Unit 7 - Week 4

Assignment 4

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-08-28, 23:59 IST.

1) The linear differential equation $L\phi(r) = f(r)$ is solved by which of the following steps (assume $b_n(r)$ is a basis function and $t_m(r)$ is a testing function): ***1 point***

- Expanding $\phi(r)$ in terms of $b_n(r)$ and taking inner product with $t_m(r)$
- Expanding $\phi(r)$ in terms of $b_n(r)$ and taking inner product with $b_n(r)$
- Expanding $\phi(r)$ in terms of $t_m(r)$ and taking inner product with $t_m(r)$
- Expanding $\phi(r)$
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Expanding $\phi(r)$ in terms of $b_n(r)$ and taking inner product with $t_m(r)$

2) In the method of moments taught in the class,the matrix elements A_{mn} for solving the equation $L\phi(r) = f(r)$ are given by ***1 point***

- $A_{mn} = \langle t_m(r), b_n(r)\rangle$
- $A_{mn} = \langle b_n(r), Lt_m(r)\rangle$
- $A_{mn} = \langle t_m(r), Lb_n(r)\rangle$
- $A_{mn} = \langle b_m(r), Lb_n(r)\rangle$
- $A_{mn} = \langle t_m(r), Lt_n(r)\rangle$
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
$A_{mn} = \langle t_m(r), Lb_n(r)\rangle$

3) The gradient of 2D Green's function, $\nabla g(\vec{r}, \vec{r}')$, is given by ($\hat{\rho}$ is the unit vector along $\vec{r} - \vec{r}'$): ***1 point***

- $(jk/4)H_0^{(1)}(k|\vec{r} - \vec{r}'|)\hat{\rho}$
- $(jk/4)H_1^{(1)}(k|\vec{r} - \vec{r}'|)\hat{\rho}$
- $(jk/4)H_0^{(2)}(k|\vec{r} - \vec{r}'|)\hat{\rho}$
- $(jk/4)H_1^{(2)}(k|\vec{r} - \vec{r}'|)\hat{\rho}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$(jk/4)H_1^{(2)}(k|\vec{r} - \vec{r}'|)\hat{\rho}$

4) What is the value of the following integral as ϵ tends to zero? ***1 point***

- $\int_\epsilon^a \ln x \, dx = a \ln a - a$
- $\int_\epsilon^a \ln x \, dx = 1/a$
- $\int_\epsilon^a \ln x \, dx = -\infty$
- $\int_\epsilon^a \ln x \, dx = 0$
- $\int_\epsilon^a \ln x \, dx = +\infty$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\int_\epsilon^a \ln x \, dx = a \ln a - a$

5) Why does the integral $\int_D \nabla g(\vec{r}, \vec{r}') \cdot \hat{n} dl$ evaluate to zero when the integration domain D is such that $\vec{r} \neq \vec{r}'$? ***1 point***

- $g(\vec{r}, \vec{r}') = 0$ for the domain D
- Magnitude of $\nabla g(\vec{r}, \vec{r}')$is zero for the domain D
- $\nabla g(\vec{r}, \vec{r}')$ is perpendicular to $\hat{n}$ for the domain D
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\nabla g(\vec{r}, \vec{r}')$ is perpendicular to $\hat{n}$ for the domain D

6) What does the absolute value of the integral $\int_D \nabla g(\vec{r}, \vec{r}') \cdot \hat{n} dl$ evaluate to, when the integration domain D is such that $\vec{r} = \vec{r}'$? ***1 point***

- 0
- $1/2$
- 1
- ∞

No, the answer is incorrect.
Score: 0

Accepted Answers:
$1/2$

7) What is the value of the Hankel function $H_0^{(2)}(x)$ for $x = 2e^{-5}$ (γ is the Euler constant)? ***1 point***

- $H_0^{(2)}(x) \approx 1 - j\frac{2}{\pi}(-5 + \gamma)$
- $H_0^{(2)}(x) \approx 1 + j\frac{2}{\pi}(-2 + \gamma)$
- $H_0^{(2)}(x) \approx j\frac{2}{\pi}(5 + \gamma)$
- $H_0^{(2)}(x) \approx -j\frac{2}{\pi}(2 + \gamma)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$H_0^{(2)}(x) \approx 1 - j\frac{2}{\pi}(-5 + \gamma)$

8) Can the Surface Integral Equation be used to solve for the scattered field from a non homogeneous object? ***1 point***

- Yes, it can be easily done analytically for any object
- Yes, it can be done, if the Green's function is provided
- No, because we can model only homogeneous objects using Green's function
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Yes, it can be done, if the Green's function is provided

9) Which of the following definition(s) describes Galerkin's method? ***1 point***

- Choosing pulse basis and delta testing functions
- Choosing pulse basis and pulse testing functions
- Choosing the same basis and testing functions
- Choosing full domain basis and pulse testing functions
- Galerkin's method is another name for Method of Moments

No, the answer is incorrect.
Score: 0

Accepted Answers:
Choosing pulse basis and pulse testing functions
Choosing the same basis and testing functions

10) Solving the Surface Integral Equation using the Method of Moments involves solving what type of equations? ***1 point***

- Underdetermined system
- Well-determined system
- Overdetermined system
- Eigenvalue problem

No, the answer is incorrect.
Score: 0

Accepted Answers:
Well-determined system