B. Tech. (ECE) 7th Semester (G-Scheme)
Examination, November–2023
ANTENNAAND WAVE PROPAGATION
Paper–PCC-ECE-402-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: ***Question No. 1 will be compulsory.*** *Students have to attempt* ***five*** *questions in total, selecting* ***one*** *question from each unit.*

1. (a) Explain in detail various radiation patter lobes. 2.5

(b) Explain the rectangular aperture positions for antenna system analysis. 2.5

(c) What are the basic characteristics of micro strip antennas? 2.5

(d) Differentiate between cell splitting and sectorized systems. 2.5

(e) Write a short note on infinitesimal dipole. 2.5

(f) Explain Circular patch antennas. 2.5

Unit-I

2. (a) Derive the expressions for total maximum directivity and draw Two and three-dimensional directivity patterns of a $\lambda/2$ dipole. 7.5

(b) Explain Friis Transmission Equation and derive the expression for reflection and polarization-matched antennas aligned for maximum directional radiation and reception. 7.5

3. (a) Draw and explain Finite length dipole geometry and far-field approximations. 7.5

(b) Explain in detail various dipoles used for mobile communication. 7.5

Unit-II

4. (a) Explain in detail field equivalence Huygens principle with actual and equivalent models 7.5

(b) Derive the expressions for circular aperture mounted on an Infinite Ground Plane. 7.5

5. (a) Explain in detail E-plane sectorial horn and coordinate system. 7.5

(b) Explain with diagram Curved or Cassegrain feed arrangement. 7.5

Unit-III

6. (a) Explain in detail Broadband Log Periodic Antenna with block diagram. 7.5

(b) Explain the theory of Elliott for three-dimensional configurations of frequency independent antennas. 7.5

7. (a) Explain various feeding methods which are used in micro strip antennas. 7.5

(b) Draw the transmission line model of rectangular patch antenna. What are the fringing effects in it? 7.5

Unit-IV

8. Analyze the uniformly spaced arrays with uniform and non-uniform excitation amplitudes. 15

9. Write short note on any **two**: 15

   (a) Woodward-Lawson method

   (b) Benefits of smart antennas

   (c) Schelkunoff polynomial method

B. Tech. 7th Semester (ECE) (G-Scheme) Examination, November–2023
FIBER OPTICAL COMMUNICATION
Paper–PCC- ECE-401G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt **five** questions in total selecting **one** question from each unit. All questions carry equal marks.* ***Question Number 1 is compulsory.***

1. (a) Discuss effects of linewidth in optical communication.

(b) Explain effect of waveguide dispersion.

(c) Enumerate advantages of Quantum well lasers.

(d) Derive equation for noise in APD.

(e) Discuss star distribution system.

(f) What do you understand by XPM? $6 \times 2.5 = 15$

Unit-I

2. (a) Explain propagation of light in optical fiber using meridional rays. Derive necessary mathematical equation for NA and Half conical angle. 9

(b) A silica optical fiber with a core refractive index 1.47 and a cladding refractive index of 1.44. Determine (i) Critical angle of core cladding interface (ii) NA for the fiber (iii) Acceptance angle in the air for the fiber. 6

3. (a) Explain losses due to intrinsic and extrinsic absorption in optical fiber cable in details. 9

(b) Discuss in detail the single mode and multi-mode optical fiber cable. 6

Unit-II

4. Discuss threshold condition for lasing. Also derive the equation for various type of efficiencies and how coupling efficiency can be improved when Laser is used as light source. 15

5. (a) Discuss working principle of APD. Also enumerate various efficiencies of APD. 8

(b) Derive the equation for noise in APD. How it can be reduced? 7

Unit-III

6. (a) Discuss optical termination and distribution system for a linear bus system. Also write and explain the elements of the loss equation. 9

(b) Enumerate salient points of link budgeting. 6

7. (a) Explain working of SOA, also draw necessary diagram. 8

(b) Discuss in detail WDM and list out salient features of WDM. 7

Unit-IV

8. (a) Discuss in detail the effects of Stimulating Raman Scattering in fiber optical communication system. 8

   (b) What do you understand by Soliton communication? Discuss its salient features. 7

9. Write short notes on the following: $2 \times 7.5 = 15$

   (a) Self-phase modulation.

   (b) Four wave mixing

B. Tech. (ECE) Professional Elective-IV 7th Semester (G-Scheme) Examination, November–2023

DATA COMMUNICATION OF NETWORK SECURITY

Paper–PEC-ECE-411-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Select one question from each unit. All questions carry equal marks.* ***Question No. 1 is Compulsory.***

1. (a) Discuss Digital to analog conversion only one of the type. 4

(b) Explain the Telephone N/W briefly 4

(c) What do you mean by Unicast routing. 4

(d) Explain voice over IP briefly. 3

Unit-I

2. Explain the OSI Model with neat diagram. Discuss each layer in detail. 15

3. Use Serval Transmission media for Networking. Explain two media in brief. 15

Unit-II

4. What do you mean by Multiplexing. Explain FDM, WDM and TDM in details. 15

5. What is Framing in data link layer? Explain Different Methods of Framing in data link layer. 15

Unit-III

6. Write Short Notes on Hierarchical routing and Broadcast routing. 15

7. (a) Explain the concept of TCP Congestion Control. 7½

   (b) If receiver window size is 16000 Bytes and maximum segment size is 1000 Byte then after how many RTT sender will send full window. 7½

Unit-IV

8. What do you mean by cryptography. Explain Symmetric Key Algorithm and Public Key Algorithm. 15

9. Write short Notes on:

   (i) DNS 5

   (ii) Audio and video compression 5

   (iii) FTP 5

B.Tech. 7th Semester (ECE) Professional Elective-V (G-Scheme) Examination, November–2023
RADAR & SONAR ENGINEERING
Paper–PEC-ECE-414G

Time allowed : 3 hours] *[Maximum marks : 75*

Note: *Attempt five questions in total. All questions carry equal marks.* ***Question Number 1 is compulsory.*** *Attempt* ***one*** *question from each unit.*

1. (a) Difference between FM and FM CW radar.

(b) Function of Duplexer in radar.

(c) Difference between Active and Passive sonar.

(d) What is the effect of Doppler shift?

(e) Function of Delay line cancellers.

(f) Explain beat frequency in radars. $6 \times 2.5=15$

Unit-I

2. (a) What do you understand by Radar? Explain historical development of radar technology. 7

(b) Tabulate radar frequencies and also explain applications of radar. 8

3. (a) Give out the classification of radar and explain applications of each type. 7

(b) Draw block diagram of radar and explain function of each block. 8

Unit-II

4. (a) Derive the range equation of radar. 7

   (b) Explain PRF and system losses in radar. 8

5. (a) Draw block diagram of FM CW radar and explain its working and advantages. 8

   (b) Discuss operation of multiple frequency CW radar. 7

Unit-III

6. (a) With the help of block diagram discuss operation of MTI radar. Also bring out limitations of MTI Radar. 8

   (b) Explain functioning and operation of Pulse Doppler radar. 7

7. (a) Discuss various types of tracking radar. 7

   (b) Explain mono pulse tracking method and how it is implemented? 8

Unit-IV

8. (a) Explain working principle of SONAR with the help of block diagram. 7

   (b) Enumerate various types of SONAR and give out applications of each type. 8

9. Write short notes on the following: $3 \times 5 = 15$

(a) PPI scope display

(b) Radar Heterodyne receiver

(c) Low noise front end

B.Tech. (ECE), 7th Semester (G-Scheme)
Examination, November-2023
MOBILE COMMUNICATION & NETWORKS
Paper -PCC-ECE-410-G

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt **five** questions in total. All questions carry equal marks. **Question no. 1 is compulsory**. Attempt **one** question from each unit.*

1. (a) Discuss in details the frequency re-use factor.

(b) Explain the term RMS delay spread.

(c) Enumerate salient features of TDMA.

(d) List out advantages of 5G over 4G.

(e) Explain effects due to Doppler shift.

(f) How MIMO is used in LTE?

6×2.5=15

Unit-I

2. (a) Why the geometry of the cell is chosen to be hexagonal? Discuss frequency reuses ration. 7.5

(b) Discuss in details the concept of Handoff. Also discuss in details soft handoff. 7.5

3. (a) Derive the equation and discuss in details cellular system capacity. How it effects Grade of Service? 7.5

(b) Discuss in detail 5G wireless standards and its salient features. 7.5

Unit-II

4. (a) Discuss the Okumara and Hata model for radio propagation. 7.5

(b) Write briefly about multipath small scale fading. Also bring out its effects on wireless channel. 7.5

5. (a) Discuss various type of propagation mechanism for wireless communication system. 7.5

(b) Discuss in detail losses due to partition between floors. 7.5

Unit-III

6. (a) What do you understand by diversity? Explain in detail the polarization and time diversity. 15

7. Write briefly about: 2×7.5=15

(a) QPSK modulation technique.

(b) Cellular CDMA access technique.

Unit-IV

8. (a) Explain the architecture of 5G mobile communication system. Also bring out its advantages. 7.5

(b) Discuss in detail application of MIMO in LTE. 7.5

9. Write briefly about the following: 2×7.5=15

(a) EDGE

(b) WCDMA