Code No: 07A4EC10 **R07** **Set No. 2**

II B.Tech II Semester Examinations,April/May 2012
EM WAVES AND TRANSMISSION LINES
Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Define reflection and transmission coefficients and mention its applications.
   (b) Derive expression for reflection coefficient of a wave on dielectric when incident normally. [8+8]

2. (a) Describe the characteristics of vector magnetic potential.
   (b) If the vector magnetic potential with in a cylindrical conductor of radius 'a' is $A = \frac{\mu_o I r^2}{4\pi a^2} a_z$, find **H**. [8+8]

3. What is total reflection in case of oblique incidence at a plane dielectric boundary? What is critical angle? Derive the expression for it. [16]

4. A transmission line of length $0.40\,\lambda$? has a characteristic impedance of 100Ω and is terminated in a load impedance of $200 + j180\omega$. Find the
   (a) Voltage reflection coefficient
   (b) Voltage stading wave ratio
   (c) Input impedance of the line. [16]

5. (a) Prove that the field given by $E = x^2 a_x + x\, a_y$ can not arise from a static distribution of charge.
   (b) Show that the power density corresponding to the field $E = a_x \cos(\beta z - \omega t) + a_y \sin(\beta z - \omega t)$ is constant everywhere. [8+8]

6. Derive the expression for α and β interms of primary constants of a line? [16]

7. (a) Differentiate polar and non-polar dielectrics in detail.
   (b) A dielectric slab ($\in_r = 2$) is placed under the influence of electric flux density $= 10a_x$ C/m^2. The slab has a volume of 0.1 cm^3. Determine polarization in the slab and total dipole moment. [8+8]

8. What is a rectangular wave guide? Derive the field expressions for TEm,n mode subject to the boundary conditions imposed by geometry of the wave guide. [16]

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Code No: 07A4EC10 **R07** **Set No. 4**

II B.Tech II Semester Examinations,April/May 2012
EM WAVES AND TRANSMISSION LINES
Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Prove that the field given by $E = x^2 a_x + x\, a_y$ can not arise from a static distribution of charge.
   (b) Show that the power density corresponding to the field $E = a_x \cos(\beta z - \omega t) + a_y \sin(\beta z - \omega t)$ is constant everywhere. [8+8]

2. (a) Differentiate polar and non-polar dielectrics in detail.
   (b) A dielectric slab ($\in_r = 2$) is placed under the influence of electric flux density = $10a_x$ C/m^2. The slab has a volume of 0.1 cm^3. Determine polarization in the slab and total dipole moment. [8+8]

3. A transmission line of length $0.40\,\lambda$? has a characteristic impedance of 100Ω and is terminated in a load impedance of $200 + j180\omega$. Find the
   (a) Voltage reflection coefficient
   (b) Voltage stading wave ratio
   (c) Input impedance of the line. [16]

4. What is total reflection in case of oblique incidence at a plane dielectric boundary? What is critical angle? Derive the expression for it. [16]

5. What is a rectangular wave guide? Derive the field expressions for TEm,n mode subject to the boundary conditions imposed by geometry of the wave guide. [16]

6. Derive the expression for α and β interms of primary constants of a line? [16]

7. (a) Describe the characteristics of vector magnetic potential.
   (b) If the vector magnetic potential with in a cylindrical conductor of radius 'a' is $A = \frac{\mu_o I r^2}{4\pi a^2} a_z$, find **H**. [8+8]

8. (a) Define reflection and transmission coefficients and mention its applications.
   (b) Derive expression for reflection coefficient of a wave on dielectric when incident normally. [8+8]

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Code No: 07A4EC10 **R07** **Set No. 1**

II B.Tech II Semester Examinations,April/May 2012
EM WAVES AND TRANSMISSION LINES
Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. What is total reflection in case of oblique incidence at a plane dielectric boundary? What is critical angle? Derive the expression for it. [16]

2. (a) Define reflection and transmission coefficients and mention its applications.
   (b) Derive expression for reflection coefficient of a wave on dielectric when incident normally. [8+8]

3. (a) Prove that the field given by $E = x^2 a_x + x\, a_y$ can not arise from a static distribution of charge.
   (b) Show that the power density corresponding to the field $E = a_x \cos(\beta z - \omega t) + a_y \sin(\beta z - \omega t)$ is constant everywhere. [8+8]

4. (a) Describe the characteristics of vector magnetic potential.
   (b) If the vector magnetic potential with in a cylindrical conductor of radius 'a' is $A = \frac{\mu_o I r^2}{4\pi a^2} a_z$, find **H**. [8+8]

5. Derive the expression for α and β interms of primary constants of a line? [16]

6. (a) Differentiate polar and non-polar dielectrics in detail.
   (b) A dielectric slab ($\in_r = 2$) is placed under the influence of electric flux density $= 10\mathrm{a}_x$ C/m^2. The slab has a volume of 0.1 cm^3. Determine polarization in the slab and total dipole moment. [8+8]

7. What is a rectangular wave guide? Derive the field expressions for TEm,n mode subject to the boundary conditions imposed by geometry of the wave guide. [16]

8. A transmission line of length 0.40 λ? has a characteristic impedance of 100Ω and is terminated in a load impedance of 200 + j180ω. Find the
   (a) Voltage reflection coefficient
   (b) Voltage stading wave ratio
   (c) Input impedance of the line. [16]

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Code No: 07A4EC10 **R07** **Set No. 3**

II B.Tech II Semester Examinations,April/May 2012
EM WAVES AND TRANSMISSION LINES
Common to Electronics And Telematics, Electronics And Communication Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. What is a rectangular wave guide? Derive the field expressions for TEm,n mode subject to the boundary conditions imposed by geometry of the wave guide. [16]

2. (a) Describe the characteristics of vector magnetic potential.
   (b) If the vector magnetic potential with in a cylindrical conductor of radius 'a' is $A = \frac{\mu_o I r^2}{4\pi a^2} a_z$, find **H**. [8+8]

3. (a) Differentiate polar and non-polar dielectrics in detail.
   (b) A dielectric slab ($\in_r = 2$) is placed under the influence of electric flux density $= 10a_x$ C/m^2. The slab has a volume of 0.1 cm^3. Determine polarization in the slab and total dipole moment. [8+8]

4. Derive the expression for α and β interms of primary constants of a line? [16]

5. (a) Define reflection and transmission coefficients and mention its applications.
   (b) Derive expression for reflection coefficient of a wave on dielectric when incident normally. [8+8]

6. What is total reflection in case of oblique incidence at a plane dielectric boundary? What is critical angle? Derive the expression for it. [16]

7. (a) Prove that the field given by $E = x^2 a_x + x\, a_y$ can not arise from a static distribution of charge.
   (b) Show that the power density corresponding to the field $E = a_x \cos(\beta z - \omega t) + a_y \sin(\beta z - \omega t)$ is constant everywhere. [8+8]

8. A transmission line of length 0.40λ ? has a characteristic impedance of 100Ω and is terminated in a load impedance of $200 + j180\omega$. Find the
   (a) Voltage reflection coefficient
   (b) Voltage stading wave ratio
   (c) Input impedance of the line. [16]

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