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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM

SUMMER TERM END TERM EXAMINATION – AUGUST 2024

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| **Semester :**V SEM | **Date :05-08-2024** |
| **Course Code :**MEC 3901 | **Time :9:30AM-12:30PM** |
| **Course Name :** FINITE ELEMENT ANALYSIS | **Max Marks :100** |
| **Program :** Btech | **Weightage :50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 5M=20M** | | | |
| 1 | What is discretization explain with suitable example | (CO 1) | [Knowledge] |
|  | | | |
| 2 | Write the types of elements | (CO1) | [Knowledge] |
|  | | | |
| 3 | Explain Potential Energy functional | (CO1) | [Knowledge] |
|  | | | |
| 4 | Write various methods for the formulation of element properties | CO 2) | [Knowledge] |
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| 5 | What is longer side numbering scheme | (CO 2) | [Knowledge] |
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| 6 | Write any five Applications of FEA | (CO 3) | [Knowledge] |

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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 7 | What is elemental stiffness matrix | (CO 3) | [Comprehension] |
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| 8 | With suitable example explain steps involved in FEA | (CO 3) | [Comprehension] |
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| 9 | Write any 5 Advantages of FEA | CO 3) | [Comprehension] |
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| 10 | A linear elastic spring is subjected to a course of 1000 N as shown in fig. Calculate the displacement and potential energy of the spring system | (CO 3) | [Comprehension] |
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| 11 | Explain various methods to formulation of Element properties | (CO 3) | [Comprehension] |
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| 12 | Write different types of beams with loading conditions | (CO 3) | [Comprehension] |
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| 13 | Write a note on Finite difference method | (CO 3) | [Comprehension] |

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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 15M=30M** | | | |
| 14 | Consider a bar as shown in fig, axial load 200kN at point P, Take A1= 2400 mm2,E1= 70 X 109 N/m2, A2 = 600 mm2, E2= 200 x 109 N/m2. calculate  i) The Nodal displacement at point P,  ii) Stresses in each Material  iii) Reaction Force | (CO 4) | [Application] |
|  | | | |
| 15 | Find the potential energy functional for the following | (CO 4) | [Application] |
|  | | | |
| 16 | Area of a triangle with corners at (x1,y1),(x2,y2) & (x3,y3) can be written in the form of. Determine the area of triangle with corners at (1,1),(4,2) & (2,4). | (CO 4) | [Application] |