

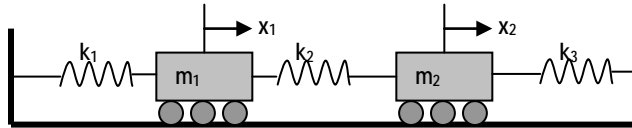
Test paper 3 Dynamics of Ocean Structures

Maximum marks: 20

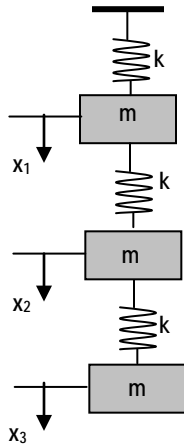
Time: 45 minutes

Answer all questions. **Answer all questions**

1. Starting with the matrix equation, $K \phi_s = \omega_s^2 M \phi_s$, pre-multiply first with KM^{-1} and using orthogonality relation $\phi_r^T M \phi_s = 0$, show that $\phi_r^T KM^{-1} K \phi_s = 0$. Repeat this to show that $\phi_r^T [KM^{-1}]^h K \phi_s = 0$ for $h = 1, 2, 3, 4, \dots, n$ where n is # degree-of-freedom.
2. Determine the influence co-efficient matrix for the multi degree-of-freedom system shown in the figure below:
- 3.



4. Find the fundamental frequency of the spring mass system shown below:



5. Compare the Dunkerley's frequency with Stodla's frequency for the spring-mass system shown below:

