

Code No: **R1641041**

R16

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

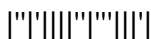
Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Define the radar cross section of a target and write the general formula for it. [3]
b) Write the applications of CW radar. [2]
c) What are the limitations of MTI radar? [2]
d) What are the differences between a search radar and a tracking radar? [3]
e) Describe the various noise components present in radar receiver. [2]
f) List out the various functions of a duplexer. [2]

PART-B (4x14 = 56 Marks)

2. a) What are the advantages of integration radar pulses? Derive the expression for integration efficiency. [9]
b) If the peak power of a radar is 100 KW, PRF is 1000 Hz, and the pulse width is 1 μ s, calculate the average power in dB. [5]
3. a) Draw the block diagram of FMCW radar and explain its operation. [7]
b) Estimate the range of a FMCW radar, if its frequency is modulated at a rate f_m over a range Δf , given $\Delta f=1.5$ kHz, $f_m=100$ kHz and the beat frequency is 40 Hz. [7]
4. a) Explain the operation of MTI radar with power oscillator transmitter with a neat block diagram. [7]
b) An MTI radar operates at 5GHz with a pulse repetition frequency of 900 Hz. Calculate the lowest three blind speeds of this radar. [7]
5. a) Explain the principle of sequential lobing with a neat diagram. [7]
b) Draw the block diagram of amplitude comparison monopulse tracking radar(two angular coordinate) and explain its operation. [7]
6. a) Derive the expression for frequency response function of a matched filter. [7]
b) Describe the relation between the noise figure and noise temperature of a radar receiver. [7]
7. a) Explain how a circulator acts a duplexer with a neat diagram. [7]
b) Ten linear array antennas are placed at a distance of 0.1 mm. the angle between the boresight and incoming waves is 30° . Find the array factor when the wavelength of the received signal is 0.5 cm. [7]



Code No: **R1641042**

R16

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

DIGITAL IMAGE PROCESSING

(Common to Electronics & Communication Engineering and Electronics & Instrumentation Engineering and Electronics & Computer Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Write short notes on neighbors of a pixel. [3]
b) Write short notes on image negative. [2]
c) Write the drawbacks of inverse filtering. [2]
d) Explain the need for image compression. [3]
e) What is the need for edge linking? [2]
f) What are the uses of color in image processing? [2]

PART-B (4x14 = 56 Marks)

2. a) Briefly explain the following mathematical tools used in image processing: [7]
(i) Linear versus Non linear operations (ii) Arithmetic operations
b) What are the advantages of image transform? Compare various transforms used in image processing. [7]
3. a) Discuss about intensity level slicing and bit plane slicing. [7]
b) Discuss about image smoothing using Gaussian lowpass filters. [7]
4. a) Discuss about estimation of degradation function using image observation and experimentation. [7]
b) Explain the principles of Computed Tomography. [7]
5. a) Draw the diagram of Block Transform coding and explain it. [7]
b) What is meant by Subband coding? Explain its use in image processing. [7]
6. a) Explain about edge detection using image gradient. [7]
b) Discuss about Morphological opening operation. [7]
7. a) Explain about converting colors from HSI to RGB. [7]
b) Discuss about histogram processing in color images. [7]



Code No: **RT41042**

R13

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

COMPUTER NETWORKS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) List out any three major differences between OSI and TCP/IP. [3]
- b) Write the advantages and disadvantages of any two transmission mediums used in physical layer. [4]
- c) Explain about Hamming distance with an example. [4]
- d) Convert the IP address whose hexadecimal representation is C22F1582 to dotted decimal notation. [4]
- e) List out the steps of RPC with a neat sketch. [4]
- f) Write in brief about the functioning of a name server. [3]

PART-B (3x16 = 48 Marks)

2. a) Explain in detail about the ARPANET. [8]
- b) Describe in detail about the functionalities of each layer in TCP/IP reference model. [8]
3. a) Describe about narrowband ISDN. [8]
- b) Write in brief about switching in ATM networks. [8]
4. a) Describe in detail about the ALOHA. [8]
- b) What is the need for error correcting codes? With a suitable example, explain about the Cyclic Redundancy Code for error correction. [8]
5. a) Describe the implementation of connectionless service and connection oriented service using datagram subnet and virtual circuit subnet respectively. Give a detailed comparison of both methods. [10]
- b) What is the need for packet fragmentation in internetwork? Discuss about the process in detail. [6]
6. a) Explain the need and process of flow control and buffering in Transport Layer. [8]
- b) Describe the connection releasing mechanism(s) in Transport Layer. [8]
7. a) Explain in detail about Quantum cryptography. [8]
- b) What is POP3? Describe its working in detail. [8]



Code No: R1641043

R16

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

COMPUTER NETWORKS

(Common to Electronics & Communication Engineering and Electronics & Instrumentation Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Explain about MAN. [2]
b) What is the difference between TDM & FDM? [3]
c) What are the design issues of Data Link layer? [2]
d) List the key requirements for wireless LANs. [2]
e) Define Congestion. What are the general Principles of Congestion? [3]
f) Mention the record types of DNS resource record. [2]

PART-B (4x14 = 56 Marks)

2. a) Explain different Network Topologies. [7]
b) Write about peer-to-peer processes and encapsulation concepts in OSI model. [7]
3. a) Explain the frequency division multiplexing with a neat sketch. [7]
b) What are the elementary data link protocols? Explain. [7]
4. a) What is the need of Flow control? Describe the stop & wait protocol. [7]
b) In the Hamming code for a data unit of 'm' bits, how do you compute the number of redundant bits 'r' needed? Explain with an example. [7]
5. a) Explain about the 802.11 Architecture. [7]
b) Explain the working of Multiple Access Protocols. [7]
6. a) With an example explain the shortest path routing algorithms used in computer networks. [7]
b) Explain Distance Vector routing algorithm with an example. [7]
7. a) Explain the structure of UDP Header format. [7]
b) Discuss the role played by the message transfer agent. [7]



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Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

DIGITAL IMAGE PROCESSING

(Common to Electronics and Computer Engineering, Electronics and Communication Engineering and Electronics and Instrumentation Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) What is Mach band effect? [4]
b) Explain intensity level slicing. [4]
c) Define impulse noise and its PDF. [3]
d) Explain Additive and subtractive primaries in color image processing. [3]
e) Short note on Huffman coding. [4]
f) What is need of filling holes. [4]

PART-B (3x16 = 48 Marks)

2. a) Explain the need of Arithmetic and Logical operations performed on images. [8]
b) Explain basic principle of KL transform and its properties. [8]
3. a) Discuss image smoothing in frequency domain with suitable expressions to obtain the desired details of an image. [8]
b) Develop a procedure to perform histogram matching. [8]
4. a) What is meant by constrained least square filtering? also give the differences between constrained and unconstrained least square filtering in image restoration. [8]
b) Explain how image degradation is carried out using [8]
i) Observation ii) Experiment iii) Mathematical modeling.
5. a) Discuss basics of full color image processing. [8]
b) Explain Noise and compression concepts in color image processing. [8]
6. a) Discuss the fast wavelet transform. [8]
b) Explain digital image water marking with neat sketch. [8]
7. a) Discuss the edge detection and linking with necessary expressions. [8]
b) Explain grey-scale morphology. [8]



Code No: **R1641044**

R16

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

OPTICAL COMMUNICATIONS
(Electronics & Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

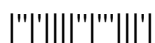
Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) List out the components required to design an optical Communication system? [2]
- b) If OF cable offers the attenuation loss is 2dbkm^{-1} , and the overall length is 10km Splices loss per km is 1 dB. Calculate the overall signal attenuation? [3]
- c) List out the types of mis-alignment when joining optical fibers? [2]
- d) Discuss the major advantages with LED as a source in optical Fibre communication? [3]
- e) Define thermal noise? How can it suppress? [2]
- f) List out the basic Parameters of WDM? [2]

PART-B (4x14 = 56 Marks)

2. a) Write a short notes on effective refractive index? [7]
- b) A silica optical fiber with a core diameter large enough to be considered by ray Theory analysis has a core refractive index of 1.50 and a cladding Refractive index of 1.47 Determine (i)The critical angle at the core-cladding interface (ii)The NA for the fiber (iii)the acceptance angle in air for the fiber [7]
3. a) Explain the properties of a Halide and Active glass materials? [7]
- b) Explain about material absorption in silica glass fiber? [7]
4. a) Explain the working of Expanded beam connectors? [7]
- b) A Graded index fiber has parabolic refractive index profile ($\alpha=1.5$) and core Diameter of $100\mu\text{m}$. Estimate the insertion loss due to a $5\mu\text{m}$ lateral misalignment at a fiber joint when there is index matching and assuming there is uniform illumination of all guided modes only [7]
5. a) Explain the external quantum efficiency in laser diode? [7]
- b) Explain the modulation of an LED system? [7]
6. a) Explain the working principle of receiver configuration? [7]
- b) Explain the function of digital signal transmission? [7]
7. Explain about i)Link power budget ii)Attenuation measurement [14]



Code No: **RT41044**

R13

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

COMPUTER ARCHITECTURE & ORGANIZATION

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) Convert the decimal number 67.485 into binary [3]
b) What is three state logic? [4]
c) Define control memory [4]
d) Explain write through method and write back method for writing to cash [4]
e) Explain the concept of cycle stealing [3]
f) Define parallel processing [4]

PART-B (3x16 = 48 Marks)

2. a) Explain the hardware implementation of signed - magnitude addition and subtraction [8]
b) Explain about different error detection codes [8]
3. a) Explain in detail about arithmetic circuit [8]
b) Explain all the steps in instruction cycle [8]
4. Explain the difference between hardwired control and micro programmed control. [16]
Is it possible to have a hardwired control associated with a control memory?
Explain
5. a) Write about magnetic disks and magnetic tape [8]
b) How many 128 X 8 RAM chips are needed to provide a memory capacity of 2048 bytes [8]
6. a) What input - output processor? What is it's functionality. [8]
b) Write about asynchronous serial transfer. [8]
7. a) Explain instruction pipeline. [8]
b) Define inter process arbitration and also differentiate serial arbitration and parallel arbitration [8]



Code No: **R164104A**

R16

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

TELEVISION ENGINEERING

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Why is scrambling needed in Television system? [2]
b) Justify the choice of negative modulation for TV transmission [2]
c) What do you understand by PAL –D Colour system? [3]
d) List some merits of high definition television [2]
e) What is Transport Stream Demultiplexing? [2]
f) What is “interoperability” and how does it relate to metadata? [3]

PART-B (4x14 = 56 Marks)

2. a) Describe how the flicker is solved by interlaced scanning? [7]
b) Explain the terms: i) primary colours ii) complementary colours iii) additive colour mixing. [7]
3. a) Discuss the factors that affect the bandwidth and resolution and explain the types of resolution and bandwidth in detail. [7]
b) Draw the structure and explain the raster scanning. [7]
4. a) Explain about FM Sound detectors. [7]
b) Explain the principle and operation of 180° PAL–SWITCH circuitry. [7]
5. a) Mention four special features of Digital TV which cannot be easily incorporated in analog TV. [7]
b) Discuss about H.264. [7]
6. a) With neat sketch explain Digital TV Receiver [7]
b) Discuss about Cable DTV Standards. [7]
7. a) What are the emerging technologies and standards? Explain. [7]
b) Write short notes on Technology and Standards Development. [7]



Code No: R164104B

R16

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

ELECTRONIC SWITCHING SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) What are the unique features of cross bar switches? [3]
- b) Define Synchronous duplex mode [3]
- c) What is the significance of Combination Switching? [2]
- d) What is Transmission Plan? [2]
- e) Define the term traffic intensity. [2]
- f) Explain the ISDN services [2]

PART-B (4x14 = 56 Marks)

2. a) List the various signaling tones available on telephone exchange. [7]
- b) Explain the functions of a switching system with signal exchange diagram [7]
3. a) Explain various modes of SPC and compare their availability [7]
- b) Distinguish between single stage and multistage networks [7]
4. a) With the help of neat diagram explain the basic mechanism of Time division switching. [7]
- b) Describe various blocking probability evaluation techniques. [7]
5. a) What are the three forms of signaling? Compare in-channel signaling with common channel signaling. [7]
- b) Explain with neat diagram the protocol architecture of SS7. [7]
6. a) Discuss about Lost Calls Cleared (LCC) System with relevant mathematical expressions [7]
- b) A PBX has 4 operators and receives 300 calls during a busy hour. The average holding time is 36 seconds. Assume that call arrivals are poissonian and service time is negative exponential distribution. Calculate (a) the percentage of calls on queue (b) average delay (c) percentage of calls delayed for more than 45 seconds, 30 seconds and 20 sec. [7]
7. a) Explain with neat diagram, the PRI concept. Explain the PRI frame format. [7]
- b) Write short notes on Voice Data Integration [7]



Code No: **RT41045**

R13

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

ELECTRONIC SWITCHING SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) Describe Simple Telephone Communication. [3]
- b) List the advantages of Centralized SPC. [4]
- c) Explain about the Customer Line Signaling. [4]
- d) Discuss the significance of Broadband Networks. [4]
- e) What is meant by Call Packing. [4]
- f) List the motivations for ISDN. [3]

PART-B (3x16 = 48 Marks)

2. a) Explain the design considerations of Touch Tone Dial Telephone. [8]
- b) Illustrate about the Cross bar Exchange. [8]
3. a) Distinguish between single stage and multi stage space division networks. [8]
- b) Determine the Switch advantage Ratio of a three stage network with N inlets and N outlets for the cases when (i) N=148 and (ii) N= 43746. [8]
4. a) Describe in detail about the Digital Customer Line Signaling. [8]
- b) What are the factors that limit the length of subscribers loop? Discuss them. [8]
5. a) With neat sketch explain the telecommunication network topologies. [8]
- b) Write the comparisons of Circuit switching, Packet switching and Virtual circuit switching concepts. [8]
6. a) Discuss about Application of Graph Theory to link Systems. [8]
- b) Describe about the Strict- Sense non-blocking Networks. [8]
7. a) Explain the interactive and distributive services of Broadband ISDN. [8]
- b) Discuss about Expert Systems in ISDN. [8]



Code No: RT41048

R13

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

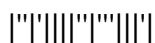
Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) Define maximum unambiguous range of Radar. [3]
- b) What are the various applications of CW Radar? [3]
- c) Write the differences between the MTI and Pulse Doppler Radar. [4]
- d) Define the beam width and directivity of an antenna and the expression for them. [4]
- e) What are the various feeds used for phased array antennas. [4]
- f) Define noise figure and write the expression for noise figure of a receiver consisting of n networks in cascade. [4]

PART-B (3x16 = 48 Marks)

2. a) What are the types of integration of radar pulses? Explain. [8]
- b) Derive the expression for the range of monostatic radar. [8]
3. a) What are the various system losses in Radar? Explain. [8]
- b) Explain the range and Doppler measurement in FMCW radar. [8]
4. a) What are the functions of a delay-line canceller? Explain the double delay-line canceller. [8]
- b) With help of a neat diagram, explain the operation of range gated Doppler filters. [8]
5. a) Explain the working principle of amplitude comparison monopulse tracking radar with a neat diagram. [8]
- b) What are the different types of lens antennas? Explain any one. [8]
6. a) Derive the expression for the frequency response of matched filter. [8]
- b) Explain the operation of constant false alarm rate receiver. [8]
7. a) Explain the different types of displays used for radar. [8]
- b) What are the different functions of duplexers? Explain the branch type duplexer with a neat diagram. [8]



Code No: **R164104D**

R16

Set No. 1

IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

EMBEDDED SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

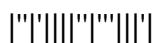
Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Discuss Testability Quality attributes of embedded systems. [3]
- b) Explain the usage of Buffers in embedded hardware circuit. [2]
- c) Write the drawbacks of assembly level language. [2]
- d) Define scheduler. [2]
- e) What are the advantages of simulator based debugging? [2]
- f) What is the difference between interpreters and compilers. [3]

PART-B (4x14 = 56 Marks)

2. a) What is an Embedded system? Give the classification of embedded systems. [7]
- b) Discuss the following Operational Quality attributes of embedded systems: [7]
 - i. Response
 - ii. Security
3. a) What is the Synchronous Communication? Discuss different ways of Synchronization. [7]
- b) Discuss in detail about wireless devices [7]
4. a) What is ISR? And discuss the features of ISR [6]
- b) Explain briefly about device driver programming [8]
5. a) Write short note on Shared Memory concept. [7]
- b) What are the issues to be considered in Hardware software co-design? Explain [7]
6. a) State the uses of assembler and disassembler in embedded application development. [7]
- b) Explain in detail about Embedded software development-process. [7]
7. a) Explain in detail about how testing will be done on host machine. [7]
- b) Discuss Simulators and Interpreters in detail. [7]



IV B.Tech I Semester Advanced Supplementary Examinations, May - 2022

OPTICAL COMMUNICATION

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

*Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any THREE questions from Part-B*

PART-A (22 Marks)

1. a) Distinguish between optical fiber communication system and conventional communication system. [4]
- b) Write in detail about glass fibers. [3]
- c) Mention the splicing techniques. [3]
- d) Draw the LASER diode characteristics. [4]
- e) List the factors involved in launching optical power from a light source to a fiber. [4]
- f) Write short notes on Eye pattern. [4]

PART-B (3x16 = 48 Marks)

2. a) Explain about step index and graded index fiber structures. [8]
- b) An optical fiber has a NA of 0.20 and a cladding refractive index of 1.59. Determine i) the acceptance angle for the fiber in water which has a refractive index of 1.33 ii) critical angle at the core cladding interface [8]
3. a) What are the basic attenuation mechanisms in the optical fiber communication. Explain in brief. [8]
- b) With the help of relevant expressions, explain pulse broadening mechanism in graded index fibers. [8]
4. Explain briefly about the optical fiber connectors with neat diagram. [16]
5. a) With respect to LED what is internal quantum efficiency and derive the expression for the life term reduction caused by interfacial recombination. [8]
- b) Write short notes on optical detectors. [8]
6. a) What are pre-amplifiers? Describe the different types of preamplifier with suitable diagrams. [8]
- b) Derive an expression for receiver sensitivity. [8]
7. a) Give an account of fiber optical link power budget with an example. [8]
- b) Discuss about a bidirectional WDM system. [8]

