305307

December, 2019
B. Tech. (ECE) - III SEMESTER
ENGINEERING MECHANICS (ESC01)

Time : 3 Hours]   [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Name the different types of trusses.   (1.5)

     (b) Differentiate between first and second moments of area.   (1.5)

     (c) Define Static Indeterminancy.   (1.5)

     (d) What is Limiting Friction?   (1.5)

     (e) Explain degrees of freedom.   (1.5)

     (f) Define D'Alembert's Principle.   (1.5)

     (g) What is Resonance?   (1.5)

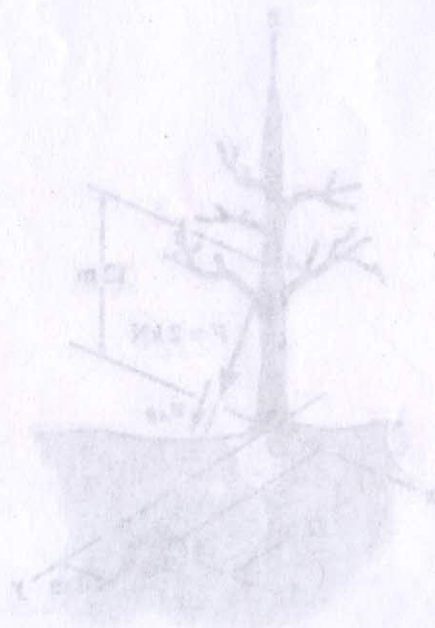(h) Explain Equilibrium. (1.5)

(i) What are Conservative Forces? (1.5)

(j) Explain Wedge Friction. (1.5)

PART - B

2. Derive the equation for Newton's law for path variables.

(15)

3. (a) Derive the relation for motion of a particle relative to a pair of translating axes. (5)

(b) Explain with an example the Method of sections for solving truss problems. (10)

4. Blocks A and B have a mass of 3 kg and 9 kg, respectively, and are connected to the weightless links shown in Fig. Determine the largest vertical force P that can be applied at the pin C without causing any movement. The coefficient of static friction between the blocks and the contacting surfaces is $\mu_s = 0.3$. (15)

5. (a) Define inertia quantities. (5)

(b) Derive the relation between mass inertia terms & area inertia terms. (10)

6. (a) Define the Method of minimum potential energy. (10)

(b) Derive the equation for minimum load to lower the load with a simple screw jack. (5)

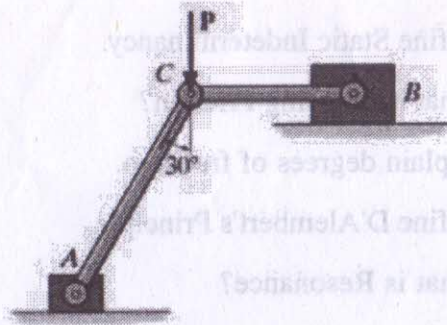7. Determine the moment produced by the force F in Fig. about point O. Express the result as a Cartesian vector. (15)