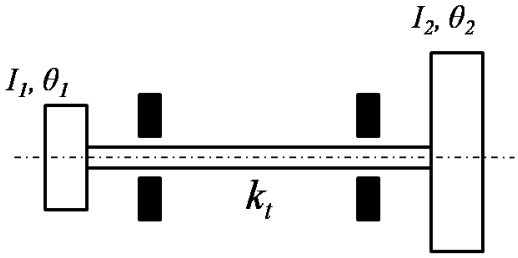
Instructions:

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

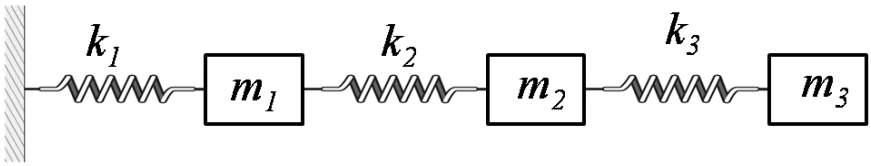
Q.1 **(a)** Use Lagrange's equation to find the equation of motion for a system shown in figure and find its natural frequencies. **07**



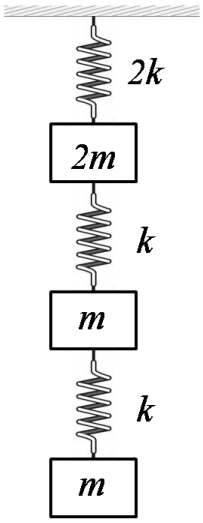
(b) In figure, an electric motor generator set is shown. Find the natural frequencies and amplitude ratios of the principle modes. **07**



Q.2 **(a)** Find the stiffness influence coefficients for the following figure. **07**



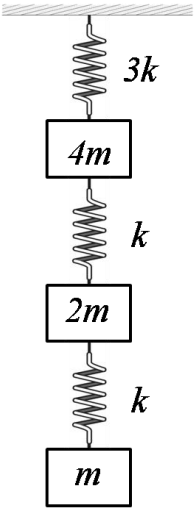
(b) Using matrix method, determine the natural frequencies of the system shown in figure. **07**



OR

(b) Use Dunkerly's formula to find the lowest natural frequency of the system **07**

shown in figure.



Q.3	**(a)**	Derive the equation of transverse vibration of beams.	**07**
	(b)	Determine the stability of the control system described by the following characteristic equation: $$S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16$$	**07**
		OR	
Q.3	**(a)**	What do you mean by control action? Explain any two types of control action with suitable diagram.	**07**
	(b)	Derive the expression for the longitudinal vibration of bars.	**07**
Q.4	**(a)**	Explain the 2-3 polynomials D-R-D Cam.	**07**
	(b)	What are Polydyne cams? Discuss the fundamental relationships in Polydyne cams.	**07**
		OR	
Q.4	**(a)**	Discuss the jump phenomenon with neat sketch.	**07**
	(b)	Do the analysis of an elastic cam system.	**07**
Q.5	**(a)**	Derive the governing equation of acoustic wave propagation.	**07**
	(b)	Discuss the forces in cam-and-follower system.	**07**
		OR	
Q.5	**(a)**	Discuss the various noise measurement techniques.	**07**
	(b)	Explain the general method for drawing root loci with suitable example.	**07**

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