

## Unit 15 - Week 12

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## Assignment 12

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

**Due on 2019-10-23, 23:59 IST.**

### Instructions :

The objective of these questions is to assess your understanding of this week's content. You are not expected to memorize any of the questions, rather, you should derive the answers from first principles based on what you have learnt so far.

1) While solving the Pocklington's equation using Method of Moments, the elements of the known vector  $b$  in the equation  $Ax = b$  contain 1 point

- Current on the conductor  
 Incident field  
 Green's function  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Incident field

2) In modelling radiations through antenna with current  $I$  and length  $L$ , the Pocklington's equation is given by (where  $K(z, z') = (d^2/dz^2 + k^2)G(z, z')$  and  $G(z, z')$  is the 1D Green's function) 1 point

- $E_z^i(z) = \int_{-L/2}^{L/2} I(z')K(z, z')dz'$   
  
 $E_z^i(z) = - \int_{-L/2}^{L/2} I(z')K(z, z')dz'$   
  
 $E_z^i(z) = - \int_0^{L/2} I(z')K(z, z')dz'$   
  
 $E_z^i(z) = - \int_0^{L/2} I(z')K(z, z')dz'$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $E_z^i(z) = - \int_{-L/2}^{L/2} I(z')K(z, z')dz'$

3) Which of the following is a method for transmitter source modelling in an antenna? 1 point

- Delta-gap  
 Magnetic frill  
 Incident field  
 Both A and B

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Both A and B

4) Radiation pattern of two antennas placed side by side along the z-axis having spacing  $d = \lambda$  (where  $\lambda$  is the wavelength) without any mutual coupling has a null and a maxima at \_\_\_\_\_ and \_\_\_\_\_ respectively 1 point

- $\theta = 0, \theta = 45$   
  
 $\theta = 0, \theta = 90$   
  
 $\theta = 90, \theta = 0$   
  
 $\theta = 90, \theta = 45$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $\theta = 0, \theta = 90$

5) Which of the following can be used to change the beam maxima for the purpose of beam forming? 1 point

- Spacing between antennas  
 Changing the wave number  
 Changing the phase difference  
 All of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
All of the above

6) The generalized eigenvalue equation for finding modes of an optical fiber problem using finite element method is given by 1 point

where  $G$  is the coupling matrix which contains integrals of Green's function,  $e$  is the electric field vector and  $\beta$  is the propagation constant

- $[I - k_0^2 Gx]e = \beta^2 Ge$   
  
 $[I - k_0^2 Gx]e = -\beta^2 Ge$   
  
 $[I - k_0^2 Gx]e = \beta^2 e$   
  
 $[I - k_0^2 Gx]e = -\beta^2 e$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $[I - k_0^2 Gx]e = -\beta^2 Ge$

7) While solving eigenvalue problem  $Ax = \lambda x$  where  $\lambda = -\beta^2$ , what range of values of eigenvalue  $\lambda$  give the propagating modes of the fiber? 1 point

- Real and positive  
 Real and negative  
 Complex and positive  
 Complex and negative

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Real and negative

8) In what way is the formulation of hybrid Finite Element - Boundary Integral (FE-BI) method different from the standard finite element method? 1 point

- Absorbing boundary condition is replaced by boundary integral  
 Boundary integral is replaced by absorbing boundary condition  
 The number of discretizations is reduced  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Absorbing boundary condition is replaced by boundary integral

9) In the hybrid FE-BI method for solving CEM problems, we obtain \_\_\_\_\_ number of equations using FEM and \_\_\_\_\_ equations using boundary integral (where  $m$  is the number of interior edges and  $n$  is the number of boundary edges). 1 point

- $m, n$   
  $m, m+n$   
  $m+n, m+n$   
  $m+n, n$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $m+n, n$

10) Which of the following is not true about hybrid FE-BI method over conventional finite element method? 1 point

- FE-BI results in a more sparse system of equations  
 FE-BI gives an exact solution  
 Both  
 None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
FE-BI results in a more sparse system of equations