| Alexandria Higher Institute of Engineering & Technology (AIET) | | |
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| Department of: Mechatronics | 4th Year | |
| الديناميكيه النظم تحليل | Code: EME 403 | |

# Sheet (1)

**QUESTION (1):**

Define the following:

1. Inputs
2. Outputs
3. External disturbance
4. Initial conditions
5. Dynamic variables
6. Settling time.

**QUESTION (2):**

Find the time constant, settling time and static gain for the following equations:

[1] $5\dot{X} + 2X = 10\sin wt$

[2] $2\dot{X} + 2X + 1 = 10t$

[3] $7\dot{X} + 2X + 10 = 5t^2 + 2$

**QUESTION (3):**

Find the natural frequency, damping ratio and static gain for the following equations:

[1] $25\ddot{X} + 4\dot{X} + 16X = 10sin5t$

[2] $5\ddot{X} + 20\dot{X} + 5X + 15 = 30t$

[3] $2\ddot{X} + 4\dot{X} + 4X + 10 = 8t^2 + 1$

**QUESTION (4):**

For the two masses shown in figure (1), Drive the equation of motion for mass **($m_2$).**

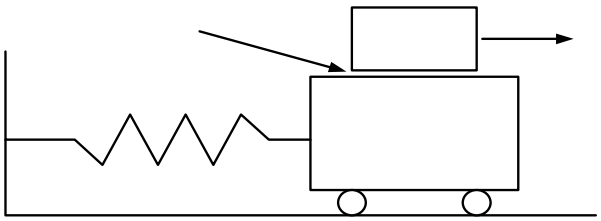

Figure (1)