Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VI

Course Code: MEC603 and Course Name: Finite Element analysis

Time: 1 hour Max. Marks: 50

Note to the students:- All the Questions are compulsory and carry equal marks .

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| Q1.  | The weight function of the subdomain method is \_\_\_. |
| Option A: | 0 |
| Option B: | 1 |
| Option C: | 2 |
| Option D:  | 3 |
|  |  |
| Q2. | Which of the following is a weak form type method? |
| Option A: | Galerkin method |
| Option B: | Subdomain method |
| Option C: | Least square method |
| Option D: | Rayleigh-Ritz method |
|  |  |
| Q3. | The weight function in Petrov Galerkin method is\_\_\_ |
| Option A: | 0 |
| Option B: | X |
| Option C: | Any algebraic polynomial |
| Option D: | Specific algebraic polynomial |
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| Q4. | The higher-order elements are also called as |
| Option A: | Complex elements |
| Option B: |  Compound element |
| Option C: |  Linear element |
| Option D: |  Integral element |
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| Q5. | Which of the following is not the property of global stiffness matrix. |
| Option A: | It is a square symmetric matrix |
| Option B: | Its order is n\*n where n is number of nodes |
| Option C: | All diagonal elements are zero or of positive value |
| Option D:  | All rows are zero or of positive value |
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| Q6. | The total potential energy of an elastic body is defined as \_\_\_\_\_\_\_ |
| Option A: |  Strain energy - Work potential  |
| Option B: | Strain energy + Work potential  |
| Option C: | Strain energy + Kinetic energy - Work potential  |
| Option D:  | Strain energy + Kinetic energy + Work potential |
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| Q7.  | The strain energy per unit volume is equal to \_\_\_\_\_\_\_\_\_. |
| Option A: | (1/2) \* force \* deflection  |
| Option B: | (1/4) \* force \* deflection  |
| Option C: | (1/2) \* stress \* deflection  |
| Option D:  | (1/4) \* stress \* deflection |
|  |  |
| Q8.  | In dynamic analysis, the solution of the problem varies with \_\_\_ |
| Option A: | Temperature |
| Option B: | Time |
| Option C: | Deformation |
| Option D:  | Stress |
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| Q9. | The formulae to find the Number of displacements for truss having 3 nodes is |
| Option A: | Number of nodes\*2 |
| Option B: | Number of nodes\*3  |
| Option C: | Number of nodes\*4  |
| Option D:  |  Number of nodes\*1 |
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| Q10.  | In case of a truss member if there are 4 nodes and each node 2 DOF, then the order of the Stiffness matrix is |
| Option A: | 2x2  |
| Option B: | 4x4  |
| Option C: | 8x8 |
| Option D:  | 16x16 |
|  |  |
| Q11.  | The determinant of an element stiffness matrix is always |
| Option A: | Zero |
| Option B: | One |
| Option C: | Two |
| Option D:  | Depends on other factor |
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| Q12.  | Analysis of tapered by is done by converting tapered bar into equivalent \_\_\_\_. |
| Option A: | Stepped bar |
| Option B: | Triangular bar |
| Option C: | Small bar |
| Option D: | Rectangular bar |
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| Q13. | A triangular element is used for ground water flow simulation. The nodel coordinates are (x1=1, y1=2), (x2=4,y2=0.5),(x3=3,y3=4. The nodal values of hydraulic heads at these nodes are (3.5,2.2,4.4) respectively. What is the value of hydraulic head at (2.5,2.5). |
| Option A: | 3.4 |
| Option B: | 4.4 |
| Option C: | 0.4 |
| Option D:  | 5.4 |
|  |  |
| Q14.  | What is the temperature at point C at a distance 5 cm from A within a linear element AB of length 8 cm. Temperature at point A and B are 300° and 100° respectively. |
| Option A: | 150°  |
| Option B: | 175 ° |
| Option C: | 185°  |
| Option D:  | 190°  |
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| Q15. | Repeated trial taken by increasing the number of elements or increasing degree of polynomial to achieve satisfactory results is called\_\_ |
| Option A: | Repeating of mesh |
| Option B: | Reusing mesh |
| Option C: | Refining mesh |
| Option D:  | Reducing mesh |
|  |  |
| Q16.  | Which of the following is not a source of error |
| Option A: | Discretisation error |
| Option B: | Formulation error |
| Option C: | Numerical error |
| Option D:  | Rotational error |
|  |  |
| Q17. | Mesh refining is done when \_\_\_ |
| Option A: | Results are not satisfactory |
| Option B: | Results are satisfactory |
| Option C: | Results are perfect |
| Option D: | When no result found. |
|  |  |
| Q18. | In mesh refining the process of subdividing the existing elements into two or more elements is called \_\_ |
| Option A: | H- method |
| Option B: | P-method |
| Option C: | R-method |
| Option D:  | X-method |
|  |  |
| Q19.  | In mesh refining, increasing the order of existing element is called \_\_. |
| Option A: | H- method |
| Option B: | P-method |
| Option C: | R-method |
| Option D:  | X-method |
|  |  |
| Q20. | Element matrix equation for axial vibration of bar is given by,\_\_\_(K=stiffness matrix, M= mass matrix, U= displacement) |
| Option A: | [K]{U}=ω2 [M]{U} |
| Option B: |  [K2]{U}=ω2 [M]{U} |
| Option C: |  [K]{U}=ω[M]{U} |
| Option D: |  [K]{U}=ω3 [M]{U} |
|  |  |
| Q21. | Lumped mass matrix is \_\_\_\_\_. |
| Option A: | Null matrix |
| Option B: | Consistent matrix |
| Option C: | Single matrix |
| Option D:  | Diagonal matrix |
|  |  |
| Q22.  | Governing equation for free transverse vibration of beam is |
| Option A: | EI (∂4v/ ∂x4)+ ρa((∂2v/ ∂t2)=0  |
| Option B: |  EI (∂4v/ ∂x4)+ ρa2((∂2v/ ∂t2)=0  |
| Option C: |  EI (∂4v/ ∂x4)+ A((∂2v/ ∂t2)=0  |
| Option D:  |  E (∂4v/ ∂x4)+ ρa((∂2v/ ∂t2)=0 |
|  |  |
| Q23. | In plain language, the finite element method is said to be \_\_\_\_\_\_\_\_ to solve differential equation |
| Option A: | Numerical method |
| Option B: | Statistical method |
| Option C: | Computer method |
| Option D:  | Integration method |
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| Q24.  | Which of the following is not the application of FEM |
| Option A: | Structural analysis |
| Option B: | Vibrational analysis |
| Option C: | Thermal analysis |
| Option D:  | Drawing analysis. |
|  |  |
| Q25. | Using FEM cost of redesign will\_\_\_\_ |
| Option A: | Increase |
| Option B: | Reduce |
| Option C: | Remain the same |
| Option D:  | Improve |