

Hall Ticket Number :

R-17

Code: 7G17E

IV B.Tech. I Semester Supplementary Examinations July 2021

Computer Networks

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

	Marks	CO	Blooms Level
UNIT-I			
1. a) Illustrate each layer in OSI Model.	7M	1	3
b) Describe function of each layer in TCP/IP Model.	7M	1	2
OR			
2. a) Demonstrate PSTN structure with explanation.	8M	1	3
b) Discuss role of protocols & their standards referred in data communication.	6M	1	2
UNIT-II			
3. a) Demonstrate working of sliding window protocols.	7M	2	3
b) Describe CSMA/CD in detail.	7M	2	2
OR			
4. a) Summarize Multiple Access Protocols.	7M	2	2
b) Explain various IEEE 802.X frame formats.	7M	2	2
UNIT-III			
5. a) Compare adaptive and non-adaptive routing algorithms.	8M	3	5
b) Give Outline of an IP address? Discuss the class field in IP address.	6M	3	4
OR			
6. a) Define fragmentation and explain why the IP4 and IP6 protocols need to fragment some packets.	7M	3	1
b) Examine role of Congestion Control Algorithms in communication.	7M	3	3
UNIT-IV			
7. a) Show TCP and UDP Headers format with description.	8M	4	3
b) Draw the segment structure of TCP.	6M	4	4
OR			
8. a) Justify the performance issues in transport layer protocols.	7M	4	5
b) Discuss application of Transport layer in data communication.	7M	4	2
UNIT-V			
9. a) State advantages and limitations of public and secret key encryption.	6M	5	2
b) Draw basic model of FTP and its function in communication.	8M	5	4
OR			
10. a) Explain broadcast, point to point and Multipoint networks.	7M	5	2
b) Classify Cryptography with their applications.	7M	5	4

Hall Ticket Number :

R-17

Code: 7G674

IV B.Tech. I Semester Supplementary Examinations July 2021

Disaster Management

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

Marks	CO	Blooms Level
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UNIT-I

- | | | | | |
|-------|--|----|-----|----|
| 1. a) | Demonstrate natural disaster and man-made disaster, what are the effects of disasters on environmental health facilities and services. | 7M | CO1 | L2 |
| b) | Explicit an account on different approaches to disaster management and relation with human ecology. | 7M | CO1 | L2 |

OR

- | | | | | |
|-------|--|----|-----|----|
| 2. a) | Summarize the concept of first responder with special reference to the role of the government in first response. | 7M | CO1 | L1 |
| b) | Discuss various methods for rescuing affected persons in a disaster situation. | 7M | CO1 | L1 |

UNIT-II

- | | | | | |
|-------|--|----|-----|----|
| 3. a) | State epicenter and focus? Create with a neat diagram? Based on depth how many types of earthquake are classified. | 8M | CO2 | L1 |
| b) | Explore plate tectonic movements, describe landslides. | 6M | CO2 | L1 |

OR

- | | | | | |
|-------|--|----|-----|----|
| 4. a) | Explicit a note on man-made landslides. State what are the mitigation measures at the time of land-slides? | 7M | CO2 | L5 |
| b) | Explore various environmental Impacts of Volcanic Eruptions | 7M | CO2 | L5 |

UNIT-III

- | | | | | |
|-------|---|----|-----|----|
| 5. a) | Describe a flow chart of planetary and extra planetary hazard. | 6M | CO3 | L3 |
| b) | Elucidate the consequences of the phenomenon of drought? Summarize briefly. | 8M | CO3 | L3 |

OR

- | | | | | |
|-------|--|----|-----|----|
| 6. a) | Distinguish the difference between natural disaster and man-made disaster. | 7M | CO3 | L2 |
| b) | Examine the role of corporate social responsibility as an emerging avenue in managing disasters. | 7M | CO3 | L2 |

UNIT-IV

- | | | | | |
|-------|---|----|-----|----|
| 7. a) | What are the important steps in relief distribution and summarize the different types of damages that occur due to disasters. | 8M | CO4 | L4 |
| b) | Illustrate the floods hazards of India in the past years. | 6M | CO4 | L4 |

OR

- | | | | | |
|-------|--|----|-----|----|
| 8. a) | Explicit a note on floods and discuss its types and causes. | 6M | CO4 | L1 |
| b) | Summarize briefly the pattern of global population growth in recent years which is causing alarm to environmental experts. | 8M | CO4 | L1 |

UNIT-V

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|-------|--|----|-----|----|
| 9. a) | List out some guidelines for achieving sustainable development. | 6M | CO5 | L5 |
| b) | Explicit the methods to predict natural disasters and discuss the role of technology in disaster management. | 8M | CO5 | L5 |

OR

- | | | | | |
|--------|--|----|-----|----|
| 10. a) | Summarize the different types of damage reports. Identify the different types of rehabilitation. | 8M | CO5 | L3 |
| b) | Discuss the role of technology in disaster management. | 6M | CO5 | L3 |

Hall Ticket Number :									
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R-17

Code: 7GA71

IV B.Tech. I Semester Supplementary Examinations July 2021

Human Resource Management

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

Marks CO Blooms Level

UNIT-I

- | | | | |
|--|----|-----|---|
| 1. a) What is HRM? Explain its nature and Scope. | 7M | 1,2 | 1 |
| b) Explain HRM Operational Functions. | 7M | 1,2 | 2 |

OR

- | | | | |
|--|----|------|---|
| 2. a) What is Ethics? Enumerate the need of ethical aspects of HRM | 7M | 1, 2 | 4 |
| b) Differentiate personnel management and HRM | 7M | 1, 2 | 5 |

UNIT-II

- | | | | |
|--|----|---------|---|
| 3. a) Elicit the role of Human Resource Information System in an organization. | 7M | 6, 7 8 | 2 |
| b) What are the different factors affecting HRP. | 7M | 6, 7, 8 | 4 |

OR

- | | | | |
|---|----|---------|---|
| 4. a) Define Job Description. What items are typically included in the Job Description? | 7M | 6, 7, 8 | 1 |
| b) Describe Job Description and its importance. | 7M | 6, 7, 8 | 2 |

UNIT-III

- | | | | |
|--|----|------|---|
| 5. a) What is recruiting? Explain process and factors affecting recruitment. | 7M | 1, 4 | 4 |
| b) Write about the importance of internal recruitment methods. | 7M | 1, 4 | 2 |

OR

- | | | | |
|--|----|------|---|
| 6. a) Explain the emerging trends in Employee Selection Process. | 7M | 1, 4 | 2 |
| b) Define placement and orientation role in HRM | 7M | 1, 4 | 1 |

UNIT-IV

- | | | | |
|---|----|---------|---|
| 7. a) List and briefly explain each of the steps in the Training Process. | 7M | 3, 4,5 | 1 |
| b) Explain different methods of training. | 7M | 3, 4, 5 | 2 |

OR

- | | | | |
|--|----|---------|---|
| 8. a) Define the process of Career stages and Development | 7M | 3, 4,5 | 1 |
| b) List the advantages and disadvantages of training process | 7M | 3, 4, 5 | 1 |

UNIT-V

- | | | | |
|---|----|----------|---|
| 9. a) Define compensation? Explain various components of pay structures in India. | 7M | 3, 4, 5 | 1 |
| b) List out various types of compensation process | 7M | 3, 4, 5, | 1 |

OR

- | | | | |
|---|----|---------|---|
| 10. a) Write a note on Industrial Relations objectives, need and parties involved | 7M | 3, 4, 5 | 3 |
| b) Define the need of Performance Appraisal | 7M | 3, 4, 5 | 1 |

**Introduction to Wireless and Cellular
Communication****Roll No.**

Date: 17-07-2021

Duration: 3 Hrs.

Max. Marks: 75

Choose the correct Answer.

75 X 1 = 70 Marks

1. For a analogue signal with bandwidth 8kHz, the Nyquist sampling rate will be []
 a) 8000 samples/sec **b) 16000 samples/sec** c) 4000 samples/sec d) None of the above
2. Consider a speech signal with bandwidth 16KHz. Assuming Nyquist sampling and sub []
 sequent quantization to 16 bits per sample, the data rate of the sample d and quantized
 stream will be
 a) 256 kbps **b) 512 kbps** c) 96 kbps d) 32 kbps
3. A cellular signal is transmitted at a power level of 2 W. The power level in dBW and dBm []
 are
 a) 0 dBW and 30 dBm b) 2 dBW and 31 dBm **c) 3 dBW and 33 dBm** d) None of the above
4. If a cdma 2000 radio has a receiver thermal noise floor-108dBm, and the minimum signal- []
 to-noise ratio to detect the signal is 5dB, then the receiver sensitivity is
a) -103dBm b) -113dBm c) Insufficient data d) -108dBm
5. A cellular system is designed for a receiver sensitivity of -102 dBm. If the total path loss []
 permitted is 112 dB, and a fading margin of 20 dB, for a transmit power of -5dBW, the
 minimum receiver antenna gain must be
a) 5 dB b) 5 dBm c) 5 dBW d) None of the above
6. For the same battery capacity, rank the following devices in terms of longest battery life to []
 the shortest battery life
 A) one-way communications device(Rx only)
 B) cordless telephone
 C) Cellular phone
 D) 2-way Long Range IoT device(Rx and Tx, low rate)
 a) A,B,D,C b) D,A,B,C **c) A,D,B,C** d) None of the above
7. A cellular phone has a 900 milli-Amp-hour (mAH) battery. Assume that the cellular phone []
 draw s3 mA in idle mode and 300mA during a call. What is the maximum possible talk
 time?
 a) 1hour **b) 3hours** c) 30hours d) Insufficient data
8. If a WCDMA cellphone has a front-end receiver bandwidth of 10 MHz, and a Noise []
 Figure $F = 3 \text{ dB}$, the receiver Thermal Noise floor in dBm is
a) -101 dBm b) -131 dBm c) -99.2 dBm d) -19.2 dBm
9. A cellular phone has a 3000 milli-Amp-hour (mAH) battery. Assume that the cellular []
 phone draws 9 mA in idle mode and 900 mA during a call. What is the approximate
 battery life (in hours) if the user makes a 5-min call every hour?
 a) 40 hours b) 3.3 hours **c) 36 hours** d) None of the above
10. For a GSM system, the channel bandwidth is 200KHz.The down link frequency is at []
 955MHz, then the uplink frequency should beat
 a) 820MHz **b) 910MHz** c) 935MHz d) None of the above
11. An isotropic antenna is radiating at a frequency of 9MHz. What is the free space path loss []
 at a distance of 4kms from the transmitter antenna?
 a) 54dB b) 54dBW c) 61dB **d) 63.6dB**

12. Assuming Free space propagation model, If the transmit power is 100 mW and the received power is 10^{-8} mW, what is the carrier frequency if the distance between the transmitter and the receiver antennas is 3 km? []
 a) 561.5MHz b) 79.6MHz **c) 795.8MHz** d) 144.4MHz
13. Consider a transmitter antenna. The output power of the transmitter amplifier is 30W and the transmit antenna gain is 15dB. The feeder attenuation is 5dB. What is the EIRP (Equivalent Isotropic Radiated Power)? []
 a) **25dBW** b) 25dB c) 55dBW d) 55dB
14. Assuming Break-point propagation model, calculate the range over which signal can be transmitted securely when the total path loss available is 150dB. Carrier frequency is 900MHz and break point $d_{break}=100$ meters. Path loss exponent is $n=3.5$ []
 a) 8.8km b) 12.7km **c) 17.5Km** d) 30km
15. Find the gain of a parabolic antenna with radius 2 meters and efficiency factor $\eta=0.6$. The carrier frequency is 600MHz []
 a) 36.28dBi b) 17.39dBi c) 22.6dBi **d) 25.78dBi**
16. In a city, cell planning is done with clusters of size 4. There are 100 channels available per cell. Each cluster covers 4sq. km area. If the city spans over 100sq.km then calculate the capacity of the designed cellular system []
 a) 5000 **b) 10000** c) 1000 d) 12000
17. Consider a cellular network built with 7-cell clusters, then What is the co-channel reuse ratio for the cellular network []
 a) 3.46 b) 4.24 **c) 4.58** d) 5.29
18. Which of the following is not a valid cluster size (assume hexagonal cells)? []
 a) 7 b) 13 **c) 14** d) 19
19. Consider a cellular system consisting of 5 users. Each user makes an average of 3 calls per hour. Each call, on average, lasts for 4minutes. What is the total offered traffic (in Erlang)? []
 a) 0.5 Erlang **b) 1.0 Erlang** c) 1.5 Erlang d) 2.0 Erlang
20. Consider transmission @ 2GHz. If the user is moving at 10 m/s towards the base station, find the maximum Doppler shift []
 a) 3.33 Hz b) 33.33 Hz c) 6.66 Hz **d) 66.66 Hz**
21. In a normalized U-V coordinate system, consider two points with the following coordinates: Point A (1,2) and Point B (5,4). What is the actual distance between points A and B if the side of each hexagon is $R=1$ km []
 a) 5.3 km **b) 9.2 km** c) 28 km d) None of the above
22. Consider a multipath channel / system defined by $y(t)=\exp(-at)x(t)+\exp(bt-c)x(t-t_0)$, where $x(t)$ is the input to the system and $y(t)$ is the corresponding output. a, b, c are positive constants. The system is []
 a) Linear and Time-Invariant **b) Linear and Time-Variant**
 c) Not linear but Time-Invariant d) Non-linear and Time-Variant
23. In which of the following scenarios will the assumption of Rayleigh fading channel be valid? []
 a) **In the absence of Line of Sight component** b) In indoor environments
 c) In ultra-wide band systems d) In the presence of narrow antenna beams
24. Consider a Rayleigh pdf channel type with $\alpha = 2$. What are the mean and RMS values of the distribution respectively? []
 a) 0 and 1.31 **b) 2.25 and 2.83** c) 2.51 and 1.31 d) 3.76 and 4.24

25. Which of the following is/are multiplicative impairment(s)? []
 a) **Rayleigh Fading** b) Satellite system c) Thermal noise in receiver d) None of the above
26. If the receiver antenna was moving away from the fixed transmitter, Let the initial []
 distance between the transmitter and the receiver be $r_0 = 500$ metres. The speed of the receiver is $v = 60$ kmph and the transmitting frequency is $f_c = 900$ MHz. What is the maximum Doppler shift (magnitude)?
 a) 20Hz b) 30 Hz c) **50Hz** d) 80Hz
27. If the receiver antenna is fixed between the transmitter and a reflecting wall. Let the []
 distance between the transmitter and the reflecting wall be $d = 3$ Km. The distance between the transmitter and receiver is $r = 1$ km. The transmitting frequency is $f_c = 900$ MHz. Then what is the delay spread of the channel.
 a) $3.33 \mu\text{sec}$ b) $6.67 \mu\text{sec}$ c) **$13.34 \mu\text{sec}$** d) $20 \mu\text{sec}$
28. If the receiver antenna is fixed between the transmitter and a reflecting wall. Let the []
 distance between the transmitter and the reflecting wall be $d = 3$ Km. The distance between the transmitter and receiver is $r = 1$ km. The transmitting frequency is $f_c = 900$ MHz. Then what is the Coherent Bandwidth of the channel
 a) 50KHz b) **74.96KHz** c) 147KHz d) None of the above
29. If the receiver antenna is moving between the transmitter and a reflecting wall. Let the []
 distance between the transmitter and the reflecting wall be $d = 3$ Km. The distance between the transmitter and receiver is $r = 1$ km and the receiver is moving towards the wall with speed $v = 60$ kmph. The transmitting frequency is $f_c = 900$ MHz. What is the range of maximum Doppler Spread?
 a) 50Hz b) 74Hz c) **100Hz** d) 149Hz
30. Consider a cellular system designed with omni directional cells and with the far the []
 setpoint of the cell at a distance R and average signal power received at the cell edge $P_r(R) = P_{\min}$, where P_{\min} is the receiver sensitivity. Then the Outage Probability P_{outage} will be
 a) 0.0 b) **0.5** c) 1.0 d) In sufficient information to make the statement
31. If the log-normal shadowing has a Gaussian distribution with variance $\sigma^2 = 8\text{dB}$, what []
 should be the margin at the cell-edge in order to ensure that $P_{\text{outage}} = 0.1$. Given that $Q(1.282) = 0.1$
 a) 0.8dB b) 8dB c) **10.3dB** d) In sufficient information to compute the margin
32. A mobile communication system uses a DBPSK modulation scheme (Tx sends 0 at the []
 beginning of the transmission). Bit 0 is transmitted with phase and Bit 1 is transmitted with phase. If the following binary stream of data 0,0,1,1,0,1 has to be conveyed to the receiver. Which of the following is the correct bit stream that is sent to the transmitter after the Differential modulation.
 a) **0,0,0,1,0,0,1** b) 0,0,0,1,1,1,0 c) 1,0,1,0,1,1,1 d) 0,1,1,0,1,1,1
33. Consider a system that uses coherent QPSK modulation and detection scheme with 20 μs []
 symbol period for communication. The channel has a coherence time of 10 ms. If 100 symbols are being used for the purpose of channel estimation find the data rate?
 a) 40 kbps b) **80 kbps** c) 100kbps d) 160kbps
34. Which of the following can result in catastrophic error propagation? []
 a) Coherent modulation and coherent detection b) Differential modulation and differential detection
 c) Differential detection and coherent modulation d) **Coherent modulation and differential detection**

35. Calculate the BER of Coherent BFSK if average SNR = 10dB. Assume Rayleigh fading []
environment.
a) 0.015 **b) 0.044** c) 0.050 d) 7.83×10^{-4}
36. What is the Rice factor(k) for a channel with no Line of Sight (LOS) component? []
a) 0 b) 1 c) 2 d) 3
37. How does the Rice factor(k) change with an increase in the power of Line of Sight(LOS) []
component?
a) Decreases **b) Increases** c) Does not change d) None of the above
38. Consider a GMSK system with SNR=10dB. What should be the SNR in dB of a BPSK []
system such that the Bit Error Rate remains same as that of the GMSK system?
a) 7.55 **b) 8.45** c) 9.25 d) 11.55
39. An $m \times n$ inter leaver takes mn bits as input(code-bits),inserts the m column-wise into a $m \times []$
 n matrix, and the output bits(Tx. bits) are produced by reading the elements of this matrix
row-wise. Consider a 4×5 inter leaver at the transmitter. Which of the following blocks
can de- interleave (reverse-process of interleaving) the Tx. bits at the receiver
a) A 4×5 interleaver **b) A 5×4 interleaver** c) Any $i \times j$ interleavers. $t_{ij}=12$ d) None of the above
40. Consider two users U1 and U2. U1 is a pedestrian walkings lowly while U2 is travelling in []
a car at a much higher speed than U1. Which user will experience a more highly correlated
channel?
a) U1 b) U2 c) Both U1 and U2 will experience same channel d) None of the above
41. Consider a GSM system with channel bandwidth of 200 kHz operating across 10 MHz []
spectrum. Communication is happening using 2 GHz carrier. A vehicle is moving at 72
kmph. Find the approx. coherence time (in micro seconds) of the channel.
a) 964 b) 470 c) 2.20 **d) 1.34**
42. Consider a GSM system with channel bandwidth of 200 kHz operating across 10 MHz []
spectrum. Communication is happening using 2 GHz carrier. A vehicle is moving at 72
kmph. It is decided to incorporate Frequency hopping into the system. Find the hop rate to
avoid fades. (Assume there is at least one good GSM channel at any instant of time)
a) 517per second b) 640 per second **c) 746per second** d) 1034per second
43. Consider a GSM system with channel bandwidth of 200 kHz operating across 10 MHz []
spectrum. Communication is happening using 2 GHz carrier.
A vehicle is moving at 72 kmph. If V_{rms} is set as the threshold then find the expected fade
duration(in milli seconds)
a) 2.2 b) 2.6 **c) 5.1** d) 10.2
44. What does the term ‘Doubly Selective Channel’ imply? []
a) Time-varying, Frequency selective channel b) Time flat, Frequency selective channel
c) Time-varying, Frequency flat channel d) Time flat, Frequency flat channel
45. Given channel coherence time and coherence bandwidth are 2.5 us and 200 kHz []
respectively. BPSK modulation is used for communication to achieve 1Mbps throughput.
Which of the following is true about the channel(consider 1Mbps throughput)
a) Fast fading, frequency selective b) Slow fading, Frequency flat
c) Fast fading, Frequency flat **d) Slow fading, Frequency selective**
46. Given the maximum doppler shift in a channel is 100Hz. It is required to simulate the []
channel using Jakes model with 20 oscillators. Which of the following is not an oscillator
frequency?
a) 0Hz b) 98.70Hz c) 99.67Hz d) 100Hz

47. Which of the following is not true about the Walsh hadamard matrices? []
 a) Symmetric matrix b) Orthogonal matrix **c) Antisymmetric matrix** d) None of the above
 48. Selection diversity is not useful in which of the following scenarios []
 a) Few of the antennas are weak b) Antennas are correlated
 c) The antennas are very close to each other **d) All of the above**
 49. Which of the following statements is incorrect? []
a) Diversity gain is present in both fading and non-fading environments b) Antenna gain is present in both fading and non-fading environments
 c) Antenna gain causes a shift in the BER curve d) Diversity gain improves the statistics of the SNR in a way that reduces the BER
 50. What is the maximum array gain factor that can be obtained in the presence of M elements (receiver antennas)? []
 a) $M/2$ b) $M/2$ **c) M** d) 2M
 51. Which of the following is true regarding Channel State Information (CSI) for a TDD system? []
a) CSI can be estimated by the transmitter b) CSI needs to be feedback from the receiver to the transmitter
 c) CSI cannot be estimated by the transmitter d) None of the above
 52. Consider an AWGN channel with SNR=12.56dB. What is the capacity of the channel per unit bandwidth? []
a) 4.25 bits/sec/Hz b) 5.45bits/sec/Hz c) 6.18bits/sec/Hz d) 7.88bits/sec/Hz
 53. For a signal with unity average signal power, the capacity of the channel depend son []
 a) The modulation scheme **b) Symbol rate** c) Receiver sensitivity d) All of the above
 54. Which of these is a necessary condition for optimal power allocation []
 a) All channels will have good SNR **b) Channel State information known at the transmitter**
 c) Channel State information known at the Receiver d) None of the above
 55. What are the benefits of have multiple transmitter and multiple receivers in a wireless system? []
 a) Diversity benefit b) Capacity increases c) Signal to Interference ratio is improved d) All of the above
 56. What is the symbol duration for a DS-SS system with spreading factor $Q = 12$ and Chip duration 48 microseconds []
 a) 4 microseconds b) 8 microseconds c) 288 microseconds **d) 576 microseconds**
 57. What is the band width of a DS-SS system with spreading factor $Q=12$ and Symbol duration 4 microseconds? []
a) 3 MHz b) 5MHz c) 25MHz d) 250MHz
 58. Which of the following is not an advantage of DS-SS? []
 a) It reduces the effect of multipath b) It reduces the effect of Interference by introducing processing gain
c) It improves the SNR in an AWGN environment d) All of the above are advantages of DS-SS system
 59. Which of the following is not a primitive polynomial? []
 a) $1+x^3+x^4$ **b) $1+x^2+x^4$** c) $1+x^2+x^3$ d) $1+x+x^3$
 60. Consider m-sequences with $m=4$.What will be the number of zeros and ones respectively in the sequences? []

- a) 3 and 4 b) 5 and 10 c) **7 and 8** d) 15 and 16
61. What would be the result of auto correlation (as defined in the lecture) of an m-sequence []
with itself (i.e., with zero lag)?
a) -1 b) -0.25 c) 0.5 **d) 1**
62. Assume 2 random sequences, X and Y, each of length Q. What would be the cross []
correlation between these sequences when there is no lag, i.e. $R_{XY}[0] = ?$
a) 0 b) 1 c) **1/Q** d) Q
63. We are given a pulse $g(t)=1/(T)^{0.5}\text{rect}((t-T_2)/T)$. the first zero crossing of $|G(f)|$ i.e. the []
magnitude of G(f) occurs at
a) 1/T b) 2/T c) 1/3T d) 0
64. For a CDMA system, the target SINR is 10 dB and $I_{o, c} = 0.6 I_{i, c}$. The Voice Activity []
Factor is 0.4 and the length of the spreading sequence is $Q = 64$. What is the pole capacity
of the system?
a) 8 **b) 10** c) 12 d) 16
65. Which of the following could be a potential problem with the de-correlating receiver? []
a) Multi user interference b) Near far problem **c) Noise Enhancement** d) None of the above
66. Consider a MIMO system in which the channel transfer matrix(H) is known. Which of the []
following method scan be used if His nota square matrix?
a) Matrix in version **b) Singular value decomposition** c) Matrix conjugate d) Matrix transpose
67. Which of the following is/are the assumption(s)made in a MIMO system? []
a) The elements of channel transfer matrix(H) are zero mean complex Gaussian values b) The noise elements are complex additive white Gaussian with zero mean
c) The transmitted signal(X) elements are zero mean complex Gaussian values **d) All of the above**
68. It was shown that using DS-SS increases the bandwidth of the signal. What is the []
consequence of this increase in bandwidth?
a) Time resolution becomes smaller and as a result many multipath components can be received which can be combined using MRC diversity combining
b) Time resolution becomes larger and as a result many multipath components can be received which can be combined using MRC diversity combining
c) Time resolution becomes smaller and as a result very few multipath components can be received which can be combined using MRC diversity combining
d) Time resolution becomes larger and as a result very few multipath components can be received which can be combined using MRC diversity combining
69. Which of the following is/are true regarding the power allocation in a MIMO system? []
a) Channels with better SNR get higher power allocation b) Channels with poor SNR get higher power allocation
c) Channel state information at the transmitter is required for optimum power allocation **d) Both (a) and (c)**
70. What is the best strategy for power allocation if all the channels have poor []
a) Allocate all the power to the channel with the best SNR and zero power to the other channels b) Allocate equal power to all the channels
c) Both (a) and (b) d) None of the above
71. Which is the relation between Capacity and Mutual Information of a channel? []
a) Capacity is always \geq MI b) Capacity is always \leq MI
c) They are one and the same d) None of these

72. Consider a 16-QAM transmitter where all the symbols are equi-likely. What is the Entropy []
of the source in terms of number of bits per channel use?
a) 1 b) 2 c) 3 **d) 4**
73. What is the entropy in the above problem, if four of the 16-QAM symbols are transmitted []
twice as frequently as the other two symbols?
a) 1 b) 2.67 **c) 3.92** d) 4
74. What is the entropy of a variable with Gaussian distribution with mean, μ and Variance []
a) $\mu + \log(e^{-2})$ b) $\log(\mu^2 + e^{-2})$ c) $\log[e^{-2} + \mu^2]$ **d) $0.5 \log_2(2 + e^{-2})$**
75. Which of the following is NOT true about HH^* , where H is the channel transition matrix, []
‘*’ is the Hermitian operator.
a) HH^* is a square matrix b) HH^* is a not square matrix **c) $HH^* = H^*H$** d) None of these

Code: 7G371

IV B.Tech. I Semester Supplementary Examinations July 2021

Optical Fiber Communication

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

		Marks	CO	Blooms Level
UNIT-I				
1.	a) List the advantages of Optical fiber Communication than Conventional Tele Communication	7M	CO1	L1
	b) Differentiate Multimode Step Index and Multimode Graded Index fibers	7M	CO1	L2
OR				
2.	a) Describe the ray optics representation of Meridional rays	8M	CO1	L2
	b) Calculate the Critical angle, NA and Acceptance angle of the fiber whose Refractive index of Core is 1.49 and Cladding is 1.47	6M	CO1	L3
UNIT-II				
3.	a) Summarize working principle of Surface emitting LED with the help of diagram	7M	CO3	L2
	b) Interpret Direct and Indirect band gap materials used in light sources with diagrams	7M	CO3	L2
OR				
4.	a) Outline the Internal quantum efficiency and LED power with bulk recombination lifetime	7M	CO2	L4
	b) Analyze the Fabry-Perot Resonator Cavity Laser Diode	7M	CO3	L4
UNIT-III				
5.	a) Explain the operation of PiN photodiode with its structure	8M	CO4	L2
	b) Determine the Quantum efficiency and Responsivity of photo diode at an incident of 3×10^{11} photons with wavelength of $0.85\mu\text{m}$ and 1.2×10^{11} electrons collected at the terminals of the device	6M	CO4	L3
OR				
6.	a) Infer the SNR of the photo detector with mathematical expressions	8M	CO3	L4
	b) Identify the key requirements of Photodiode for Optical communication.	6M	CO3	L1
UNIT-IV				
7.	a) Illustrate different types of Non-linear scattering losses in optical fiber.	7M	CO2	L4
	b) Interpret the Effective number of modes a fiber can support by considering Critical radius of curvature	7M	CO2	L2
OR				
8.	a) Summarize the concept of Inter model dispersion of Multi-mode step index fiber with necessary mathematical relations	7M	CO2	L2
	b) How Coupling efficiency can be improved with Lensing schemes	7M	CO4	L1
UNIT-V				
9.	a) List the advantages and necessity of Wavelength Division Multiplexing	6M	CO4	L1
	b) Classify and discuss about the types of noises affecting the Signal to Noise Ratio	8M	CO3	L4
OR				
10.	a) Describe short notes on Multi-channel transmission techniques	7M	CO3	L2
	b) Discuss about Radio over fiber links.	7M	CO3	L2
