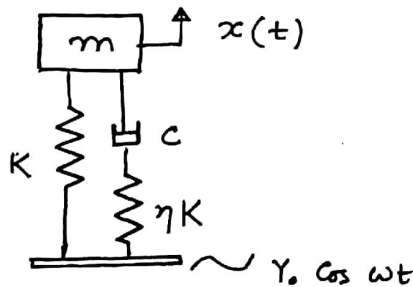




INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR  
Mid-Autumn Semester 2018-19

Date of Examination : \_\_\_\_\_ Session (FN/AN) \_\_\_\_\_ Duration 2 hrs Full Marks 30  
Subject No. : ME60417 Subject : Vibration Control and Isolation  
Department/Center/School : Mechanical Engineering (ME3/5DDME)  
Specific charts, graph paper, log book etc., required NIL  
Special Instructions (if any) : Answer all questions in brief. Marks are shown against respective question. Assume any data, if required, after clearly mentioning it.

- Question 1: Classify different types of excitation in a vibrating system. Give an example of each one. [2]  
Question 2: What do you mean by active control of vibration? Discuss the difference between feed-forward and feed-back control. Give an example of each. [1+2]  
Question 3: Write the significance of balancing in vibration control. State the balancing methods of reciprocating machines. [1+2]  
Question 4: Define force and motion transmissibility with the help of a single-degree-of-freedom system. [2]  
Question 5: Derive the expression for motion transmissibility of the base excited system shown in the figure. [5]



- Question 6: What do you mean by negative-stiffness spring? How is it useful in vibration isolation? [2]  
Question 7: State the difference between the performance of a single-stage isolator and a two-stage isolator. [3]  
Question 8: What is meant by sky-hook damper? How such a damper is simulated in a mobile system by active means? [1+2]  
Question 9: State the working principle of (a) continuous sky-hook damping control (b) continuous balance logic control in semi-active motion isolation. [2]  
Question 10: Assume that a spring has been designed whose stiffness can be varied between  $k_{\min}$  and  $k_{\max}$ . Develop a semi-active control algorithm to closely simulate a sky-hook damper in motion isolation problem. [5]

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