

Question # 3 of 10 (Start time: 01:25:14 PM, 19 July 2023)

Total Marks:

Which of the following discretized factor is utilized to check the stability of finite difference scheme in Fourier transform,

Binte Rafique

Select the correct option

 Reload Math Equations☐

$$u_{i,j} = G^i e^{Ikx}$$

☐

$$u_{i,j} = G^j e^{I\Delta x}$$

☐

$$u_{i,j} = G^j e^{Ikx}$$

C☐

$$u_{i,j} = G^j e^{Ik\Delta y}$$

Click to Save Answer & Move to Next Question

Question # 9 of 10 (Start time: 02:17:59 PM, 19 July 2023)

A finite difference method when applied on PDE will be stable if the amplification factor G is

Select the correct option

 Reload Ma

☐

None of these

☐

Bounded

B

☐

Unrestrained

☐

Unbounded

Click to Save Answer & Move to Ne

Which of the following mathematical expression represents the rotated five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

 Reload Math Equations

☐	$u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$	B
☐	$u_{i,j} = \frac{1}{4}[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$	
☒	$u_{i,j} = \frac{1}{4}[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$	
☐	$u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$	

Click to Save Answer & Move to Next Question

Question # 8 of 10 (Start time: 01:32:38 PM, 19 July 2023)

Gauss-Seidel method is also known as..... Method.

Select the correct option

☐	Jacobi's iterative
☐	Gauss Jordan
☐	Gauss elimination
☐	Successive displacement

D



Question # 8 of 10 (Start time: 01:32:38 PM, 19 July 2023)

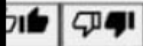
Gauss-Seidel method is also known as..... Method.

Select the correct option

- | | |
|-----------------------|-------------------------|
| ☐ | Jacobi's iterative |
| ☐ | Gauss Jordan |
| ☐ | Gauss elimination |
| ☐ | Successive displacement |

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The discretized form of 2D Laplace PDE for the nonuniform grid spacing in both direction is given by the equation,

Binte Rafique

Select the correct option

 Reload Math Equations

☐ $4\left(\frac{h^2}{k^2} - 1\right)w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$

☐ $2\left(\frac{h^2}{k^2} - 1\right)w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$

☐ $4\left(\frac{h^2}{k^2} + 1\right)w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$

C

☐ $2\left(\frac{h^2}{k^2} + 1\right)w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$

Click to Save Answer & Move to Next Question

Question # 6 of 10 (Start time: 01:31:40 PM, 19 July 2023)

Which of the following equation represents 2D Laplace partial differential equation?

Select the correct option



$$\nabla^2 u = 0$$

A



$$\nabla u = 0$$



$$\nabla u = f(x)$$



$$\nabla^2 u = f(x, y)$$

Click to Save Answer



Question # 6 of 10 (Start time: 01:31:40 PM, 19 July 2023)

Which of the following equation represents 2D Laplace partial differential equation?

Select the correct option



$$\nabla^2 u = 0$$



$$\nabla u = 0$$



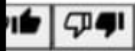
$$\nabla u = f(x)$$



$$\nabla^2 u = f(x, y)$$

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Question # 9 of 10 (Start time: 02:26:12 PM, 19 July 2023)

Total Marks: 1

The discretized form of 2D Laplace PDE for the nonuniform grid spacing in both direction is given by the equation,

Binte Rafique

Select the correct option

 Reload Math Equations

☐	$2(\frac{h^2}{k^2} + 1)w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$	
☐	$4(\frac{h^2}{k^2} + 1)w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$	B
☐	$4(\frac{h^2}{k^2} - 1)w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$	
☐	$2(\frac{h^2}{k^2} - 1)w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$	

Click to Save Answer & Move to Next Question



Which of the following PDE generates first order upwind scheme after applying appropriate difference approximations and $c > 0$

Select the correct option

Reload Math Equations

- ☐ $\frac{\partial f(x,t)}{\partial t} + c \frac{\partial f(x,t)}{\partial x} = 0$
- ☐ $\frac{\partial f(x,t)}{\partial t} = c \frac{\partial^2 f(x,t)}{\partial x^2}$
- ☐ $\frac{\partial f(x,t)}{\partial t} - c \frac{\partial f(x,t)}{\partial x} = 0$
- ☐ $\frac{\partial f(x,t)}{\partial t} + c \frac{\partial^2 f(x,t)}{\partial x^2} = 0$

Click to Save Answer & Move to Next Question

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Question # 4 of 10 (Start time: 01:30:40 PM, 19 July 2023)

Total M

The discretized form of 2D Laplace PDE for the uniform grid spacing in both direction is given by the equation,

Select the correct option

 Reload Math Equation

☐ $4w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i,j+1}]$

☐ $w_{i,j} = 4[(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$

☐ $4w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$

☐ $w_{i,j} = 4[w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$

C

Click to Save Answer & Move to Next Question

MC210401768: NISHAT MARYAM

MTH646 - Partial Differential Equations (Quiz#1)

Question # 8 of 10 (**Start time: 01:27:56 PM, 19 July 2023**)

Fourier analysis method is used to find the of finite difference scheme.

Select the correct option

- | | |
|-----------------------|---------------|
| ☐ | Consistency |
| ☐ | Convergence |
| ☐ | Stability |
| ☐ | None of these |

C

Click to

Question # 5 of 10 (Start time: 01:31:14 PM, 19 July 2023)

Which of the following equation represents 2D Poisson partial differential equation?

Select the correct option

☐	$\nabla u = f(x)$
☐	$\nabla u = 0$
☐	$\nabla^2 u = f(x, y)$
☐	$\nabla^2 u = 0$

C

Click to See

The discretized form of 2D Laplace PDE when central difference approximation is applied on both derivatives with uniform step size h in both directions is

Select the correct option

 Reload Math Equa

- ☐
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$
- ☐
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = \frac{1}{4} f_{i,j}$
- ☐
- $4w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = -4 f_{i,j}$
- ☐
- $w_{i,j} - (w_{i-1,j} + w_{i+1,j}) - (w_{i,j-1} + w_{i,j+1}) = 0$

A

Click to Save Answer & Move to Next Quest

MTH646 - Partial Differential Equations (Quiz#1)

Question # 1 of 10 (**Start time: 01:24:07 PM, 19 July 2023**)

Laplace partial differential equation is a type of..... partial equation.

Select the correct option

☐	Parabolic
☐	Elliptical
☐	None of these
☐	Hyperbolic

B

Click

Question # 3 of 10 (start time: 01:30:14 PM, 19 July 2023)

Consider the mesh point $w_l = w_{i,j}$ of the solution domain where l denotes the labeling to the internal grid points and $l =$

Select the correct option

☐

$$i + (n - 1 - j)(m - 1)$$

☐

$$i + (m + 1 + j)(n - 1)$$

☐

$$j + (m - 1 - i)(n - 1)$$

☐

$$i + (m - 1 - j)(n - 1)$$

D

Click to Save

Which of the following PDE generates first order upwind scheme after applying appropriate difference approximations and $c > 0$

Select the correct option

 Reload Math Equations

- | | | |
|-----------------------|---|---|
| ☐ | $\frac{\partial f(x,t)}{\partial t} + c \frac{\partial f(x,t)}{\partial x} = 0$ | A |
| ☐ | $\frac{\partial f(x,t)}{\partial t} = c \frac{\partial^2 f(x,t)}{\partial x^2}$ | |
| ☐ | $\frac{\partial f(x,t)}{\partial t} - c \frac{\partial f(x,t)}{\partial x} = 0$ | |
| ☐ | $\frac{\partial f(x,t)}{\partial t} + c \frac{\partial^2 f(x,t)}{\partial x^2} = 0$ | |

Click to Save Answer & Move to Next Question

Which of the following mathematical expression represents the standard five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

Binte Rafique

 Reload Math Equations

☐	$u_{i,j} = \frac{1}{4} [u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$	A
☐	$u_{i,j} = \frac{1}{4} [u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$	
☐	$u_{i,j} = 4 [u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$	
☐	$u_{i,j} = 4 [u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$	

Click to Save Answer & Move to Next Question

Question # 8 of 10 (Start time: 01:12:43 PM, 19 July 2023)

Consider the PDE $\frac{\partial f(x, t)}{\partial t} + c \frac{\partial f(x, t)}{\partial x} = 0$

which of the following difference approximation will be used to make upwind scheme when $c > 0$

Select the correct option

☒	Forward difference
☐	Central difference
☐	Backward difference
☐	Crank-Nicolson scheme

C

Click to Save Answer

Question # 7 of 10 (Start time: 01:11:44 PM, 19 July 2023)

A finite difference method when applied on PDE will be stable if the amplification factor G is

Select the correct option



☐	Unrestrained
☐	Bounded
☐	Unbounded
☐	None of these

B

Click to Save Answer & Mark

The discretized form of 2D Laplace PDE for the uniform grid spacing in both direction is given by the equation,

Binte Rafique

Select the correct option

 Reload Math Equations

☐	$4w_{i,j} = [w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i,j+1}]$	
☐	$w_{i,j} = 4[(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$	
☒	$4w_{i,j} = [(w_{i-1,j} + w_{i+1,j}) + (w_{i,j-1} + w_{i,j+1})]$	C
☐	$w_{i,j} = 4[w_{i-1,j-1} + w_{i+1,j+1} + w_{i+1,j-1} + w_{i-1,j+1}]$	

Click to Save Answer & Move to Next Question

Question # 6 of 10 (Start time: 01:10:59 PM, 19 July 2023)

A finite difference scheme will be stable if the amplification factor G satisfied the following condition,

Select the correct option

 Reload M

☐	$ G = 1$
☒	$ G \leq 1$ B
☐	$ G \geq 1$
☐	$ G < 1$

Click to Save Answer & Move to N

Question # 8 of 10 (Start time: 01:12:43 PM, 19 July 2023)

Consider the PDE $\frac{\partial f(x,t)}{\partial t} + c \frac{\partial f(x,t)}{\partial x} = 0$

which of the following difference approximation will be used to make upwind scheme when $c > 0$

Select the correct option

☒	Forward difference
☐	Central difference
☐	Backward difference
☐	Crank-Nicolson scheme

A

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BC210409715: KAINAT KANWAL

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Sta

Question # 9 of 10 (Start time: 01:33:02 PM, 19 July 2023)

A finite difference scheme will be stable if the amplification factor G satisfied the following condition

Select the correct option



$|G| \leq 1$



$|G| = 1$



$|G| < 1$



$|G| \geq 1$

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MTH646 – Partial Differential Equations (Quiz#1)

Question # 4 of 10 (**Start time: 01:09:26 PM, 19 July 2023**)

The Crank-Nicolson scheme when applied on heat diffusion equation is

Select the correct option

☐	Conditionally stable
☐	Unconditionally stable B
☐	Neither stable nor bounded
☐	None of these



MC210400840: ALI HASSAN

MTH646 - Partial Differential Equations (Quiz#1)

Quiz Start Time: 01

Question # 5 of 10 (Start time: 01:10:17 PM, 19 July 2023)

Consider the PDE $\frac{\partial f(x,t)}{\partial t} + c \frac{\partial f(x,t)}{\partial x} = 0$

which of the following difference approximation will be used to make upwind scheme when $c < 0$

Select the correct option

Reload

- | | |
|----------------------------------|-----------------------|
| ☒ | Forward difference |
| ☐ | Central difference |
| ☐ | Backward difference |
| ☐ | Crank-Nicolson scheme |

Click to Save Answer & Move



Question # 3 of 10 (Start time: 01:07:55 PM, 19 July 2023)

Total Marks: 1

Which of the following mathematical expression represents the standard five-point formula for 2D Laplace partial differential equation for the uniform step size in both x and y direction?

Select the correct option

 Reload Math Equations☐

$$u_{i,j} = \frac{1}{4} [u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$$

A

☐

$$u_{i,j} = \frac{1}{4} [u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$$

☐

$$u_{i,j} = 4[u_{i-1,j} + u_{i+1,j} + u_{i,j-1} + u_{i,j+1}]$$

☐

$$u_{i,j} = 4[u_{i-1,j-1} + u_{i+1,j+1} + u_{i+1,j-1} + u_{i-1,j+1}]$$

Click to Save Answer & Move to Next Question



MTH646 - Partial Differential Equations (Quiz#1)



Question # 10 of 10 (Start time: 01:14:30 PM, 19 July 2023)

Which of the following equation represents 2D Poisson partial differential equation?

Select the correct option

- | | |
|----------------------------------|------------------------|
| ☐ | $\nabla u = f(x)$ |
| ☐ | $\nabla u = 0$ |
| ☐ | $\nabla^2 u = 0$ |
| ☒ | $\nabla^2 u = f(x, y)$ |

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Question # 4 of 10 (Start time: 01:25:43 PM, 19 July 2023)

Which of the following equation represents 2D Poisson partial differential equation?

Binte Rafique

Select the correct option

- | | | |
|-----------------------|------------------------|---|
| ☐ | $\nabla^2 u = f(x, y)$ | A |
| ☐ | $\nabla u = f(x)$ | |
| ☐ | $\nabla u = 0$ | |
| ☐ | $\nabla^2 u = 0$ | |

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