Assignment 08

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Due on 2019-04-24, 23:59 IST.

1) In the gradient theorem equation, \( \nabla \) means:  
- \( \frac{\partial y}{\partial y} - \frac{\partial y}{\partial x} \)  
- \( \frac{\partial y}{\partial x} - \frac{\partial y}{\partial y} \)  
- \( \frac{\partial y}{\partial x} + \frac{\partial y}{\partial y} \)  
- \( \frac{\partial y}{\partial y} + \frac{\partial y}{\partial x} \)  

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
\( \frac{\partial y}{\partial x} + \frac{\partial y}{\partial y} \)  

2) For boundary conditions: 
\( u(0) = 0 \) and \( u'(1) = 0 \), which of the following \( \Phi \) (approximation function) can be chosen in strong form of differential equation?  
- \( \Phi_0 = 0; \ \Phi_1 = x(x-2); \ \Phi_2 = x^2(x-3) \)  
- \( \Phi_0 = 0; \ \Phi_1 = x(x-2); \ \Phi_2 = x^2(x-3) \)  
- \( \Phi_0 = 1; \ \Phi_1 = (x-2); \ \Phi_2 = x(x-3) \)  
- \( \Phi_0 = 1; \ \Phi_1 = x(x-2); \ \Phi_2 = x(x^2-3) \)  

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
\( \Phi_0 = 0; \ \Phi_1 = x(x-2); \ \Phi_2 = x(x^2-3) \)  

3) Class of the primary variable must belong to \( \square \) for a \( 4^{th} \) order differential equation in its strong form.  
- \( C^1 \)  

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
\( C^1 \)
Accepted Answers: 

4) Which of the following is not true about Φ's (approximation function)? 

- They help us in defining how the primary variable will behave. 
- They have to be a polynomial function. 
- They should satisfy the boundary conditions. 
- They have to be assumed. 

No, the answer is incorrect. 
Score: 0 

Accepted Answers: 

- They have to be a polynomial function.

5) For a 4th order differential equation in its weak form, the weight function must belong to the 1 point class:

- C^0 
- C^1 
- C^2 
- C^3 

No, the answer is incorrect. 
Score: 0 

Accepted Answers: 

- C^2

6) For boundary conditions: u(0) = 0; u'(1) = 0, which of the following Φ (approximation function) can be chosen in strong form of differential equation?

- Φ_0 = 0; Φ_1 = x(x-2); Φ_2 = x(x^3 - 4) 
- Φ_0 = 1; Φ_1 = x(x-2); Φ_2 = x(x^2 - 2) 
- Φ_0 = 0; Φ_1 = x(x-2); Φ_2 = x(x^3 - 3) 
- Φ_0 = 1; Φ_1 = x(x-2); Φ_2 = x(x^3 - 4) 

No, the answer is incorrect. 
Score: 0 

Accepted Answers: 

- Φ_0 = 0; Φ_1 = x(x-2); Φ_2 = x(x^3 - 4)

7) What is the meaning of weak formulation? 

- Solutions obtained are incorrect. 
- The differentiability requirement on primary variable is decreased. 
- The differentiability requirement on primary variable is increased. 
- No Boundary conditions have to be satisfied. 

No, the answer is incorrect. 
Score: 0 

Accepted Answers: 

- The differentiability requirement on primary variable is decreased.

8) (wv)' is same as:

- w^2 + v^2 
- w + v
9) Which of the following is true about \( F \) in the assembly level equations, \( [K][u] = \{f\} + \{Q\} = \{F\}? \)

- \( \{F\} \) will represent external force for any type of governing differential equation.
- \( \{F\} \) represents the terms related to external load – both point and distributed loads.
- \( \{F\} \) represents the terms related to distributed load.
- \( \{F\} \) represents the terms related to point loads.

No, the answer is incorrect.
Score: 0
Accepted Answers:
- \( \{F\} \) represents the terms related to external load – both point and distributed loads.

10) In parabolic time dependent problems, temporal approximation uses __________.

- Newmark family of approximations.
- Alpha family of approximations.
- Beta family of approximations.
- Gamma family of approximations.

No, the answer is incorrect.
Score: 0
Accepted Answers:
- Alpha family of approximations.

11) Expression for a weighted residual method is given below:
\[
\int w \cdot \text{Residue} = 0.
\]
Which of the following options are true?

- \( w \) represents user-defined functions.
- \( w \) represents the physical weight of the material.
- \( w \) represents the primary variable.
- Residue is the same as the governing differential equation, therefore it will always be zero.

No, the answer is incorrect.
Score: 0
Accepted Answers:
- \( w \) represents user-defined functions.

12) Consider \( \Delta t \) is the difference of time step. What is the order of accuracy of Euler method in \( \alpha \) family of approximation for parabolic time dependent problems?

- \( (\Delta t)^{1/2} \)
- \( (2\Delta t)^2 \)
- \( (3\Delta t)^3 \)
- \( \Delta t \)

No, the answer is incorrect.
Score: 0
In context of a space-time PDE, what is the meaning of "spatial approximation"?  

- Conversion of a space-time partial differential equation into a partial differential equation in time.  
- Conversion of a space-time partial differential equation into a partial differential equation in space.  
- Conversion of a space-time partial differential equation into an ordinary differential equation in time.  
- Conversion of a space-time partial differential equation into an ordinary differential equation in space.  

No, the answer is incorrect.  
Score: 0

Consider the mass matrix given below.  

Which of the options represents a matrix which is obtained by diagonalizing the above matrix using row sum lumping method?  

No, the answer is incorrect.  
Score: 0

Which of the options are not true while solving a time-dependent partial differential equation given below?  

- The equation cannot be solved without initial conditions.  
- Given equation needs to be integrated four times with respect to x.  
- Given equation needs to be integrated twice with respect to time.  
- None of the options are correct.  

No, the answer is incorrect.  
Score: 0

Consider a time-dependent problem. Which of the options is true?  

- They must be linear in both time as well as the primary variable.  
- They do not require boundary conditions to be solved.  
- They require initial conditions along with boundary conditions knowledge.  
- They cannot be ordinary differential equation.  

No, the answer is incorrect.  
Score: 0
Accepted Answers:
They require initial conditions along with boundary conditions knowledge.