PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - NOV 2023

Semester : Semester V - 2021

Course Code : MEC3091

Course Name : Sem V - MEC3091 - Finite Element Analysis

Program : B. TECH

Date : 3-NOV-2023

Time : 11:30AM - 1:00PM

Max Marks : 50

Weightage : 25%

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Question paper consists of 3 parts.

(iii) Scientific and non-programmable calculator are permitted.

(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS   (5 X 2 = 10M)

1. Write the application involved in utilizing the FEA methods.

   (CO1,CO2) [Knowledge]

2. Write a brief note on sources of error in FEA.

   (CO2,CO1) [Knowledge]

3. How the material behaviour is defined in FEA method?

   (CO1,CO2) [Knowledge]

4. Write the strain equation in the form of solution displacement vector.

   (CO2,CO1) [Knowledge]

5. List the advantages of using FEA method to solve Engineering problems.

   (CO1,CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS   (2 X 10 = 20M)

6. At a point in a stressed material the cartisian components of stress in x direction is given by σx = 80MPa, σy = 70MPa and σz = 80MPa, τxy=20MPa, τyz= --20MPa and τxz = 0, and cos α =12/25, cosβ = 15/25 and cos γ = 16/25. Find out 1. Resultant stress, 2. Normal stress 3. Shear stress.

   (CO2,CO1) [Comprehension]

7. For the given figure below the interior point P at (2,2) divides the three areas namely A1, A2 and A3. Determinte A1/A, A2/A and A3/A.

   (CO1,CO2) [Comprehension]

ANSWER THE FOLLOWING QUESTION **(1 X 20 = 20M)**

8. The differential equation of physical phenomenon is given by $(d^2y/dx^2) + 500x^2 = 0$. Where the value of x is greater than or equal to 1. The trial function $Y = a_1(x - x^4)$. The boundary conditions are $y(x=0) = 0$ and $y(x=1) = 0$, . Calculate the value parameter of a_1 by the four weighted residual methods.

(CO1,CO2) [Application]