Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021

Course Name - –Applied Numerical Analysis
Course Code - MSCMC402

* You can submit the form ONLY ONCE.
* Fill the following information for further process.

* Required

1. Email *

2. Name of the Student *

3. Enter Full Student Code *

4. Enter Roll No *

5. Enter Registration No *

6. Enter Course Code *

7. Enter Course Name *

8. *

Mark only one oval.

- Diploma in Pharmacy
- Bachelor of Pharmacy
- B.TECH.(CSE)
- B.TECH.(ECE)
- BCA
- B.SC.(CS)
- B.SC.(BT)
- B.SC.(ANCS)
- B.SC.(HN)
- B.Sc.(MM)
- B.A.(MW)
- BBA
- B.COM
- B.A.(JMC)
- BBA(HM)
- BBA(LLB)
- B.OPTOMETRY
- B.SC.(MB)
- B.SC.(MLT)
- B.SC.(MRIT)
- B.SC.(PA)
- LLB
- B.SC(IT)-AI
- B.SC.(MSJ)
- Bachelor of Physiotherapy
- B.SC.(AM)
- Dip.CSE
- Dip.ECE
- DIP.EE
- DIP.CE

- [ ] DIP.ME
- [ ] PGDHM
- [ ] MBA
- [ ] M.SC.(BT)
- [ ] M.TECH(CSE)
- [ ] LLM
- [ ] M.A.(JMC)
- [ ] M.A.(ENG)
- [ ] M.SC.(MATH)
- [ ] M.SC.(MB)
- [ ] MCA
- [ ] M.SC.(MSJ)
- [ ] M.SC.(AM)
- [ ] M.SC.CS)
- [ ] M.SC.(ANCS)
- [ ] M.SC.(MM)
- [ ] B.A.(Eng)

Answer all the questions. Each question carry one mark.

9. 1. The Jacobi's method is a method of solving a matrix equation on a matrix that has no zeroes along _____

Mark only one oval.

- [ ] Leading diagonal
- [ ] Last column
- [ ] Last row
- [ ] Non-leading diagonal

10. 2. How many assumptions are there in Jacobi's method?

Mark only one oval.

- 2
- 3
- 4
- 5

11. 3. Which of the following is another name for Jacobi's method?

Mark only one oval.

- Displacement method
- Simultaneous displacement method
- Simultaneous method
- Diagonal method

12. 4. The predictor-corrector method is a combination of _____

Mark only one oval.

- midpoint and trapezoidal rules
- backward Euler method and Trapezoidal rule
- implicit and explicit methods
- forward and backward Euler methods

13. 5. The two-level predictor-corrector method is _____

Mark only one oval.

- second-order accurate
- first-order accurate
- fourth-order accurate
- third-order accurate

14. 6. The stability of the two-level predictor-corrector method matches with that of the _____

Mark only one oval.

- midpoint rule
- trapezoidal rule
- backward Euler method
- forward Euler method

15. 7. To increase the order of accuracy, the multipoint method uses _____

Mark only one oval.

- highly stable two-level methods for prediction and correction
- higher-order two-level methods for prediction and correction
- additional points where data is already available
- additional points where data is interpolated

16. 8. Which of these is used by the Adam-Bashforth method?

Mark only one oval.

- Newton’s method
- Frobenious covariant
- Frobenious norm
- Lagrange polynomial

17. 9. Which of these is correct for the multipoint method?

Mark only one oval.

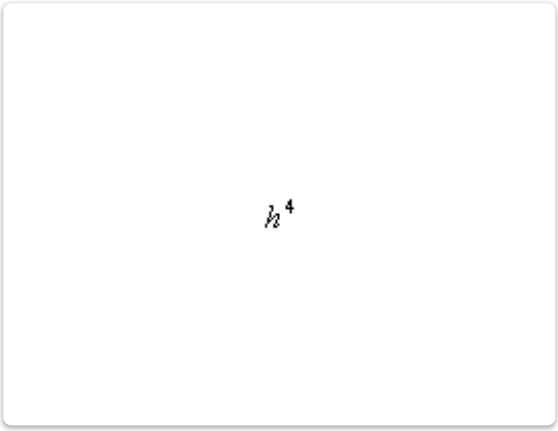
- multiple derivatives at each time step
- only one evaluation of derivative per time step
- order of accuracy is restricted to four
- extremely unstable

18. 10. Runge-Kutta method has a truncation error, which is of the order

Mark only one oval.

Option 1

Option 2



Option 3

None of these

19. 11. The ordinary differential equations are solved numerically by?

Mark only one oval.

- Euler method
- Taylor method
- Runge-Kutta method
- All of these

20. 12.

For $\frac{dy}{dx} = f(x,y), y(x_0) = y_0, y^{n+1}(x) = y_0 + \int_{x_0}^{x} f(x, y^n)dx$ is

Mark only one oval.

- Taylor's series method
- Picard's method
- Euler's method
- modified Euler's method

21. 13.

$\frac{dy}{dx} = x + y, y(0) = 1$, then $y(.1)$ given by Euler's method is

Mark only one oval.

- 1.1
- 1.2
- 1.4
- 2

22. 14. Runge-Kutta method of 4th order is used

Mark only one oval.

- to interpolate
- to solve a non-linear equation
- to evaluate a definite integral
- to solve differential equation

23. 15. Milne's corrector formula is

Mark only one oval.

$y_{n+1} = y_n + \frac{h}{3}(y'_{n-1} + 4y'_n + 4y'_{n+1})$

Option 1

$y_{n+1} = y_{n-1} + \frac{h}{3}(y'_{n-1} + 4y'_n + y'_{n+1})$

Option 2

$y_{n+1} = y_n + \frac{4h}{3}(y'_{n-1} + 4y'_n + 4y'_{n+1})$

Option 3

None of these

Option 4

24. 16. Which of these correctors does the second-order Runge-Kutta method use?

Mark only one oval.

- Backward Euler corrector
- Forward Euler corrector
- Trapezoidal corrector
- Midpoint rule corrector

25. 17. The first two steps of the fourth-order Runge-Kutta method finds the value at which point?

Mark only one oval.

- ◯ At the (n+0.5)th point
- ◯ At the (n+1)th point
- ◯ At the (n-1)th point
- ◯ At the nth point

26. 18. How many predictor and corrector steps does the fourth-order Runge-Kutta method use?

Mark only one oval.

- ◯ Three predictor and one corrector steps
- ◯ One predictor and three corrector steps
- ◯ Two predictor and two corrector steps
- ◯ One predictor and two corrector steps

27. 19. The final corrector of the fourth-order Runge-Kutta method uses _____

Mark only one oval.

- ◯ Midpoint rule
- ◯ Backward Euler method
- ◯ Simpson's rule
- ◯ Trapezoidal rule

28. 20. Which of these is a disadvantage of the Runge-Kutta method over the multipoint method?

Mark only one oval.

- Computational stability
- Computational cost
- Accuracy
- Convergence

29. 21. In which of the following method, we approximate the curve of solution by the tangent in each interval.

Mark only one oval.

- Picard's method
- Euler's method
- Newton's method
- Runge Kutta method

30. 22. The Neumann and Dirichlet boundary conditions are _____ and _____ in mathematical terms.

Mark only one oval.

- value specified, flux specified
- flux specified, value specified
- flux specified, gradient specified
- value specified, time specified

31. 23. Initial conditions are used for _____ problems.

Mark only one oval.

- time-dependent problems
- boundary value problems
- control volume problems
- finite difference problems

32. 24. Which of these is not a combination of Neumann and Dirichlet Boundary conditions?

Mark only one oval.

- Cauchy boundary conditions
- Wall boundary conditions
- Mixed boundary conditions
- Robin boundary conditions

33. 25. Under which condition does the inviscid steady flow become elliptic?

Mark only one oval.

- M=1
- M<1
- M>1
- M>5

34. 26. Which of these are correct for an elliptic equation?

Mark only one oval.

- ◯ There is no limited region of influence or domain of dependence
- ◯ There is no region of influence or domain of dependence
- ◯ There is no region of influence, but there exists a domain of dependence
- ◯ There is no domain of dependence, but there exists a region of influence

35. 27. Which of these statements is true for elliptic equations?

Mark only one oval.

- ◯ The solution can be approximated in some of the points
- ◯ The solution can be marched from some initial conditions
- ◯ The solution at all points must be carried out simultaneously
- ◯ The solution process should be carried out simultaneously for some region and then marching can be done

36. 28. The solution technique used to solve elliptic equations should _____

Mark only one oval.

- ◯ allow each point to be influenced by its boundary-side neighbours
- ◯ allow each point to be influenced by its west neighbour
- ◯ allow each point to be influenced by its east neighbour
- ◯ allow each point to be influenced by all its neighbours

37. 29. Which of these is the prototype elliptic equation?

Mark only one oval.

- Incompressible irrotational flow
- Incompressible rotational flow
- Compressible irrotational flow
- Compressible rotational flow

38. 30. Robin boundary condition is also known as

Mark only one oval.

- first-type boundary condition
- second type boundary condition
- zero type boundary condition
- third type boundary condition

39. 31.

$\partial y/\partial n = f$ is representation of

Mark only one oval.

- Neumann boundary condition
- Dirichlet boundary condition
- Cauchy boundary condition
- Robin boundary condition

40. 32. The error occurring while approximating the physical problem is called as _____

Mark only one oval.

- Modelling error
- Physical error
- Mathematical order
- Iteration error

41. 33. Neumann boundary condition is known as

Mark only one oval.

- First type boundary condition
- Second type boundary condition
- Zero type boundary condition
- Third type boundary condition

42. 34. A boundary condition which specifies the value of the normal derivative of the function is a

Mark only one oval.

- Neumann boundary condition
- Neument boundary condition
- Neumornn boundary condition
- Deumann boundary condition

43. 35. When is the steady inviscid flow hyperbolic?

Mark only one oval.

- In supersonic flow regime
- Never
- Always
- In subsonic flow regime

44. 36. Which of these equations is hyperbolic?

Mark only one oval.

- Unsteady Navier-Stokes equation
- Steady Navier-Stokes equation
- Steady Euler equation
- Unsteady Euler equation

45. 37. In two dimension heat flow, the temperature along the normal to the xy-plane is

Mark only one oval.

- zero
- infinity
- finite
- 100K

46. 38. While solving a partial differential equation using a variable separable method, we equate the ratio to a constant which?

Mark only one oval.

- can be positive or negative integer or zero
- can be positive or negative rational number or zero
- must be a positive integer
- must be a negative integer

47. 39. When solving a 1-Dimensional wave equation using variable separable method, we get the solution if

Mark only one oval.

- k is positive
- k is negative
- k is 0
- k can be anything

48. 40. Which of these conditions is unstable?

Mark only one oval.

- Error is amplified in increasing iterations
- Error is decreasing in increasing iterations
- Error is amplified in decreasing iterations
- Error is maintained in increasing iterations

49. 41. The error due to the discretization of the partial differential equation is called as _____

Mark only one oval.

- round-off error
- discretization error
- truncation error
- iteration error

50. 42. _____ become significant after a repeated number of calculations.

Mark only one oval.

- Round-off errors
- Discretization errors
- Truncation errors
- Modelling errors

51. 43. Round-off errors are important in _____

Mark only one oval.

- modelling
- iterations
- discretization
- truncation

52. 44.

In a general second order linear partial differential equation with two independent variables

$$A\frac{\partial^2 u}{\partial x^2}+B\frac{\partial^2 u}{\partial x\partial y}+C\frac{\partial^2 u}{\partial y^2}+D=0$$

where A, B, C are functions of x and y, and D is a function of x, y, $\frac{\partial u}{\partial x}, \frac{\partial u}{\partial y}$, then the partial differential equation is parabolic if

Mark only one oval.

$B^2-4AC<0$

Option 1

$B^2-4AC>0$

Option 2

$B^2-4AC=0$

Option 3

$B^2-4AC\neq 0$

Option 4

53. 45. Heat equation is

Mark only one oval.

$\frac{\partial u}{\partial x} = c^2 \nabla^2 x^2$

Option 1

$\frac{\partial u}{\partial y} = \frac{1}{c^2} \nabla^2 t^2$

Option 2

$\frac{\partial u}{\partial t} = c^2 \nabla^2 u$

Option 3

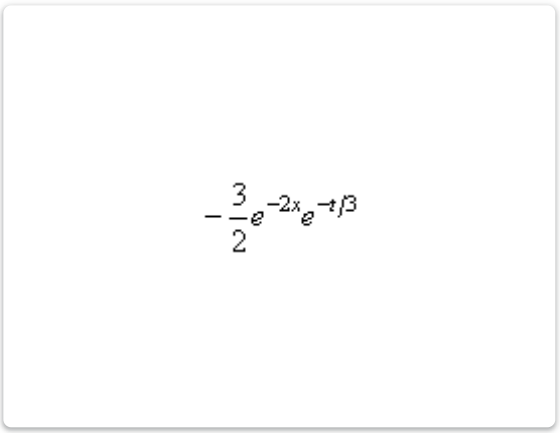
$\frac{\partial u}{\partial t} = c^2 \nabla^2 y^2$

Option 4

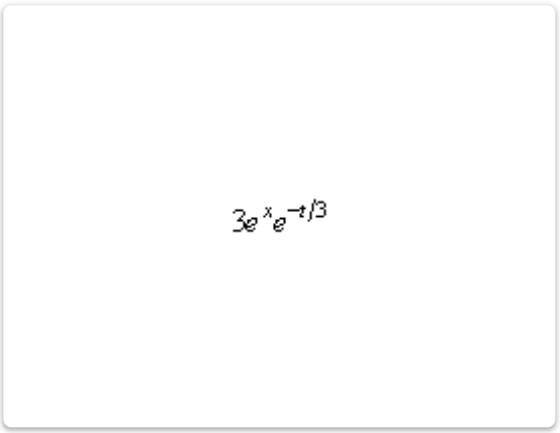
54. 46.

The solution of $\frac{\partial u}{\partial x} = 36\frac{\partial u}{\partial t} + 10u$ if $\frac{\partial u}{\partial x}(t=0) = 3e^{-2x}$ using the method of separation of variables, is

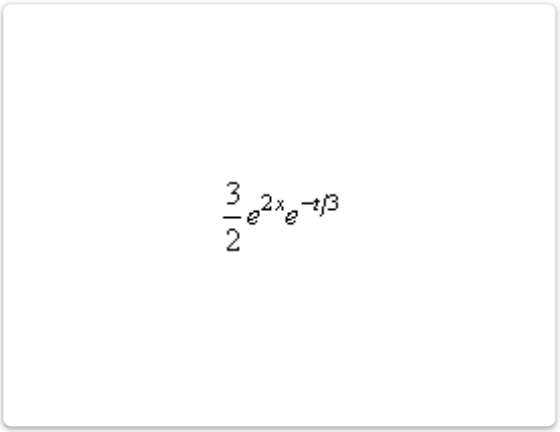
Mark only one oval.



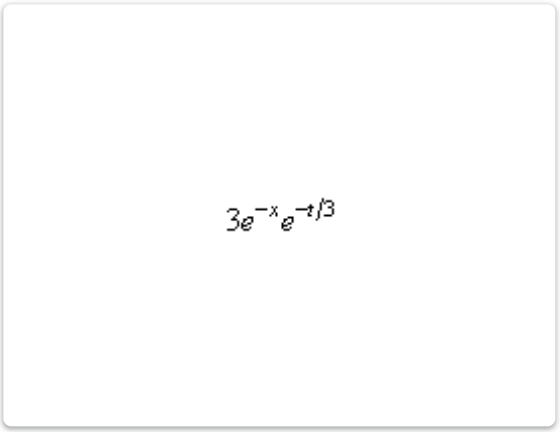
Option 1



Option 2



Option 3

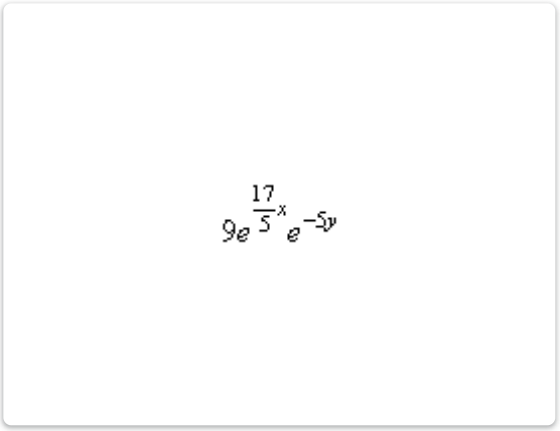


Option 4

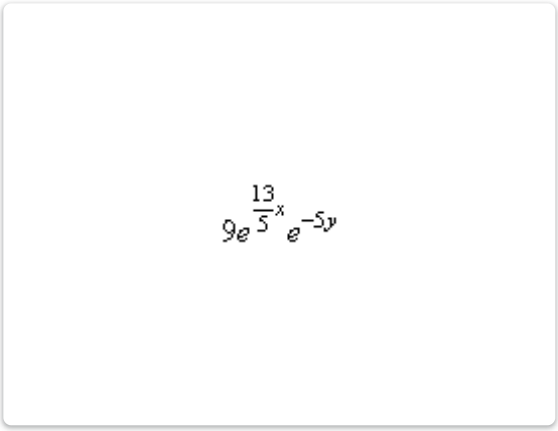
55. 47.

Solve the differential equation $5\frac{\partial u}{\partial x}+3\frac{\partial u}{\partial y}=2u$ using the method of separation of variables if $u(0,y)=9e^{-5y}$.

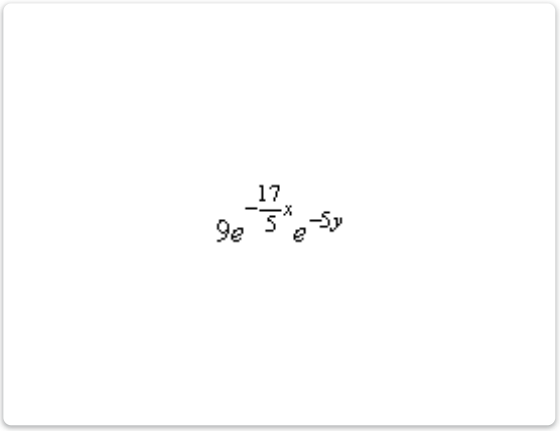
Mark only one oval.



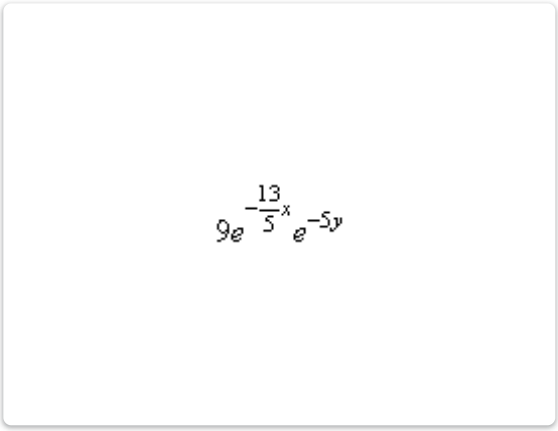
Option 1



Option 2



Option 3



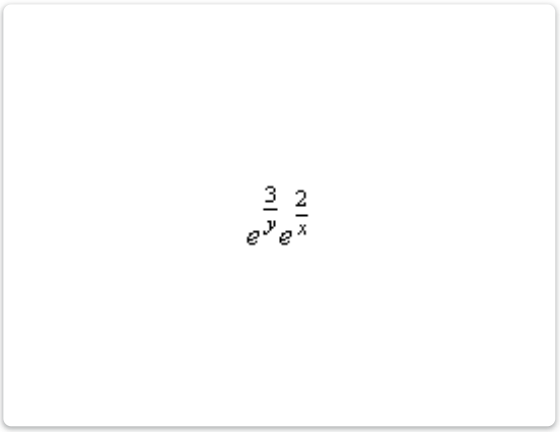
Option 4

56. 48.

Solve the differential equation $x^2\frac{\partial u}{\partial x}+y^2\frac{\partial u}{\partial y}=u$ using the method of separation of variables if $u(0,y)=e^{\frac{2}{y}}$.

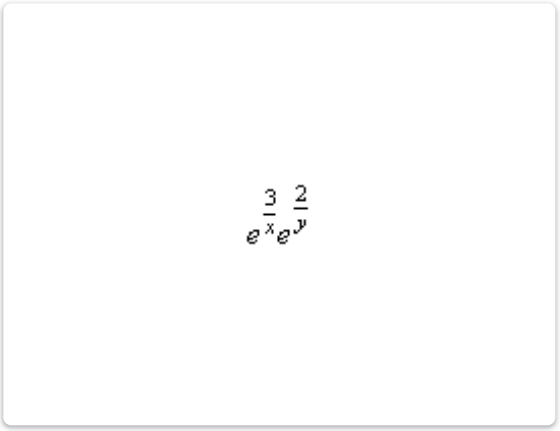
Mark only one oval.

Option 1



Option 2

Option 3



Option 4

57. 49.

The solution of one dimensional heat equation $\frac{\partial u}{\partial t} = \alpha^2 \frac{\partial^2 u}{\partial x^2}$ exists if

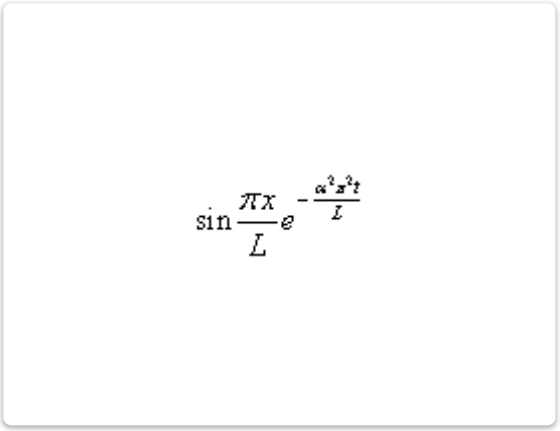
Mark only one oval.

- Both LHS & RHS are constants
- RHS is constant
- LHS is constant
- Always exists

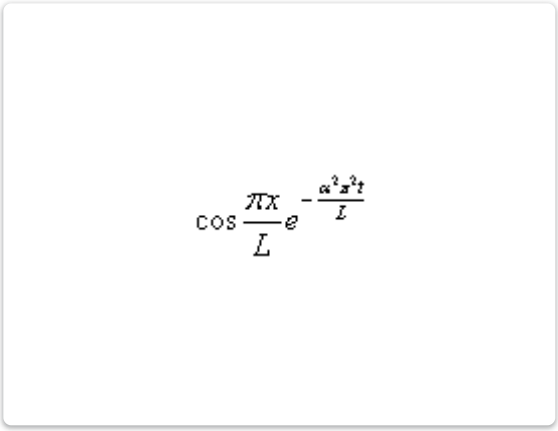
58. 50.

The ends of a bar at $x=0$ and $x=L$ are kept at zero temperature. The bar is subjected to an initial temperature $u(x,0)=\sin\frac{\pi x}{L}$, the temperature distribution is given by $u(x,t)=$

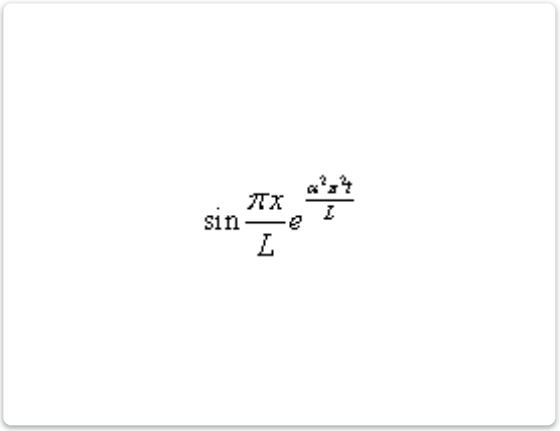
Mark only one oval.



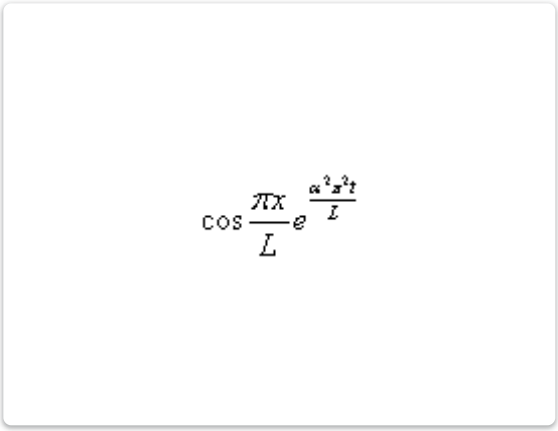
Option 1



Option 2



Option 3



Option 4

59. 51. Which one of the following statements is true for all real symmetric matrices?

Mark only one oval.

- All the eigenvalues are real.
- All the eigenvalues are positive.
- All the eigenvalues are distinct.
- Sum of all the eigenvalues is zero.

60. 52. What is Eigen value?

Mark only one oval.

- A vector obtained from the coordinates
- A matrix determined from the algebraic equations
- A scalar associated with a given linear transformation
- It is the inverse of the transform

61. 53. The determinant of the matrix whose eigen values are 4, 2, 3 is given by, _____

Mark only one oval.

- 9
- 24
- 5
- 3

62. 54. Which of the following is not a necessary condition for a matrix, say A, to be diagonalizable?

Mark only one oval.

- A must have n linearly independent eigen vectors
- All the eigen values of A must be distinct
- A can be an idempotent matrix
- A must have n linearly dependent eigen vectors

63. 55. The LU method of factorization was introduced by the mathematician_____

Mark only one oval.

- Alan Tangot
- David Hilbert
- G. W. Leibniz
- Alex Grothendieck

64. 56. The trace and determinant of a 2 × 2 matrix are known to be -2 and -35 respectively. Its Eigen values are

Mark only one oval.

- -30 and -5
- -37 and -1
- -7 and 5
- 17.5 and -2

65. 57. What is the other name for factorization method?

Mark only one oval.

- Doolittle's Method
- Lin Bairstow Method
- Muller's Method
- Decomposition Method

66. 58. The approximation of the derivative taken by the Crank-Nicolson scheme is the same as the _____ of spatial derivative.

Mark only one oval.

- second order forward difference approximation
- backward difference approximation
- forward difference approximation
- central difference approximation

67. 59. The Crank-Nicolson scheme is _____

Mark only one oval.

- fourth-order accurate
- third-order accurate
- second-order accurate
- first-order accurate

68. 60. The Adams-Moulton scheme comes under _____

Mark only one oval.

- Backward schemes
- Forward schemes
- Multipoint schemes
- Runge-Kutta methods