

Code No: NR210204

NR

Set No. 2

II B.Tech I Semester Examinations, November 2010

ELECTRO MAGNETIC FIELDS

Electrical And Electronics Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. State Gauss's law and explain and its application. [16]
2. (a) Derive the expression for potential at any point due to a point charge Q and also write electric field in rectangular co ordinate system. [8]
(b) A point charge $Q = 10^{-9}$ C is located at $(-0.5, -1, 2\text{m})$ in air. Find E at $(0.9, 1.2, -2.4\text{m})$ [8]
3. (a) Describe how a differential current loop behaves like a Magnetic dipole. [6]
(b) Derive an expression for the torque on a current loop placed in a magnetic field. [10]
4. (a) Define electric dipole and dipole moment. [6]
(b) Derive the expression for torque on an electric dipole in an electric field. [10]
5. Two mutually coupled coils are connected in series.
 $L_1 = 0.5$ H $L_2 = 0.6$ H
 $M = 0.1$ H
A dc current of 2Amps is passed through this system in such a way that the current increases at a uniform rate of 1 Amp. per sec. What is the voltage developed across the end points if
(a) the coils are connected in a magnetically aiding condition [8]
(b) the coils are connected in a magnetically opposing condition. [8]

Derive formula used.

6. Derive an expression for magnetic field intensity at a point along the axis, due to a circular current carrying loop. [16]
7. The parallel plate capacitor with a flat slab of dielectric material between the plates shown in below figure 5. Assuming top plate as the charged, calculate \bar{D} and \bar{P} [16]

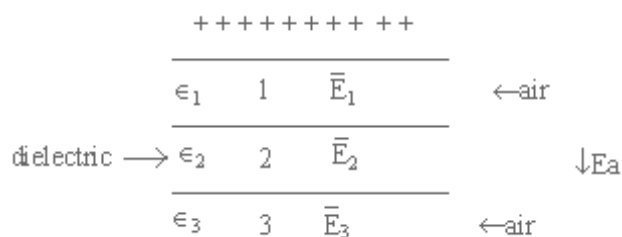


Figure 5

Code No: NR210204

NR

Set No. 2

8. Write the Maxwell's equations for harmonically varying fields? [16]

FIRSTRANKER

Code No: NR210204

NR

Set No. 4

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ELECTRO MAGNETIC FIELDS

Electrical And Electronics Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

- Describe how a differential current loop behaves like a Magnetic dipole. [6]
 - Derive an expression for the torque on a current loop placed in a magnetic field. [10]
- State Gauss's law and explain and its application. [16]
- Two mutually coupled coils are connected in series.
 $L_1 = 0.5 \text{ H}$ $L_2 = 0.6 \text{ H}$
 $M = 0.1 \text{ H}$
 A dc current of 2Amps is passed through this system in such a way that the current increases at a uniform rate of 1 Amp. per sec. What is the voltage developed across the end points if
 - the coils are connected in a magnetically aiding condition [8]
 - the coils are connected in a magnetically opposing condition. [8]
 Derive formula used.
- Define electric dipole and dipole moment. [6]
 - Derive the expression for torque on an electric dipole in an electric field. [10]
- Write the Maxwell's equations for harmonically varying fields? [16]
- The parallel plate capacitor with a flat slab of dielectric material between the plates shown in below figure 5. Assuming top plate as the charged, calculate \bar{D} and \bar{P} [16]

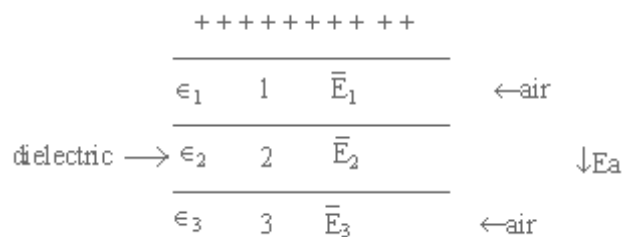


Figure 5

- Derive the expression for potential at any point due to a point charge Q and also write electric field in rectangular co ordinate system. [8]

Code No: NR210204

NR

Set No. 4

- (b) A point charge $Q = 10^{-9}$ C is located at $(-0.5, -1, 2\text{m})$ in air. Find E at $(0.9, 1.2, -2.4\text{m})$ [8]
8. Derive an expression for magnetic field intensity at a point along the axis, due to a circular current carrying loop. [16]

FIRSTRANKER

Code No: NR210204

NR

Set No. 1

II B.Tech I Semester Examinations, November 2010

ELECTRO MAGNETIC FIELDS

Electrical And Electronics Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

- Derive the expression for potential at any point due to a point charge Q and also write electric field in rectangular co ordinate system. [8]
 - A point charge $Q = 10^{-9}$ C is located at $(-0.5, -1, 2\text{m})$ in air. Find E at $(0.9, 1.2, -2.4\text{m})$ [8]
- Write the Maxwell's equations for harmonically varying fields? [16]
- Two mutually coupled coils are connected in series.
 $L_1 = 0.5$ H $L_2 = 0.6$ H
 $M = 0.1$ H
 A dc current of 2Amps is passed through this system in such a way that the current increases at a uniform rate of 1 Amp. per sec. What is the voltage developed across the end points if
 - the coils are connected in a magnetically aiding condition [8]
 - the coils are connected in a magnetically opposing condition. [8]
 Derive formula used.
- State Gauss's law and explain and its application. [16]
- Define electric dipole and dipole moment. [6]
 - Derive the expression for torque on an electric dipole in an electric field. [10]
- The parallel plate capacitor with a flat slab of dielectric material between the plates shown in below figure 5. Assuming top plate as the charged, calculate \bar{D} and \bar{P} [16]

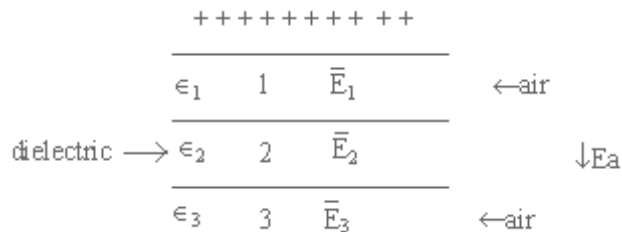


Figure 5

- Derive an expression for magnetic field intensity at a point along the axis, due to a circular current carrying loop. [16]

Code No: NR210204

NR

Set No. 1

8. (a) Describe how a differential current loop behaves like a Magnetic dipole. [6]
(b) Derive an expression for the torque on a current loop placed in a magnetic field. [10]

FIRSTRANKER

Code No: NR210204

NR

Set No. 3

II B.Tech I Semester Examinations, November 2010

ELECTRO MAGNETIC FIELDS

Electrical And Electronics Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

- Write the Maxwell's equations for harmonically varying fields? [16]
- Derive the expression for potential at any point due to a point charge Q and also write electric field in rectangular co ordinate system. [8]
 - A point charge $Q = 10^{-9}$ C is located at $(-0.5, -1, 2\text{m})$ in air. Find E at $(0.9, 1.2, -2.4\text{m})$ [8]
- Describe how a differential current loop behaves like a Magnetic dipole. [6]
 - Derive an expression for the torque on a current loop placed in a magnetic field. [10]
- Derive an expression for magnetic field intensity at a point along the axis, due to a circular current carrying loop. [16]
- The parallel plate capacitor with a flat slab of dielectric material between the plates shown in below figure 5. Assuming top plate as the charged, calculate \bar{D} and \bar{P} [16]

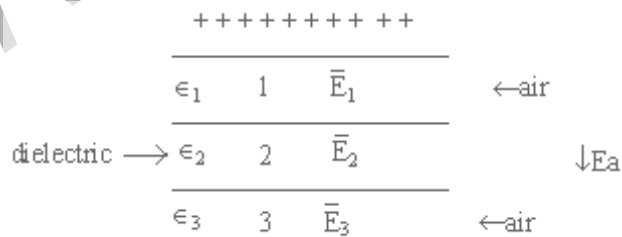


Figure 5

- Two mutually coupled coils are connected in series.
 $L_1 = 0.5$ H $L_2 = 0.6$ H
 $M = 0.1$ H
 A dc current of 2Amps is passed through this system in such a way that the current increases at a uniform rate of 1 Amp. per sec. What is the voltage developed across the end points if
 - the coils are connected in a magnetically aiding condition [8]
 - the coils are connected in a magnetically opposing condition. [8]

Derive formula used.

- Define electric dipole and dipole moment. [6]

Code No: NR210204

NR

Set No. 3

- (b) Derive the expression for torque on an electric dipole in an electric field. [10]
8. State Gauss's law and explain and its application. [16]

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