

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

Programme Name: B.TECH-ADE

Semester : VII

Course Name : Modeling and Simulation

Time : 03 hrs.

Course Code : ADEG-436

Max. Marks: 100

Nos. of page(s) : 02

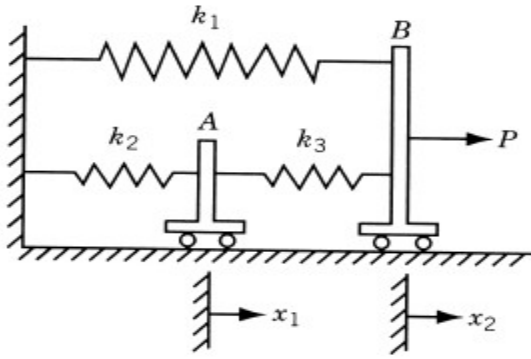
Instructions: Attempt All Questions from Section A, B and C. One question from section B and C have an internal Choice. Assume any Missing Data if required.

SECTION A

S. No.		Marks	CO
Q1	Discuss various characteristics of system.	4	CO1
Q2	Why black box approach is important in modeling and simulation.	4	CO2
Q3	How do the Lumped mass approximation helps in approximation of complex thermal engineering problem in modeling.	4	CO3
Q4	Classify various optimization problems.	4	CO4
Q5	Compare advantages, disadvantages and pitfalls of simulation.	4	CO5

SECTION B

Q6	<p>The temperature variation with height in the large oil fires in Kuwait was an important consideration. Measurements of the temperature T versus the height H were taken and presented in dimensionless terms as</p> <table border="1"><thead><tr><th>H</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr></thead><tbody><tr><th>T</th><td>10.0</td><td>7.9</td><td>6.9</td><td>6.3</td><td>5.9</td></tr></tbody></table> <p>It is given that T varies as $T = A(H)^a$. Using linear regression methods, as applied to such equations, obtain the values of A and a from these data. How accurate is your correlation</p>	H	1	2	3	4	5	T	10.0	7.9	6.9	6.3	5.9	10	CO3
H	1	2	3	4	5										
T	10.0	7.9	6.9	6.3	5.9										
Q7	Summarize various steps to design or analyze a complex system by simulation with flow chart.	10	CO5												
Q8	Two frictionless rigid bodies (carts) A and B connected by three linear elastic springs having spring constants k1, k2 and k3 (as shown in figure given below). The springs are at their natural positions when applied force P is zero. Find the displacement x1 and x2 by using principal of minimum potential energy.	10	CO4												

			
Q9	<p>A beam of uniform rectangular cross section is to be cut from a log having circular section of diameter $4a$. The beam has to be used as a cantilever beam (length is fixed) to carry concentrated load at the free end. Find the dimensions of the beam that corresponds to maximum tensile(bending) stress carrying capacity.</p> <p style="text-align: center;">OR</p> <p>a) Interpret about Positive and negative definite in Hessian Matrix. Discuss indefinite case also.</p> <p>b) Find the extreme points of the function given below and calculate Relative minimum and maximum with nature of Hessian determinant.</p> $f(x_1, x_2) = 3x_1^3 + 6x_2^3 + 2x_1^2 + 4x_2^2 + 8$	<p>10</p> <p>[5+5]</p>	<p>CO4</p>
SECTION-C			
Q10	<p>A. Find the dimensions of a cylindrical tin (with top and bottom) made up of sheet metal to maximize its volume such that the total surface area is equal to 72π.</p> <p>B. Minimize $f = kx^{-2}y^{-1}$</p> <p>Subject to $g(x, y) = x^2 + y^2 - 36a^2 = 0$</p> <p>Find the solution using</p> <ol style="list-style-type: none"> Method of Constraints Variations Method of Lagrange Multiplier 	<p>[10+10]</p>	<p>CO4</p>
Q11	<p>For the following elements</p> <ol style="list-style-type: none"> Problem Statement Program Organization and Logic Relevant Flow Charts Output and Discussion <p>Perform, Simulation of an Inventory System.</p> <p style="text-align: center;">OR</p> <p>Using-Server Queueing System using.</p>	<p>20</p>	<p>CO5</p>