DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

QUESTION BANK

FOR

(R15) IV B.TECH II SEM
(2019 – 20)

MALLA REDDY COLLEGE OF ENGINEERING &TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade, ISO 9001:2008 Certified)

Maisammaguda, Dhulapally, Secunderabad – 500100.

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1	RADAR SYSTEMS
2	WIRELESS COMMUNICATIONS AND NETWORKS

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
IV B. Tech II Semester Regular Examinations, April/ May 2019
Radar Systems
(ECE)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE
Questions, Choosing ONE Question from each SECTION and each Question carries 10
marks.

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PART A - (25Marks)

Q1 (a) Write the different applications of radar.   [3M]
  (a)   Define multiple time around echoes.   [2M]
  (b)   What is Doppler effect?   [2M]
  (d)   Write the application of multiple-frequency CW radar?   [3M]
  (e)   How blind speed problems can be overcome in pulse radar system? [3M]
  (f)   What is the role of a delay line canceller in MTI Radar?   [2M]
  (g)   What is the difference between MTI radar & pulse Doppler radar? [3M]
  (h)   What do you understand by low angle tracking?   [2M]
  (i)   What is noise figure?   [2M]
  (j) Explain about A scope and PPI display?   [3M]

PART-B (50 MARKS)
SECTION-I

Q2 . (a) A radar system operates at 3 cm wavelength with peak pulse power of 100 KW. If its
minimum detectable signal is 4μW, radar cross section area is 12 m^2 & effective antenna
aperture is 6 m^2. Calculate maximum range of the radar. [6M]
  (b). Derive the simple Radar Range Equation. [4M]

OR

Q3 (a) Derive the expression for probability of false alarm (P_{fa}), when only noise is present at the
input of the IF Amplifier.   [5M]
(b) Briefly explain various types of losses taking place in radar systems.   [5M]
SECTION-II
Q4. (a) How isolation between transmitter and receiver is obtained in CW radar.   [5M]
(b) Discuss about the Multiple Frequency CW Radar.   [5M]
OR
Q5. (a) Transmit frequency of a CW radar is 5GHz. Calculate the Doppler frequency seen by a
Stationary Radar when the target radial velocity is 100 km/h.   [4M]
  (a) Draw the block diagram of a CW radar and explain its working principle.   [6M]
SECTION-III
Q6. Describe the operation of MTI Radar with power amplifier transmitter and power oscillator
Transmitter.   [10M]

OR

Q7. With the help of block diagram explain the operation of amplitude comparison monopulse tracking radar for one angular coordinate. [10M]

SECTION-IV

Q8. What is Matched filter receiver? Derive expression for the response of Matched filter characteristics. [10M]

OR

Q9. (a) Draw and explain the block diagram of a cross-correlation receiver. [6M]

(b) Discuss in brief about matched filter with nonwhite noise. [4M]

SECTION-V

Q10. Write about radiation pattern of phased array antennas with suitable equations. And also write applications of phased array antennas. [10M]

OR

Q11. (a) Explain about the antennas used in radar systems. [6M]

(b) List the advantages and limitations of array antennas. [4M]

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R15

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
IV B. Tech II Semester Advance Supplementary Examinations, May 2019
Radar Systems
(ECE)

Roll No									

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART-A (25 Marks)

1).	a	Explain what is meant by false alarm.	**[2M]**
	b	What is meant by minimum detectable signal.	**[3M]**
	c	Why Stationary objects are most easily detected by an FM system?	**[2M]**
	d	Calculate Doppler frequency of an aircraft moving with a speed of 550Knots when the CW radar is working with λ=8cm?	**[3M]**
	e	Describe the Early-late range gates with respect to Tracking in range.	**[2M]**
	f	Differentiate MTI and pulse Doppler Radar	**[3M]**
	g	Explain the frequency-response function of the filter	**[2M]**
	h	Discuss the efficiency of non-matched filters	**[3M]**
	i	Describe the coordinates are presented on a PPI scope?	**[2M]**
	j	Describe the noise figure of a receiver	**[3M]**

PART-B (50 MARKS)
SECTION-I

2	a)	A Pulse Radar transmits a peak power of 1 Mega Watt. It has a PRT equal to 1000 micro sec and the transmitted pulse width is 1 micro sec. Calculate (i)Maximum unambiguous range (ii) Average Power (iii)Duty Cycle (iv) Energy transmitted & (v) Bandwidth	**[6M]** **[4M]**
	b)	Discuss the relation between the signal to noise ratio, the probability of detection and the probability of false alarm	

OR

3	a)	Write the simplified version of radar range equation and explain how this equation does not adequately describe the performance of practical radar?	**[5M]**
	b)	Explain system losses will effect on the radar range?	**[5M]**

SECTION-II

4	a)	Analyze the factors that limit the amount of isolation between Transmitter and Receiver of CW Radar.	**[4M]**
	b)	Draw and explain the block diagram of CW Radar and write is applications.	**[6M]**

5   a) Discuss the effect of receiver bandwidth on the efficiency of detection and performance of a CW Doppler radar   **[6M]**

      b) Determine the Range and Doppler velocity of an approaching target using a triangular modulation FMCW Radar. Given : Beat frequency fb(up) = 15KHz and fb (down) = 25KHz , modulating frequency : 1MHz, Δf : 1KHz and Operating frequency : 3Ghz   **[4M]**

SECTION-III

6   Compare and contrast the situations with a Power amplifier and Power oscillator in the transmitter of a MTI system with neat block diagrams   **[10M]**

OR

7   Why is amplitude comparison mono pulse more likely to be preferred over the phase comparison mono pulse and conical scan tracker over sequential lobbing, or lobe switching tracker? Explain.   **[10M]**

SECTION-IV

8   Explain the principle and characteristics of a Matched filter. Hence derive the expression for it's frequency response function   **[10M]**

OR

9   Discuss the relation between the matched filter characteristics and correlation detection in detail   **[10M]**

SECTION-V

10   a) Derive an expression for the effective Noise figure of two cascaded networks.   **[5M]**

      b) Briefly explain the concept of beam steering of Phased array antennas   **[5M]**

OR

11   a) Write the applications, advantages and disadvantages of Phased Array Antennas .   **[6M]**

      b) Discuss the types of displays in RADAR   **[4M]**

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R13

Time: 3 hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a)	Define signal to noise ratio.	[2]
b)	What is maximum unambiguous range?	[3]
c)	Give the advantages of FM - CW radar.	[2]
d)	Write the applications of CW radar.	[3]
e)	What is butterfly shape on radar receiver?	[2]
f)	What is delay line canceller?	[3]
g)	Define squint-angle.	[2]
h)	List the disadvantages of sequential lobbing.	[3]
i)	Define noise temperature.	[2]
j)	Write about correlation function.	[3]

PART - B

(50 Marks)

2.a)	Describe the operation of radar block diagram.	
b)	Derive modified radar range equation.	[5+5]

OR

3.a)	Explain, how to minimize the false alarm.	
b)	With the help of expressions explain radar transmitter power.	[5+5]

4.a)	Draw and explain CW radar with nonzero IF receiver.	
b)	Write the merits and demerits of continuous wave radar.	[6+4]

OR

5.a)	With suitable waveforms discuss frequency time relationships in FM-CW radar.	
b)	Explain, how the various unwanted signals causes errors in FM altimeter.	[5+5]

6.a)	Describe the operation of MTI Radar with power oscillator transmitter.	
b)	Draw and explain three pulse canceller.	[5+5]

OR

7.a)	Write a short note on multiple pulse repetition frequencies.	
b)	What are the factors limits the MTI performance? Explain.	[5+5]

8.a) Describe the operation of conical scanning method.

b) Draw and explain the block diagram of one-coordinate amplitude–comparison mono pulse tracking radar. [5+5]

OR

9.a) In mono pulse radar two antennas are used to produce a phase difference of 25^0 between the echo signals. It operates at frequency of 1.5 GHz. Find the spacing between the antennas, if the angle $\theta=15^0.$

b) Discuss about acquisition and scanning parameters. [5+5]

10. Write a short note on
a) Derivation of matched filter characteristic.
b) Efficiency of non- matched filters. [5+5]

OR

11.a) Draw and explain balanced type duplexer.

b) Explain the merits and limitations of phased array antennas. [5+5]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, June - 2018
RADAR SYSTEMS
(Electronics and Communication Engineering)

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) List the applications of Radar. [2]
  b) Discuss in brief about Pulse Repetition Frequency(PRF) and range ambiguities. [3]
  c) List the characteristics of FM-CW Radar. [2]
  d) Give the principle of Doppler effect. [3]
  e) What is Staggered PRF? [2]
  f) Explain the operation of MTI Radar. [3]
  g) Explain about sequential lobing. [2]
  h) Give the principle of operation of conical scan. [3]
  i) What are the different types of antennas used in Radar? [2]
  j) Draw the block diagram of cross correlation receiver. [3]

PART - B

(50 Marks)

2.a) Obtain the Radar equation in terms of minimum detectable power and gains of transmitting and receiving antenna?
  b) Explain about integration of Radar pulses in detail. [5+5]

OR

3.a) Calculate the minimum pulse interval and pulse repetition frequency required for Radar to detect unambiguous targets up to a range of 125miles?
  b) Explain the terms integration loss and Radar cross section of a target. [5+5]

4.a) Explain range and Doppler measurement in FM-CW Radar.
  b) What is the major limitation of CW Radar and how it can be overcome? [5+5]

OR

5.a) Explain the principle of operation of FM-CW Radar with using side band super heterodyne Receiver.
  b) Briefly discuss the FM-CW altimeter. [5+5]

6.a) Give the principle operation of MTI Radar and pulse Doppler Radar.
  b) List and explain MTI Radar Parameters. [5+5]

OR

7.a) With the aid of the block diagram, explain fully operation of an MTI system using a power amplifier in the transmitter?
  b) How moving target is distinguish from stationary target? [5+5]

8.a) Differentiate single -delay-line canceller and double-delay-line canceller.
  b) Explain the concept of conical scan. [5+5]

OR

9. Describe different Radar tracking techniques. [10]

10.a) Discuss Matched filter receiver and derive Matched filter characteristics.
  b) Distinguish series feeds and parallel feeds. [5+5]

OR

11. List and explain the applications, advantages and limitations of phased array antennas.
[10]

---ooOoo---

R13

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) Describe various radar applications. [2]
 b) Calculate the range of a target, if the time taken by the signal to travel and return is 100 micro seconds? [3]
 c) Calculate the Doppler frequency of an aircraft moving with a speed of 550 Knots and when the CW radar is working with λ=8cms. [2]
 d) Write about Doppler principle. [3]
 e) What are the differences between Pulse radar and Pulse Doppler radar? [2]
 f) Write about MTI radar parameters. [3]
 g) Discuss the sequential lobing tracking antenna mechanism. [2]
 h) Briefly explain the tracking radar and search radar system. [3]
 i) Give the comparison between the efficiency of matched and non matched filters. [2]
 j) Discuss in brief measuring of noise figure. [3]

PART - B

(50 Marks)

2.a) What is minimum detectable signal? Calculate minimum receivable signal in a radar receiver that has an IF bandwidth of 1.5 MHz and a 9-dB noise figure.
 b) Discuss in brief the radar range equation and modified radar range equation. [5+5]

OR

3.a) Discuss the radar cross section of the targets : Sphere, Flat Plate, Triangular trihedral.
 b) Write about radar system losses. [5+5]

4. Draw a block diagram of the FMCW radar and explain its operation. [10]

OR

5. Discuss the following a) Non-Zero IF receiver b) Isolation between the transmitter and receiver. [10]

6.a) Explain MTI radar with a block diagram.
 b) Define the terms : Clutter attenuation, Sub-clutter visibility. [5+5]

OR

7.a) Discuss the principle of operation of Pulse Doppler Radar.
 b) Explain bind speed and the methods for reducing the effects of blind speed. [5+5]

8. Explain with the help of a block diagram amplitude comparison monopulse radars for extracting error signals in both elevation and azimuth. [10]

OR

9.a) Define tracking in range and explain the split gate tracker method.
  b) Explain the working of a monopulse radar with the help of a block diagram. [5+5]

10.a) What is meant by correlation? Explain cross correlation with the help of neat block diagram.
   b) A radar receiver is connected to a 30 ohm resistance antenna that has an equivalent noise resistance of 25 ohm. Calculate the noise figure of the receiver and the equivalent noise temperature of the receiver. [5+5]

OR

11.a) Write about radiation pattern of phased array antennas with suitable equations.
   b) Write about: i) beam steering ii) beamwidth of phased array antennas. [5+5]

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MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV B.Tech II Semester Examinations
WIRELESS COMMUNICATIONS AND NETWORKS (R15A0432)
(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks: 75marks

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer
FIVE Questions, Choosing ONE Question from each SECTION and
each Question carries 10 marks.

PART A (25 Marks)

1.
a) Write some examples for wireless communication system.   [2M]
b) Write a short note on cordless telephone systems?   [3M]
c) Define large scale propagation model?   [2M]
d) Explain about free space propagation model?   [3M]
e) What is Doppler shift?   [2M]
f) Explain impulse response model of a multipath channel?   [3M]
g) Write an IEEE standard name for Wi-Fi &Bluetooth?   [2M]
h) Explain Advantages & Disadvantages of WLAN?   [3M]
i) Define WLL?   [2M]
j) Explain briefly IEEE 802.11 medium access control?   [3M]

PART B (50marks)

2. a) Briefly explain mobile radio evolution.   [6M]

b) Briefly compare the common wireless communication systems.   [4M]

OR

3. a) Explain about 2G and 3G cellular networks.   [6M]

b) Explain about WLL and WLAN.   [4M]

4. a) Write a short note on Fresnel zone geometry and Knife edge diffraction model?   [6M]

b) Explain the terms signal penetration into buildings and Ray tracing and site specific
modeling?   [4M]

OR

5. a)Explain about reflection from perfect conductors and Ground reflection model.   [4M]

b) Explain any two outdoor propagation models.   [6M]

6. a) What are factors influencing small scale fading?   [4M]

b) Explain briefly about parameters of mobile multipath channels?   [6M]

OR

7. a) Explain different types of small scale fading?   [4M]

b) Explain briefly about Two -ray Rayleigh fading model?   [6M]

8. a) Explain different types of WLAN Topologies?   [5M]

b) Compare standards of I EEE 802.11 a, b, g and n standards?   [5M]

OR

9. a) Explain briefly IEEE 802.11 medium access control?   [5M]

b) Explain briefly about WLAN & WLL?   [5M]

10. a) Explain the functional requirements of HYPERLAN.   [5M]

b) Explain the functioning of WATM with basic architecture.   [5M]

OR

11. a)Explain about data oriented CDPD network.   [4M]

b) Write short note on GSM and GPRS   [6M]

MODEL PAPER –II

R15

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV B.Tech II Semester Examinations
WIRELESS COMMUNICATIONS AND NETWORKS (R15A0432)
(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks: 75marks

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
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FIVE Questions, Choosing ONE Question from each SECTION and
each Question carries 10 marks.

PART A (25 Marks)

1.

a)	Write a short note on cellular telephone systems?	[2M]
b)	Write a short note on 2G cellular systems?	[3M]
c)	What are the factors influencing small scale fading?	[2M]
d)	Name some of the outdoor propagation models?	[3M]
e)	What is Doppler spread?	[2M]
f)	What are statistical models for multiparty fading channels?	[3M]
g)	Define IEEE 802.11?	[2M]
h)	What are enhancements in IEEE 802.16?	[3M]
i)	Define HIPER LAN?	[2M]
j)	Explain briefly about Wireless ATM?	[3M]

PART B (50marks)

2. a) Briefly explain about paging systems.   [4M]

 b) Briefly explain modern wireless communication systems.   [6M]

OR

3. a) Write note on trends in cellular radio and personal communications.   [5M]

b) Write note on Bluetooth and PAN.   [5M]

4. a) Explain the basic propagation mechanisms.   [4M]

b) Explain any two indoor propagation models.   [6M]

OR

5. a)Write a note on reflection from dielectrics and Brewster angle.   [6M]

b) Explain Longley Ryce outdoor propagation model.   [4M]

6. a) Explain impulse response model of a multipath channel and derive relationship between bandwidth and received power. [6M]

b) Explain briefly about parameters of mobile multipath channels? [4M]

OR

7.a) Explain different types of small scale fading? [4M]

b) Explain clarets model for flat fading? [6M]

8.a) Write note on IEEE 802.11 architecture and services. [5M]

b)Write note on Bluetooth and IEEE 802.15 standard. [5M]

OR

9a) Explain briefly about IEEE 802.11 standards? [5M]

b)Explain briefly about different specifications of IEEE 802.15. [5M]

10.aWrite note on the specifications of HYPERLAN-2. [5M]

b) Write note on GPRS and higher data rates. [5M]

OR

11.a)Explain the similarities between HYPERLAN 1 and HYPERLAN 2. [6M]

b)Write short note on short messaging service in GSM. [4M]

IV B.Tech II Semester Examinations
WIRELESS COMMUNICATIONS AND NETWORKS (R15A0432)
(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks: 75marks

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer
FIVE Questions, Choosing ONE Question from each SECTION and
each Question carries 10 marks.

PART A (25 Marks)

1.
   a) Write a short note on paging systems?   [2M]
   b) Write a short note on WLANs?   [3M]
   c) What are the factors influencing small scale fading?   [2M]
   d) Write note on log-distance path loss model.   [3M]
   e) Define coherence Bandwidth.   [2M]
   f) Explain briefly about Level crossing and fading statistics.   [3M]
   g) Define Bluetooth.   [2M]
   h) Compare standards of I EEE 802.11 a, b, g and n standards.   [3M]
   i) Define WATM?   [2M]
   j) Write note on data oriented CDPD network.   [3M]

PART B (50marks)

2. a) Briefly explain about WLL and LMDS.   [4M]

   b) Briefly explain the evolution of mobile radio communication.   [6M]

                                    OR

3. a) Explain about different wireless communication systems.   [6M]

   b) Write note on 2G and 3G cellular networks.   [5M]

4. a) Explain knife-edge diffraction model and multiple knife-edge diffraction. [6M]

   b) Explain Okumura and Hata models.   [4M]

                                    OR

5. a)Write a note on indoor propagation models.   [6M]

   b) Explain free space propagation model.   [4M]

6. a) What are factors influencing small scale fading? [6M]

b) Explain briefly about Two -ray Rayleigh fading model? [6M]

OR

7. a) Explain briefly about parameters of mobile multiparty channels.

[4M]

b) Explain simulation of Clarke and Guns fading model? [6M]

8. a) Describe WLAN standards. [5M]

b) Write note on IEEE 802.15 logical link control and adaptation protocol. [5M]

OR

9a) Explain briefly about IEEE 802.11 medium access control layer. [5M]

b)Explain briefly about WLAN and Bluetooth. [5M]

10. a) Explain briefly about mobile data networks.

b) Write note on HYPERLAN specifications. [5M]

[5M]

OR   [6M]

11. a)Explain the frame format of Wireless ATM.

b) Write short note on mobile application protocols. [4M]

R15

MODEL PAPER –IV
MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV B.Tech II Semester Examinations
WIRELESS COMMUNICATIONS AND NETWORKS (R15A0432)
(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks: 75marks

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer
FIVE Questions, Choosing ONE Question from each SECTION and
each Question carries 10 marks.

PART A (25 Marks)

1. a) What is intersystem handoff?   [2]
b) Discuss about Longley-Ryce Model.   [3]
c) Define Brewster angle.   [2]
d) What are the Time Dispersion Parameters of Multipath channels?   [3]
e) Discuss about advantages and disadvantages of WLAN.   [2]
f) Discuss about Ericsson Multiple Breakpoint Model.   [3]
g) Define Adjacent-channel Interference.   [2]
h) Define equalization.   [3]
i) List the advantages of WLAN.   [2]
j) Write about Hiper Lan WLL.   [3]

PART - B (50 Marks)

2.   Explain the various types of Handoff processes available.   [10]
                                        OR

3.   Explain in detail about Trunking and Grade of Service.   [10]

4. a)   Explain knife Edge Diffraction Model.

   b)   With neat diagrams explain the Free Space Propagation Model.   [5+5]

                                        OR

5.   Derive the Impulse response model of a Multipath channel.   [10]

6.   Discuss in detail different types of small scale fading.   [10]

                                        OR

7. What is small scale fading? What are the factors influencing small scale fading? [10]

8. Explain LMS and Recursive Least Square algorithm.   [10]

OR

9. Derive the expression for Maximal Ratio Combining Improvement.   [10]

10. a) Draw the configuration of IEEE802.11 architecture.

    b) Explain the physical layer specifications of IEEE802.11 using infrared. [5+5]

OR

11. Compare and contrast IEEE 802.11 a, b, g and n standards.   [10]

Time: 3 Hours   Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks

- - -

1.a) Explain about the Public Switched Telephone Network (PSTN).
  b) Briefly explain evolution of mobile radio communication.   [7+8]

2.a) Explain the logic link control of Bluetooth.
  b) Bring out the salient features of third generation wireless networks.   [7+8]

3.a) Why sectorization of cell is very important and writes its advantages?
  b) What is hand-off process? Explain the hand-off mechanism?
  c) Prove that for a hexagonal geometry, the co-channel reuse ratio is given by
      $Q = \sqrt{3N}$, where $N = i^2 + ij + j^2$.   [4+4+7]

4.a) Distinguish between FDMA and SDMA with a neat sketches.
  b) Explain in detail the operation of spread spectrum multiple accesses.   [7+8]

5.a) Briefly explain about Traffic Routing in wireless networks.
  b) Discuss briefly about the development of wireless networks.   [7+8]

6.a) Explain how location and management is achieved in GPRS?
  b) Explain about packet and frame formats in IS-95.   [7+8]

7.a) Mention the functional requirements of Hyper LAN.
  b) Explain the functioning of WATM with basic architecture.   [7+8]

8.a) Differentiate between Single channel system and Multi channel system.
  b) Derive mathematical representation of OFDM signal.   [7+8]