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National Testing Agency

Question Paper Name :	Numerical Methods in Civil Eng Shift 1
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Numerical Methods in Civil Engineering

Group Number :	1
Group Id :	89951415
Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	100
Is this Group for Examiner? :	No

Numerical Methods in Civil Engineering

Section Id :	89951415
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory

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Number of Questions :	70
Number of Questions to be attempted :	70
Section Marks :	100
Display Number Panel :	Yes
Group All Questions :	Yes
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	89951424
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 8995141126 Question Type : MCQ Option Shuffling : No Display Quest
Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Following two statements are made.

Statement 1: Explicit Euler's method is **unconditionally** stable.
Statement 2: Implicit Euler's method is **conditionally** stable.

State whether the statements 1 and 2 are True or False, without altering the statements.

(a) True, True

(b) False, False

(c) True, False

(d) False, True

Options :
8995144480. 1
8995144481. 2
8995144482. 3
8995144483. 4

Question Number : 2 Question Id : 8995141127 Question Type : MCQ Option Shuffling : No Display Quest
Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Classify differential equation $u_{xx} + (\ln x)u_y = \sin(xy)$.

(a) 2nd order linear homogeneous PDE

(b) 2nd order linear non-homogeneous PDE

(c) 2nd order quasi linear non-homogeneous PDE

(d) 2nd order quasi linear homogeneous PDE

Options :
8995144484. 1
8995144485. 2
8995144486. 3
8995144487. 4

Question Number : 3 Question Id : 8995141128 Question Type : MCQ Option Shuffling : No Display Quest
Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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How many minimum number of Gauss points are needed in x and y respectively for exact integration of

$$I = \iint (15x^5 + 20x^3y^2 - 20x^2y^3 + 16x^3y^3 - 15y^3)\, dxdy$$

(a) 2 and 3

(b) 3 and 4

(c) 3 and 2

(d) 4 and 3

Options :
8995144488. 1
8995144489. 2
8995144490. 3
8995144491. 4

Question Number : 4 Question Id : 8995141129 Question Type : MCQ Option Shuffling : No Display Quest
Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Average acceleration method is _____ stable and Linear accelera
is _____ stable.

(a) Conditionally, Unconditionally

(b) Unconditionally, Unconditionally

(c) Conditionally, Conditionally

(d) Unconditionally, Conditionally

Options :
8995144492. 1
8995144493. 2
8995144494. 3
8995144495. 4

Question Number : 5 Question Id : 8995141130 Question Type : MCQ Option Shuffling : No Display Quest
Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Runge-Kutta methods are primarily used to solve _____ order differen
pertaining to _____ Value Problem.

(a) 1st, initial

(b) 1st, eigen

(c) 1st, boundary

(d) nth (n ≥ 1), boundary

Options :

8995144496. 1

8995144497. 2

8995144498. 3

8995144499. 4

Question Number : 6 Question Id : 8995141131 Question Type : MCQ Option Shuffling : No Display Quest
Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Choose the **correct** option regarding condition number (CN) for a functio

(a) CN=1 denotes that relative error of f(x) is identical to relative e

(b) CN>1 denotes that small change in x causes larger change in f(

(c) CN>>1 denotes that function is ill-conditioned

(d) All of the above

Options :

8995144500. 1

8995144501. 2

8995144502. 3

8995144503. 4

Question Number : 7 Question Id : 8995141132 Question Type : MCQ Option Shuffling : No Display Quest
Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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First degree spline uses concept of _____ continuum and second d
uses concept of _____ continuum.

(a) C^0, C^1

(b) C^1, C^0

(c) C^1, C^1

(d) C^0, C^0

Options :
8995144504. 1
8995144505. 2
8995144506. 3
8995144507. 4

Question Number : 8 Question Id : 8995141133 Question Type : MCQ Option Shuffling : No Display Quest
Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

For a groundwater flow modelling, which is the possible "excitation"?

(a) Permeability

(b) Pumping

(c) Recharge

(d) Pumping and recharge

Options :

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8995144508. 1
8995144509. 2
8995144510. 3
8995144511. 4

Question Number : 9 Question Id : 8995141134 Question Type : MCQ Option Shuffling : No Display Quest
Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

In Mathematical modeling, which one of the following is the best solution

(a) Analytical solution

(b) Numerical solution

(c) Scaled model solution

(d) Semi-analytical solution

Options :
8995144512. 1
8995144513. 2
8995144514. 3
8995144515. 4

Question Number : 10 Question Id : 8995141135 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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What is a Cauchy boundary condition?

(a) Value specified

(b) Slope specified

(c) Both Value and Slope specified

(d) None of the above

Options :
8995144516. 1
8995144517. 2
8995144518. 3
8995144519. 4

Question Number : 11 Question Id : 8995141136 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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An aquifer is bounded by a river on one side. The water levels in the rive and are assumed to be constant during the period of study. What bounda does this represent?

(a) Dirichlet

(b) Neumann

(c) Cauchy

(d) None of the above

Options :
8995144520. 1
8995144521. 2
8995144522. 3
8995144523. 4

Question Number : 12 Question Id : 8995141137 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Which of the following is NOT a weighted residual method?

(a) Galerkin method

(b) Rayleigh Ritz method

(c) Method of Least Squares

(d) Method of Point Collocation

Options :
8995144524. 1
8995144525. 2
8995144526. 3
8995144527. 4

Question Number : 13 Question Id : 8995141138 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Following statements are made.

i. Well posed problem may have multiple solutions.

ii. The discriminant of an elliptic equation is greater than 0.

iii. If Δ is forward difference operator, ∇ is backward difference ope central difference operator, then, $\Delta y_0 = \nabla y_1 = \delta y_{1/2}$.

iv. Taylor series is the basis for FDM.

Which of the following is correct?

(a) Statements ii, iii and iv are correct

(b) Only statements i and ii are correct

(c) All statements are correct

(d) Only statements iii and iv are correct

Options :
8995144528. 1
8995144529. 2
8995144530. 3
8995144531. 4

Question Number : 14 Question Id : 8995141139 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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In Boundary Element Method (BEM), a 3-D problem is solved computatio

(a) 1D problem

(b) 2D problem

(c) 3D problem

(d) None of the above

Options :
8995144532. 1
8995144533. 2
8995144534. 3
8995144535. 4

Question Number : 15 Question Id : 8995141140 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The BEM is based on:

(a) Green's theorem

(b) Taylor's theorem

(c) Gauss method

(d) Jacobi's theorem

Options :
8995144536. 1

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8995144537. 2
8995144538. 3
8995144539. 4

Question Number : 16 Question Id : 8995141141 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

How pumping/ recharge is considered in BEM simulation:

(a) As distributed throughout the domain

(b) As point source/ sink

(c) As a boundary condition

(d) None of the above

Options :
8995144540. 1
8995144541. 2
8995144542. 3
8995144543. 4

Question Number : 17 Question Id : 8995141142 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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In Dual Reciprocity Boundary Element Method, the time component equations is approximated as:

(a) Laplace equation

(b) Helmholtz equation

(c) Poisson equation

(d) Wave equation

Options :
8995144544. 1
8995144545. 2
8995144546. 3
8995144547. 4

Question Number : 18 Question Id : 8995141143 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

What is the advantage of Boundary Element Method?

(a) Computational dimension of problem is reduced by 1

(b) Computational dimension of problem is reduced by 2

(c) The problem of meshing and remeshing is resolved

(d) None of the above

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Options :

8995144548. 1

8995144549. 2

8995144550. 3

8995144551. 4

Question Number : 19 Question Id : 8995141144 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Locking and inter-connectivity is a problem in:

(a) Finite element method

(b) Meshfree method

(c) Finite difference method

(d) Boundary element method

Options :

8995144552. 1

8995144553. 2

8995144554. 3

8995144555. 4

Question Number : 20 Question Id : 8995141145 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Which of the following statements is not true regarding support domain?

(a) Support domain is also called the influence domain

(b) The value of shape function is considered to be zero outs domain

(c) The support domain in a meshfree method can be of various and shapes

(d) Support domain has no effect on the accuracy of the meshfree n

Options :
8995144556. 1
8995144557. 2
8995144558. 3
8995144559. 4

Question Number : 21 Question Id : 8995141146 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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In BEM, fundamental solution satisfies the governing equation at

(a) Source point

(b) Points inside the domain

(c) Everywhere except source point

(d) None

Options :
8995144560. 1
8995144561. 2
8995144562. 3
8995144563. 4

Question Number : 22 Question Id : 8995141147 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Following statements are made with respect to BEM and FEM.

i. BEM can be applied only when a fundamental solution is available

ii. BEM has wider applications than FEM and can replace FEM

iii. BEM always has a simpler numerical implementation when compa

Which one of the following option depicts correct statements?

(a) Only i

(b) Only ii

(c) Only ii and iii

(d) i, ii and iii

Options :
8995144564. 1
8995144565. 2
8995144566. 3
8995144567. 4

Question Number : 23 Question Id : 8995141148 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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The homogeneous and heterogeneous part of DRBEM gives, respectively,

(a) Indirect and direct solutions

(b) Direct and indirect solutions

(c) Complementary and particular solutions

(d) Particular and complementary solutions

Options :
8995144568. 1
8995144569. 2
8995144570. 3
8995144571. 4

Question Number : 24 Question Id : 8995141149 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Which of the following statements is INCORRECT?

(a) In indirect method of BEM, the solution is obtained by super fundamental solutions

(b) Indirect method uses Divergence theorem

(c) In the indirect method, the source points are forced to satisfy t conditions and the governing equation

(d) In the direct method, the functions in the boundary integral eq physical implication

Options :
8995144572. 1
8995144573. 2
8995144574. 3
8995144575. 4

Question Number : 25 Question Id : 8995141150 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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The ideal requirement of a meshfree method is that

(a) No mesh is required in the process of interpolation

(b) No mesh is required in the process of integration

(c) No mesh is required in the process of assembly into global matrix

(d) No mesh is required throughout the formulation and solution

Options :
8995144576. 1
8995144577. 2
8995144578. 3
8995144579. 4

Question Number : 26 Question Id : 8995141151 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which of the following statements is correct?

(a) Support domain size effects only the accuracy of the solution efficiency

(b) Support domain must be circular in shape for weak form mesh free

(c) Support domain is usually centred at the point of interest

(d) A dimensionless size of support domain of 3-4 gives good results

Options :

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8995144580. 1
8995144581. 2
8995144582. 3
8995144583. 4

Question Number : 27 Question Id : 8995141152 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

In the Moving Least Squares Method, the unknown coefficient matrix is d by

(a) Minimizing the L1 norm

(b) Minimizing the L2 norm

(c) By taking $a = P^{-1}U$, where a is unknown coefficient matrix, P is bas is matrix of field variables at nodal points

(d) By taking $a = PU^{-1}$, where a is unknown coefficient matrix, P is bas is matrix of field variables at nodal points

Options :
8995144584. 1
8995144585. 2
8995144586. 3
8995144587. 4

Question Number : 28 Question Id : 8995141153 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Which of the following is a strong form meshfree method?

(a) Element free Galerkin

(b) Collocation

(c) Meshless Local Petrov Galerkin

(d) Meshfree weak strong

Options :
8995144588. 1
8995144589. 2
8995144590. 3
8995144591. 4

Question Number : 29 Question Id : 8995141154 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Which of the following statements is INCORRECT?

(a) In successive over relaxation method, more weightage is given to field variable at the current node than the value at the surrounding n

(b) Jacobi method is twice as fast as Gauss-Siedel method

(c) The accuracy of the solutions can be improved by using iterative m

(d) In successive over relaxation method, the value of the field variabl time step is taken as the sum of the value of the field variable in time step and the change in the value of field variable in the next Gauss-Siedel method

Options :
8995144592. 1
8995144593. 2
8995144594. 3
8995144595. 4

Question Number : 30 Question Id : 8995141155 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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In Alternative Direction Implicit Scheme,

(a) A diagonal coefficient matrix is obtained

(b) A tridiagonal coefficient matrix is obtained

(c) The coefficient matrix is in echelon form

(d) The solution is not stable

Options :
8995144596. 1
8995144597. 2
8995144598. 3
8995144599. 4

Question Number : 31 Question Id : 8995141156 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Consistency of solution means:

(a) As Δx and Δt tends to zero, the finite difference form of the equat
the original difference equation

(b) The solution is stable

(c) Convergence of the solution is guaranteed

(d) All of the above

Options :
8995144600. 1

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8995144601. 2
8995144602. 3
8995144603. 4

Question Number : 32 Question Id : 8995141157 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which of the following software is based on Meshfree methods?

(a) ABAQUS

(b) GMS MODFLOW

(c) FreeFEM

(d) SimSolid

Options :
8995144604. 1
8995144605. 2
8995144606. 3
8995144607. 4

Question Number : 33 Question Id : 8995141158 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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On substituting the fundamental solution in the governing equation, the va
right hand side of the governing equation at the source points is

(a) Zero

(b) Infinity

(c) – Infinity

(d) Undefined

Options :
8995144608. 1
8995144609. 2
8995144610. 3
8995144611. 4

Question Number : 34 Question Id : 8995141159 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

In meshfree method,

(a) Nodes must have a regular arrangement

(b) Nodes can be taken only inside the domain

(c) Support domain should be the same at all the nodes

(d) Information about the relationship between the nodes is not require

Options :
8995144612. 1

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8995144613. 2
8995144614. 3
8995144615. 4

Question Number : 35 Question Id : 8995141160 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

In the difference method

(a) The derivative terms and boundary conditions are replaced b approximation

(b) The governing equation is differentiated again

(c) The governing equation is integrated for approximation

(d) None of the above

Options :
8995144616. 1
8995144617. 2
8995144618. 3
8995144619. 4

Question Number : 36 Question Id : 8995141161 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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For a 2D problem, the shape of the support domain is

(a) Circular

(b) Rectangular

(c) Triangular

(d) Any of the above

Options :
8995144620. 1
8995144621. 2
8995144622. 3
8995144623. 4

Question Number : 37 Question Id : 8995141162 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The objective of weighted residual method is

(a) To make the residual zero

(b) To minimize the residual

(c) To minimize the residual at the boundary

(d) To minimize the residual at the interior points

Options :
8995144624. 1

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8995144625. 2
8995144626. 3
8995144627. 4

Question Number : 38 Question Id : 8995141163 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Mathematically, FEM is a special case of

(a) Collocation method

(b) FDM

(c) Finite volume method

(d) Rayleigh Ritz method

Options :
8995144628. 1
8995144629. 2
8995144630. 3
8995144631. 4

Question Number : 39 Question Id : 8995141164 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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In which concept, the particles are observed in a fixed frame in space th
the particles pass?

(a) Lagrangian concept

(b) Eulerian concept

(c) Both

(d) None

Options :
8995144632. 1
8995144633. 2
8995144634. 3
8995144635. 4

Question Number : 40 Question Id : 8995141165 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

In which of the following fields, can numerical models be applied?

(a) Seismology

(b) Fluid mechanics

(c) Crustal dynamics

(d) All of the above

Options :
8995144636. 1

8995144637. 2
8995144638. 3
8995144639. 4

Question Number : 41 Question Id : 8995141166 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which type of solution does FDM use?

(a) Analytical

(b) Difference

(c) Integration

(d) Curve Fitting

Options :
8995144640. 1
8995144641. 2
8995144642. 3
8995144643. 4

Question Number : 42 Question Id : 8995141167 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Which of the following is NOT an integration method?

(a) Trapezoidal rule

(b) Simpson's rule

(c) Gauss Elimination

(d) Gauss Quadrature

Options :
8995144644. 1
8995144645. 2
8995144646. 3
8995144647. 4

Question Number : 43 Question Id : 8995141168 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which of the following is not iterative?

(a) Successive over relaxation

(b) Jacobi method for implicit scheme

(c) Trapezoidal rule

(d) Gauss Quadrature rule

Options :
8995144648. 1
8995144649. 2
8995144650. 3

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8995144651. 4

Question Number : 44 Question Id : 8995141169 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

What is the value of Δy_1?

(a) $y_1 - y_0$

(b) $y_2 - y_1$

(c) $(y_2 - y_0)/2$

(d) $(y_2 + y_0)/2$

Options :
8995144652. 1
8995144653. 2
8995144654. 3
8995144655. 4

Question Number : 45 Question Id : 8995141170 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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A well posed problem has

(a) Boundary conditions which are not well defined

(b) Unique solution

(c) Multiple solutions

(d) Unstable solution

Options :
8995144656. 1
8995144657. 2
8995144658. 3
8995144659. 4

Question Number : 46 Question Id : 8995141171 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Absolute error is 0.0012 in an approximate number 31.23420712. The nu
correct digits in the given approximate number is

(a) 7

(b) 6

(c) 8

(d) 4

Options :
8995144660. 1

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8995144661. 2
8995144662. 3
8995144663. 4

Question Number : 47 Question Id : 8995141172 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Find the value of x in the given equation.

$$\begin{bmatrix} 2 & 4 \\ x & -3 \end{bmatrix} \begin{Bmatrix} 2 \\ -2 \end{Bmatrix} = \begin{Bmatrix} -4 \\ 16 \end{Bmatrix}$$

(a) 5

(b) 9

(c) -9

(d) -5

Options :
8995144664. 1
8995144665. 2
8995144666. 3
8995144667. 4

Question Number : 48 Question Id : 8995141173 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Find the value of D in the given equation.

$$\begin{bmatrix} 8 & -4 \\ 2 & 6 \end{bmatrix}^{-1} = \frac{1}{D}\begin{bmatrix} 6 & 4 \\ -2 & 8 \end{bmatrix}$$

(a) 6

(b) 22

(c) 40

(d) 56

Options :
8995144668. 1
8995144669. 2
8995144670. 3
8995144671. 4

Question Number : 49 Question Id : 8995141174 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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What are the eigenvalues for the matrix $\begin{bmatrix} 2 & 2 \\ 3 & 7 \end{bmatrix}$?

(a) 8, 1

(b) -8, 1

(c) 8, -1

(d) -8, -1

Options :
8995144672. 1
8995144673. 2
8995144674. 3
8995144675. 4

Question Number : 50 Question Id : 8995141175 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which one the following is the Generalized eigenvalue problem?

(a) Evaluation of Natural Frequencies

(b) Evaluation of Principal Stresses

(c) Evaluation of Spectral Radii

(d) Evaluation of Principal Strains

Options :
8995144676. 1

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8995144677. 2
8995144678. 3
8995144679. 4

Question Number : 51 Question Id : 8995141176 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Static condensation is employed for

(a) in-core solution

(b) out-of-core solution

(c) dynamic relaxation

(d) formulating gradient matrix

Options :
8995144680. 1
8995144681. 2
8995144682. 3
8995144683. 4

Question Number : 52 Question Id : 8995141177 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

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Following statements are made for Boundary Value Problem.

I. It is always governed by ordinary differential equation

II. It always pertains to open domain.

III. The governing differential equation is even ordered.

IV. It pertains to steady state situation.

Which of the following option is applicable?

(a) Only statements I and III are correct.

(b) Only statements III and IV are correct.

(c) Only statements I, III and IV are correct.

(d) All statements are correct.

Options :
8995144684. 1
8995144685. 2
8995144686. 3
8995144687. 4

Question Number : 53 Question Id : 8995141178 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

9/16/2020

Which one of the following time marching method is conditionally stable?

(a) Central Difference Method

(b) Newmark's Average Acceleration Method

(c) Wilson-Θ Method

(d) Implicit Euler's Method

Options :
8995144688. 1
8995144689. 2
8995144690. 3
8995144691. 4

Question Number : 54 Question Id : 8995141179 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

During following step of finite element method, Gauss Quadrature is often

(a) Formulation of Shape functions

(b) Formulation of Constitutive Law

(c) Assembly

(d) Computation of element property matrix

Options :
8995144692. 1
8995144693. 2

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8995144694. 3
8995144695. 4

Question Number : 55 Question Id : 8995141180 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Following methods are used to solve nonlinear algebraic equations.

i. Initial stiffness method.

ii. The secant method.

iii. The false-position method.

iv. The Newton-Raphson method.

Which of the following option is correct?

(a) i and iii are open methods

(b) ii and iii are open methods

(c) i, ii and iv are open methods

(d) All are open methods

Options :
8995144696. 1
8995144697. 2
8995144698. 3
8995144699. 4

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Sub-Section Id : 89951425
Question Shuffling Allowed : Yes

Question Number : 56 Question Id : 8995141181 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

Following statements are made regarding generalized eigenvalue prob
$\lambda.[B].\{q\}$.

i. [B] can be any square matrix other than identity matrix.

ii. [B] has to be an identity matrix.

iii. Generalized eigenvalue problem can be converted into standa problem.

iv. If [A] and [B] are symmetric matrices with real coefficients, the e always real.

Choose the correct option.

(a) Statements ii, iii and iv are correct

(b) Only Statement i is correct

(c) Only Statement ii is correct

(d) Statements i, iii and iv are correct

Options :

8995144700. 1
8995144701. 2
8995144702. 3
8995144703. 4

Question Number : 57 Question Id : 8995141182 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

If $T(x,y) = 5x^4 + 10x^3y^2 - 10x^2y^3 + 8x^2y^2 - 5y^4$, find $\nabla^4 T$ at (3,4).

(a) 0

(b) -124

(c) -142

(d) -176

Options :
8995144704. 1
8995144705. 2
8995144706. 3
8995144707. 4

Question Number : 58 Question Id : 8995141183 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

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What is the general solution of $u_{xx} = 6x$ when $u: u(x, y)$?

(a) $u = x^3 + x.f(y) + g(y) + C$

(b) $u = x^3 + x.f(y) + y.g(x) + C$

(c) $u = x^3 + y.g(x) + C$

(d) $u = x^3 + f(y) + y.g(x) + C$

Options :
8995144708. 1
8995144709. 2
8995144710. 3
8995144711. 4

Question Number : 59 Question Id : 8995141184 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

9/16/2020

Following statements are made for differential equation $x^2 u_{xx} + u_{yy} =$

i. Equation is parabolic for zero values of x.

ii. Equation is hyperbolic for all values of x.

iii. Equation is elliptic for positive values of x.

iv. Equation is elliptic for negative values of x.

Choose the correct option.

(a) All statements are correct

(b) Statements i, iii and iv are correct

(c) Statements i and iii are correct

(d) Only Statement i is correct

Options :
8995144712. 1
8995144713. 2
8995144714. 3
8995144715. 4

Question Number : 60 Question Id : 8995141185 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

9/16/2020

Following statements are made.

Statement 1: Galerkin's Weighted Residual approach is used when soluti
Differential equation is sought.
Statement 2: Variational Principle is used when solution of Integral equat
sought.

State whether the statements are True or False, without altering the seque
statements.

(a) True, False

(b) False, True

(c) True, True

(d) False, False

Options :
8995144716. 1
8995144717. 2
8995144718. 3
8995144719. 4

Question Number : 61 Question Id : 8995141186 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

9/16/2020

For the given data, what are the values of dy/dx and d^2y/dx^2, respectively,

x	0.1	0.15	0.2	0.25	0.3	0.35
y	2.216	2.339	2.472	2.618	2.781	2.968

(a) 13.5 and 4.03

(b) 3.12 and 2.45

(c) 4.03 and 13.5

(d) 2.45 and 3.12

Options :
8995144720. 1
8995144721. 2
8995144722. 3
8995144723. 4

Question Number : 62 Question Id : 8995141187 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

9/16/2020

For the data given below, find d^2y/dx^2 at $x = 0.5$

x	0	0.5	1
y	0	1.5	5

(a) 0.8

(b) 8

(c) 1.2

(d) 12

Options :
8995144724. 1
8995144725. 2
8995144726. 3
8995144727. 4

Question Number : 63 Question Id : 8995141188 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

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Followings statements are made.

i. Meshfree methods cannot be extended to 3D problems.

ii. Meshfree methods alleviates the locking problem.

iii. Construction of shape function is an issue in meshfree methods.

iv. Nodes are scattered in the problem domain and on the boundar methods.

Which of the following option is correct?

(a) Statements i, ii and iii are correct

(b) Statements i and iv are correct

(c) Statements ii, iii and iv are correct

(d) All statements are correct

Options :
8995144728. 1
8995144729. 2
8995144730. 3
8995144731. 4

Question Number : 64 Question Id : 8995141189 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

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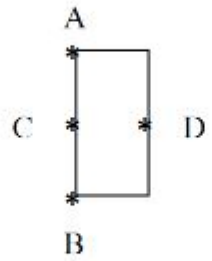
The boundary ACB is a Neumann boundary. The values of the parameter as:



Point	U
A	100
B	0
D	45

What is the value of U at the point C?

(a) 47.5

(b) 55.5

(c) 45

(d) 48.33

Options :
8995144732. 1
8995144733. 2

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8995144734. 3
8995144735. 4

Question Number : 65 Question Id : 8995141190 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

The consistent load vector $\{f\}$ for a three-node axial bar of length **3m** s
uniformly distributed load of intensity **10 kN/m** is

(a) $\{f\} = [\ 10.0, 10.0, 10.0\ ]^T$

(b) $\{f\} = [\ 5.0, 20.0, 5.0\ ]^T$

(c) $\{f\} = [\ 7.5, 15.0, 7.5\ ]^T$

(d) $\{f\} = [\ 0.0, 30.0, 0.0\ ]^T$

Options :
8995144736. 1
8995144737. 2
8995144738. 3
8995144739. 4

Question Number : 66 Question Id : 8995141191 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

9/16/2020

Given:

c	1	3	6	9
f(x)	6	26	101	230

Find f(5) by using Lagrange's interpolating polynomial of third degree.

(a) 46

(b) 64

(c) 68

(d) 70

Options :
8995144740. 1
8995144741. 2
8995144742. 3
8995144743. 4

Question Number : 67 Question Id : 8995141192 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

9/16/2020

Given:

x	1.0	2.0	3.0	4.0
y	5	25	125	625

Fit power function $y(x) = ax^b$ and find the values of a and b.

(a) a = 1.3319 and b = 3.3878

(b) a = 3.7882 and b = 3.3878

(c) a = 1.4528 and b = 3.7827

(d) a = 3.9127 and b = 3.7827

Options :
8995144744. 1
8995144745. 2
8995144746. 3
8995144747. 4

Question Number : 68 Question Id : 8995141193 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

9/16/2020

Compute the absolute and relative error in deflection $w = PL^3/3EI$ at t cantilever beam. The beam is loaded with concentrated load P at the following data:

$$P^* = 500\ N;\ \Delta P = 10\ N$$

$$L^* = 3\ m;\ \Delta L = 0.1\ m$$

$$I^* = 0.08\ m^4;\ \Delta I = 0.0008\ m^4$$

$$E^* = 2.0 * 10^8\ N/m^2;\ \Delta E = 0.02 * 10^8\ N/m^2$$

(a) $\Delta w = 3.9375 \times 10^{-5}$ and $\delta w = 14\%$

(b) $\Delta w = 3.9375 \times 10^{-6}$ and $\delta w = 1.4\%$

(c) $\Delta w = 3.9375 \times 10^{-4}$ and $\delta w = 14\%$

(d) $\Delta w = 3.9375 \times 10^{-7}$ and $\delta w = 1.4\%$

Options :
8995144748. 1
8995144749. 2
8995144750. 3
8995144751. 4

Question Number : 69 Question Id : 8995141194 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

9/16/2020

Solve the following differential equation by point collocation method, t
and x = 5 as the collocation points.

$$\frac{\partial^2 y}{\partial x^2} + 3\frac{\partial y}{\partial x} = 5x$$

Consider y = 0 at x = 0 and x = 8.

(a) $y = (x)(x - 8)(2 - x)$

(b) $y = (x^2 - 8x)(1.116 - 0.061x)$

(c) $y = (x)(x - 8)(2 + x)$

(d) $y = (x - 8)(1.116 - 0.061x)$

Options :
8995144752. 1
8995144753. 2
8995144754. 3
8995144755. 4

Question Number : 70 Question Id : 8995141195 Question Type : MCQ Option Shuffling : No Display Ques
Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 3 Wrong Marks : 0

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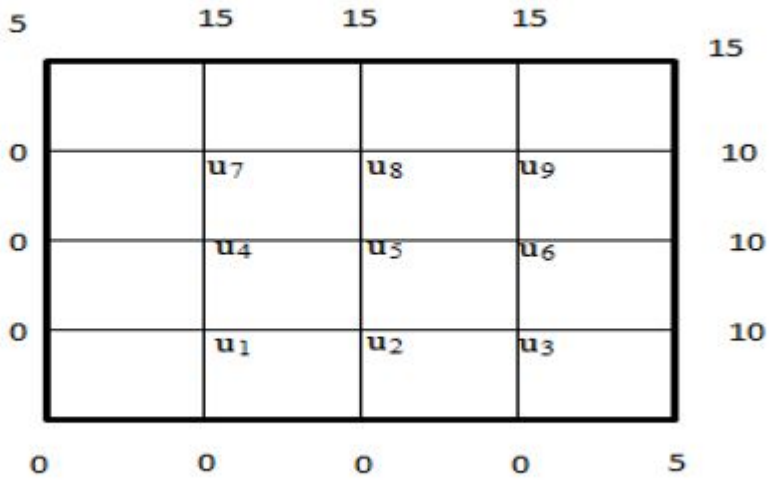
The values of u_1 through u_9 and the boundary conditions are given as fol



u_1	u_2	u_3	u_4	u_5	u_6	u_7	u_8	u
1.5625	3.28125	5.3125	3.594	6.25	8.281	6.5625	9.844	11.5

What are the values of u_3 and u_9 after 1 iteration of Gauss Siedel metho

(a) 5.3905 and 10.781

(b) 5.31 and 11.56

(c) 5.36 and 11.10

(d) 5.4 and 10.82

Options :

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8995144756. 1
8995144757. 2
8995144758. 3
8995144759. 4