

USN

--	--	--	--	--	--	--	--	--	--

10EC/TE71

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Computer Communication Network

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

1.
 - a. With layer diagram, explain the responsibility of each layer in OSI model. (09 Marks)
 - b. Explain the operation of ADSL using discrete multitone modulation with a neat diagram. (06 Marks)
 - c. List different types of addressing in TCP. Explain any one type of addressing with a suitable example. (05 Marks)
2.
 - a. Distinguish character stuffing and bit stuffing, with an example. (04 Marks)
 - b. Explain different HDLC frames. (06 Marks)
 - c. What are sliding window protocols? Design Go-Back-N ARQ protocol for noisy channel. (10 Marks)
3.
 - a. Explain non persistent, l-persistent and p-persistent with flow diagram. (06 Marks)
 - b. Explain Token passing as a controlled access technique. (04 Marks)
 - c. With a suitable example, explain data communication on a CDMA/CD network. Also list the properties of chip Sequences. (10 Marks)
4.
 - a. Explain addressing mechanism used in IEEE 802.11. (06 Marks)
 - b. Explain the standard Ethernet physical layer implementation of, (i) 10 base 2 (ii) 10 base 5 (iii) Twisted pair Ethernet (iv) Fibre Ethernet. (08 Marks)
 - c. Explain the IEEE 802.3 MAC frame format of standard Ethernet. (06 Marks)

PART – B

5.
 - a. Explain spanning tree algorithm with graphical representation. (06 Marks)
 - b. Explain the characteristics of VLAN used to group stations and explain them briefly. (06 Marks)
 - c. Explain the following interconnecting devices:
(i) Repeater (ii) Bridges (iii) Router (iv) Gateway (08 Marks)
6.
 - a. Compare between IPV4 and IPV6 extension headers. (06 Marks)
 - b. Describe three strategies devised by IETF to help transition from IPV4 to IPV6. (06 Marks)
 - c. An ISP is granted a block of address strating with 190.100.0.0/16 the ISP needs to distribute these addresses to three group of customers as follows:
i) The first group has 64 customers, each need 256 addresses.
ii) The second group has 128 customers, each need 128 addresses.
iii) The third group has 128 customers, each need 64 addresses.
Design sub blocks and find out how many addresses are still available after these allocations. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 7 a. Write short notes on :
- i) Forwarding process. (15 Marks)
 - ii) Address aggregation. (05 Marks)
 - iii) Dynamic routing table. (05 Marks)
- b. What are the basis for classification of four types of links defined by OSPF? (05 Marks)
- 8 a. With a neat diagram, explain briefly connection establishment, data transfer, connection termination and half close connection in TCP. (12 Marks)
- b. With regards to DNS in internet,
- i) Explain briefly recursive and iterative resolution. (08 Marks)
 - ii) Query and response messages. (08 Marks)

* * * * *

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10EC/TE72

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Optical Fiber Communications

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

1.
 - a. What are the advantages and disadvantage of optical fiber communication? (07 Marks)
 - b. Derive necessary mathematical condition that the angle of incidence “ θ ” must satisfy for the optical skew ray to propagate in a step index fiber. (08 Marks)
 - c. Calculate the number of modes of an optical fiber having diameter of 50 μm , $n_1 = 1.48$, $n_2 = 1.46$ and wavelength ‘ λ ’ of 820 nm. (05 Marks)
2.
 - a. Explain the different types of absorption losses in optical fiber. (06 Marks)
 - b. Derive an expression for pulse spreading due to material dispersion which is a function of wavelength and time delay. (08 Marks)
 - c. Explain the different types of bending losses in optical fiber. (06 Marks)
3.
 - a. Draw the cross section of GaALAS double hetero structure LED energy band diagram and refractive index variation. Explain their importance. (07 Marks)
 - b. Derive an expression for lasing condition and hence for optical gain in LASERS. (08 Marks)
 - c. With proper sketch briefly explain the structure of RPAD photodiode. (05 Marks)
4.
 - a. Show that optical power coupled into a step index fiber due to an LED with lambertian distribution is given by $P = P_s(NA)^2$ for $r_s \leq a$, with usual notations. (07 Marks)
 - b. What are different types of mechanical misalignments? (05 Marks)
 - c. Explain briefly the various fiber splicing techniques. (08 Marks)

PART – B

5.
 - a. With neat diagram, explain the operation of transimpedance preamplifier equivalent circuit. (06 Marks)
 - b. Derive an expression for receiver sensitivity and also explain quantum limit. (08 Marks)
 - c. Discuss how the eye diagram is powerful measurement tool for assessing the data handling capability in digital transmission system. (06 Marks)
6.
 - a. Explain with block diagram, the elements of analog link. List the signal impairments in analog systems. (06 Marks)
 - b. Explain sub-carrier multiplexing techniques in optical fiber communication. (04 Marks)
 - c. Briefly explain the rise time budget analysis with its basic elements contribute to system risetime. (10 Marks)
7.
 - a. With a neat sketch, explain WDM scheme. (05 Marks)
 - b. Derive an expression for difference in length in MZI multiplexers. (09 Marks)
 - c. Write a note on optical add | drop multiplexers. (06 Marks)
8.
 - a. Explain in detail the amplification mechanism with energy level diagram in an EDFA. (10 Marks)
 - b. With suitable diagram describe SONET/SDH optical network function. (10 Marks)

* * * * *

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10EC73

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017

Power Electronics

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART - A

1. a. Explain five types of power electronic converter circuits briefly. Also indicate two applications of each type. (10 Marks)
 b. What are the peripheral effects of power electronics equipments? (06 Marks)
 c. Give symbol, and characteristic features of the following devices: i) GTO; ii) TRIAC. (04 Marks)
2. a. What is the necessity of base drive control in a power transistor? Explain proportional base control. (08 Marks)
 b. The bipolar transistor of Fig.Q.2(b) is specified to have β in the range 8 to 40. The load resistance is $R_C = 11\Omega$. The dc supply voltage is $V_{CC} = 200V$ and the input voltage to the base circuit is $V_B = 10V$, $V_{CE(sat)} = 1V$ and $V_{BE(sat)} = 1.5V$. Find:
 i) The value of R_B that results in saturation with an overdrive factor of 5.
 ii) The forced β_F .
 iii) The power loss P_T in the transistor. (08 Marks)

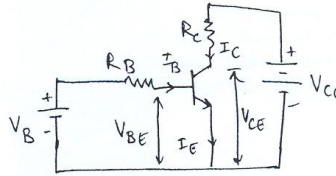


Fig.Q.2(b)

- c. Give the comparison between MOSFET and IGBT. (04 Marks)
3. a. Draw the two transistor model of a thyristor and derive an expression for the anode current in terms of the common base current gain α_1 and α_2 of the transistors. (10 Marks)
 b. An UJT is used to trigger the thyristor whose minimum gate triggering voltage is 6.2V. The UJT ratings are: $\eta = 0.66$, $I_P = 0.5mA$, $I_V = 3mA$, $R_{B1} + R_{B2} = 5k\Omega$, leakage current = 3.2mA, $V_P = 14V$ and $V_V = 1V$. Oscillator frequency is 2kHz and capacitor $C = 0.04\mu F$. Design the complete circuit. (10 Marks)
4. a. With a neat circuit diagram and waveforms, explain the working of a single phase full converter feeding highly inductive load. Derive the expression for the average output voltage and rms output voltage. (10 Marks)
 b. With a neat circuit diagram and waveforms, explain the principle of operation of dual converter with circulating current. (04 Marks)
 c. What are the advantages and drawbacks of circulating current mode of operation of a dual converter? (06 Marks)

PART – B

- 5 a. Explain the working of step down choppers with waveforms and derive the equation for output voltage. (06 Marks)
- b. Explain the working of boost regulator and derive the expression for average output voltage. (06 Marks)
- c. A buck regulator has an input voltage of 12V. The required average output voltage is 5V at $R = 5\Omega$ and peak-to-peak output ripple voltage is 20mV. The switching frequency is 25kHz. If the peak-to-peak ripple current of inductor is limited to 0.8A, determine: i) duty cycle; ii) filter inductance L; iii) Filter capacitance; iv) Critical values of L and C. (08 Marks)
- 6 a. What do you mean by commutation? With necessary circuit and waveforms, explain self commutation scheme. (10 Marks)
- b. With a neat circuit diagram and waveforms, explain the auxiliary commutation (impulse commutation). (10 Marks)
- 7 a. Explain the working of ON/OFF controllers and derive an expression for output rms voltage. (06 Marks)
- b. An ACVC is provided with a load of 10Ω , supplied with an AC voltage of 120V, 50Hz with 25 cycles ON and 75 cycles OFF. Calculate the power dissipated in the resistance, rms current in each of the SCR's and average current in each of the SCR's. (06 Marks)
- c. A single phase full wave AC controller has a load resistance of $R = 10\Omega$ and input voltage of 120V, 60Hz. The delay angle for both the thyristors is $\pi/2$. Determine rms value of output voltage, input power factor and average thyristor current. (08 Marks)
- 8 a. Explain single phase half bridge inverter with R-load with necessary circuit diagram and waveforms. Derive the equation for rms output voltage. (08 Marks)
- b. Explain the performance parameters of inverters. (08 Marks)
- c. Give the comparison between voltage source inverter and current source inverter. (04 Marks)

* * * * *

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10EC74

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Embedded System Design

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

1.
 - a. Explain a microprocessor based embedded system with diagram. (08 Marks)
 - b. With necessary block diagram, explain the embedded system life cycle. (08 Marks)
 - c. Explain the important steps in developing an embedded system. (04 Marks)
2.
 - a. Analyze how errors propagate under : (i) Addition process (ii) Multiplication process. (08 Marks)
 - b. With the help of diagram, explain
 - (i) Index mode data transfer operation. (08 Marks)
 - (ii) Program counter relative operation. (08 Marks)
 - c. With timing diagram, explain (i) Writing to a register (ii) Reading from a register. (04 Marks)
3.
 - a. With diagram, explain direct mapping implementation and associative mapping cache implementation. (08 Marks)
 - b. With diagram, explain the operation of DRAM. With timing diagram, explain read operation. (08 Marks)
 - c. Explain the concept of dynamic memory allocation. (04 Marks)
4.
 - a. Develop hardware and software specification for designing a counter and give data control flow diagram. (08 Marks)
 - b. With diagram explain (i) Water fall life cycle model (ii) Spiral life cycle model. (08 Marks)
 - c. Compare functional model and architectural model. (04 Marks)

PART – B

5.
 - a. Explain how memory is managed at,
 - (i) System level (ii) Process level. (08 Marks)
 - b. Explain operating system architecture with diagram. (08 Marks)
 - c. Explain multithreaded OS. (04 Marks)
6.
 - a. Organize general purpose registers as,
 - (i) Four different contexts (ii) Overlapping contexts. (08 Marks)
 - b. Explain the structure of TCB with diagram. (08 Marks)
 - c. With diagram, explain real time stack and application stack. (04 Marks)
7.
 - a. Analyze the basic flow of control construct in, (i) Constant time statements (ii) Sequence of statements (iii) For loops (iv) While loops. (08 Marks)
 - b. Explain the 3 methods used to compute time loading. (08 Marks)
 - c. What is a co-routine? Explain. (04 Marks)
8.
 - a. Explain a typical memory map with diagram and explain the design of memory map with reference to memory loading. (08 Marks)
 - b. Explain caches and their performance. (08 Marks)
 - c. Write explanatory note on hardware accelerators. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10EC751

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
DSP Algorithms and Architecture

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. An analog signal is sampled at the rate of 8KHz. If 512 samples of this signal are used to compute DFT $x(k)$, determine analog and digital frequency spacing between adjacent $x(k)$ elements. Also, determine analog and digital frequencies corresponding to $k = 64$. (06 Marks)
- b. With a neat block diagram, explain scheme of a DSP system. (08 Marks)
- c. Let $x[n] = [3, 2, -2, 0, 7]$. It is interpolated using an interpolation filter $b_k = [0.5, 1, 0.5]$ with interpolation factor 2. Determine the interpolated sequence. (06 Marks)
- 2 a. With a neat block diagram, explain arithmetic logic unit (ALU) of a DSP system. (06 Marks)
- b. Explain the operation of barrel shifter, with an example. (05 Marks)
- c. Explain : i) circular addressing mode ii) parallelism iii) Guard bits. (09 Marks)
- 3 a. Explain functional architecture of TMS320C54XX processor, with a block diagram. (10 Marks)
- b. Explain the addressing modes of TMS320C54XX processor. Give examples. (10 Marks)
- 4 a. Explain the following assembler directives of TMS320C54XX processors.
i) `.mmregs` ii) `.global` iii) `.include 'xx'` iv) `.data` v) `.end` vi) `.bss` (06 Marks)
- b. Describe Host port interface and explain its signals. (06 Marks)
- c. Write an assembly language program of TMS320C54XX processors to compute the sum of three product terms given by the equation, $y(n) = h_0 x(n) + h_1 x(n-1) + h_2 x(n-2)$ with usual notations. Find $y(n)$ for signed 16 bit data samples and 16 bit constants. (08 Marks)

PART – B

- 5 a. Determine the value of each of the following 16-bit numbers represented using the given Q-notations: i) 4400h as a Q0 number ii) 4400h as a Q7 number iii) 3125 as a Q15 number iv) -3125 as a Q15 number. (06 Marks)
- b. Write an assembly language program for TMS320C54XX processors to multiply two Q15 numbers to produce Q15 number result. (06 Marks)
- c. What is an interpolation filter? Explain the implementation of digital interpolation using FIR filter and polyphase subfilter. (08 Marks)
- 6 a. Write a TMS320C54XX program that illustrates the implementation of 8-point DIT FFT algorithm. (12 Marks)
- b. Briefly explain scaling and derive the expression for optimum scaling factor for DIT FFT Butterfly algorithm. (08 Marks)
- 7 a. With a neat schematic diagram, design a data memory system with address range 000800h – 000FFFh for a C5416 processor. Use 2K×8 SRAM memory chips. (08 Marks)
- b. Explain how the interrupts are handled in TMS320C54XX processor, with the help of a flow chart. (08 Marks)
- c. Explain briefly memory space organization in TMS320C54XX memory. (04 Marks)
- 8 a. Explain PCM3002 CODEC, with the help of a neat block diagram. (06 Marks)
- b. Explain DSP-based biotelemetry receiver system, with the help of a block schematic diagram. (06 Marks)
- c. With the help of a block diagram, explain the image compression and reconstruction using JPEG encoder and decoder. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10EC763

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Image Processing

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. With a neat block diagram, explain the fundamental steps in image processing. (10 Marks)
- b. Explain the principle of image acquisition using a single sensor with neat diagram. (06 Marks)
- c. List four applications of image processing. (04 Marks)
- 2 a. Explain the concept of sampling and quantization in image processing with example. (08 Marks)
- b. Consider the image segment shown :
 - i) Let $V = \{0, 1\}$ and compute the lengths of shortest 4 – , 8 – and m-path between p and q
If a particular path does not exist between these two points explain why.
 - ii) Repeat for $v = \{1, 2\}$

	3	1	2	1	(q)
	2	2	0	2	
	1	2	1	1	
(p)	1	0	1	2	
- c. Define spatial and gray level resolution. (02 Marks)
- 3 a. An image U and information matrix A are given by :

$$U = \begin{bmatrix} 6 & 3 \\ 12 & 1 \end{bmatrix} A = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$$
 Obtain the transformed image V. compare the energy in U and V and give inference. (06 Marks)
- b. Explain the following properties of unitary transform : (06 Marks)
 - i) Energy conservation
 - ii) decorrelation.
- c. Show that the cosine transform of a vector of N elements can be calculated in $O(N \log_2 N)$ operation via N – point FFT. (08 Marks)
- 4 a. Using the core matrix H_1 generate hadamard transform matrix H_3 and explain 4 properties of hadamard transform. (08 Marks)
- b. Obtain the Harr transform matrix for $N = 4$. (08 Marks)
- c. State the four properties of slant retransform. (04 Marks)

PART – B

- 5 a. Explain the power law transformation and piece-wise linear contrast stretching with a neat graphical illustration. (10 Marks)
- b. Explain the importance of image enhancement in image processing. Explain in brief any two point processing techniques implemented in image processing. (10 Marks)
- 6 a. Explain image subtraction and image averaging operations with examples. (10 Marks)
- b. Explain the smoothing of images in frequency domain using : (10 Marks)
 - i) Ideal lowpass filer
 - ii) Butterworth lowpass filter.

- 7 a. Write an explanatory note on the following noise models :
- i) Erlang noise
 - ii) Raleigh noise
 - iii) Impulse (salt and pepper) noise
 - iv) Uniform noise. (06 Marks)
- b. Explain band reject filter used in the periodic noise reduction in frequency domain. (06 Marks)
- c. Derive an expression of the linear degradation model in presence of additive noise. (08 Marks)
- 8 a. Briefly explain any two color model used in color image processing. (06 Marks)
- b. Develop a procedure for converting :
- i) RGB to HSI model
 - ii) HSI to RGB model. (06 Marks)
- b. Write a note on pseudo color image processing. (08 Marks)

* * * * *

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10EC/TE71

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Computer Communication Network

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

1.
 - a. With layer diagram, explain the responsibility of each layer in OSI model. (09 Marks)
 - b. Explain the operation of ADSL using discrete multitone modulation with a neat diagram. (06 Marks)
 - c. List different types of addressing in TCP. Explain any one type of addressing with a suitable example. (05 Marks)
2.
 - a. Distinguish character stuffing and bit stuffing, with an example. (04 Marks)
 - b. Explain different HDLC frames. (06 Marks)
 - c. What are sliding window protocols? Design Go-Back-N ARQ protocol for noisy channel. (10 Marks)
3.
 - a. Explain non persistent, l-persistent and p-persistent with flow diagram. (06 Marks)
 - b. Explain Token passing as a controlled access technique. (04 Marks)
 - c. With a suitable example, explain data communication on a CDMA/CD network. Also list the properties of chip Sequences. (10 Marks)
4.
 - a. Explain addressing mechanism used in IEEE 802.11. (06 Marks)
 - b. Explain the standard Ethernet physical layer implementation of, (i) 10 base 2 (ii) 10 base 5 (iii) Twisted pair Ethernet (iv) Fibre Ethernet. (08 Marks)
 - c. Explain the IEEE 802.3 MAC frame format of standard Ethernet. (06 Marks)

PART – B

5.
 - a. Explain spanning tree algorithm with graphical representation. (06 Marks)
 - b. Explain the characteristics of VLAN used to group stations and explain them briefly. (06 Marks)
 - c. Explain the following interconnecting devices: (08 Marks)
 - (i) Repeater
 - (ii) Bridges
 - (iii) Router
 - (iv) Gateway
6.
 - a. Compare between IPV4 and IPV6 extension headers. (06 Marks)
 - b. Describe three strategies devised by IETF to help transition from IPV4 to IPV6. (06 Marks)
 - c. An ISP is granted a block of address strating with 190.100.0.0/16 the ISP needs to distribute these addresses to three group of customers as follows:
 - i) The first group has 64 customers, each need 256 addresses.
 - ii) The second group has 128 customers, each need 128 addresses.
 - iii) The third group has 128 customers, each need 64 addresses.
 Design sub blocks and find out how many addresses are still available after these allocations. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 7 a. Write short notes on :
- i) Forwarding process. (15 Marks)
 - ii) Address aggregation. (05 Marks)
 - iii) Dynamic routing table.
- b. What are the basis for classification of four types of links defined by OSPF? (05 Marks)
- 8 a. With a neat diagram, explain briefly connection establishment, data transfer, connection termination and half close connection in TCP. (12 Marks)
- b. With regards to DNS in internet,
- i) Explain briefly recursive and iterative resolution. (08 Marks)
 - ii) Query and response messages.

* * * * *

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10EC/TE72

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Optical Fiber Communications

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

1.
 - a. What are the advantages and disadvantage of optical fiber communication? (07 Marks)
 - b. Derive necessary mathematical condition that the angle of incidence “ θ ” must satisfy for the optical skew ray to propagate in a step index fiber. (08 Marks)
 - c. Calculate the number of modes of an optical fiber having diameter of 50 μm , $n_1 = 1.48$, $n_2 = 1.46$ and wavelength ‘ λ ’ of 820 nm. (05 Marks)
2.
 - a. Explain the different types of absorption losses in optical fiber. (06 Marks)
 - b. Derive an expression for pulse spreading due to material dispersion which is a function of wavelength and time delay. (08 Marks)
 - c. Explain the different types of bending losses in optical fiber. (06 Marks)
3.
 - a. Draw the cross section of GaALAS double hetero structure LED energy band diagram and refractive index variation. Explain their importance. (07 Marks)
 - b. Derive an expression for lasing condition and hence for optical gain in LASERS. (08 Marks)
 - c. With proper sketch briefly explain the structure of RPAD photodiode. (05 Marks)
4.
 - a. Show that optical power coupled into a step index fiber due to an LED with lambertian distribution is given by $P = P_s(NA)^2$ for $r_s \leq a$, with usual notations. (07 Marks)
 - b. What are different types of mechanical misalignments? (05 Marks)
 - c. Explain briefly the various fiber splicing techniques. (08 Marks)

PART – B

5.
 - a. With neat diagram, explain the operation of transimpedance preamplifier equivalent circuit. (06 Marks)
 - b. Derive an expression for receiver sensitivity and also explain quantum limit. (08 Marks)
 - c. Discuss how the eye diagram is powerful measurement tool for assessing the data handling capability in digital transmission system. (06 Marks)
6.
 - a. Explain with block diagram, the elements of analog link. List the signal impairments in analog systems. (06 Marks)
 - b. Explain sub-carrier multiplexing techniques in optical fiber communication. (04 Marks)
 - c. Briefly explain the rise time budget analysis with its basic elements contribute to system risetime. (10 Marks)
7.
 - a. With a neat sketch, explain WDM scheme. (05 Marks)
 - b. Derive an expression for difference in length in MZI multiplexers. (09 Marks)
 - c. Write a note on optical add | drop multiplexers. (06 Marks)
8.
 - a. Explain in detail the amplification mechanism with energy level diagram in an EDFA. (10 Marks)
 - b. With suitable diagram describe SONET/SDH optical network function. (10 Marks)

* * * * *

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10TE73

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Wireless Communication

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. With a flow diagram, explain AMPS network operation for a mobile originated call. (10 Marks)
- b. Describe with a neat diagram the data encapsulation process in the context of the OSI model. (04 Marks)
- c. Mention the differences between 1G and 2G cellular systems. (06 Marks)
- 2 a. Explain common cellular network components. (10 Marks)
- b. Explain mobile terminated call operation in AMPS with a neat diagram. (10 Marks)
- 3 a. Explain cell splitting and cell sectoring with suitable diagrams. (10 Marks)
- b. A service provider has a total licensed bandwidth of 5 MHz for a particular geographic area. Each subscriber needs 10 KHz of bandwidth when using the system. For the service provider to provide service from a single transmitter site, the total number of possible simultaneous users is 500. If the service provider implements a cellular system with 35 transmitter sites located to minimize interference and provide total coverage of the area, determine the new system capacity. (06 Marks)
- c. Draw the diagram of a typical cellular location updating. (04 Marks)
- 4 a. Explain with a block diagram, the GSM network architecture. (10 Marks)
- b. Discuss with the frame format the different types of GSM hyperframe. (10 Marks)

PART – B

- 5 a. Explain in brief with flow a diagrams the GSM service request and authentication operations. (10 Marks)
- b. With a neat diagram. Explain inter MSC handover of GSM with operation steps. (10 Marks)
- 6 a. Explain the basic spectrum spreading operation and procedure used on CDMA forward channels. (10 Marks)
- b. With a neat block diagram describe the generation of CDMA reverse traffic channel. (10 Marks)
- 7 a. What is the received power in dBm for a signal in free space with a transmitting power of 1w, frequency of 1900 MHz and distance from the receiver of 1000 meters, if the transmitting antenna and receiving antennas both use dipole antennas with gains of approximately 1.6? What is the path loss in dB? (05 Marks)
- b. With the help of basic diagram, explain RAKE receiver. (10 Marks)
- c. Explain the concept of block codes. (05 Marks)
- 8 a. Explain the components of the Bluetooth architecture with relevant figure. (10 Marks)
- b. Describe IEEE 802.16 wireless MAN's deployment and antenna sectoring scheme. (10 Marks)

* * * * *

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

USN

1	K	S	1	3	T	E	O	S	2
---	---	---	---	---	---	---	---	---	---

10TE754

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Image Processing

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. With a block diagram, explain the fundamental steps involved in “Digital Image Processing” (10 Marks)
- b. Describe briefly the principle of image formation in human eye. (05 Marks)
- c. Explain brightness adaptation with the help of suitable diagram. (05 Marks)
- 2 a. What is image sampling and quantization? (08 Marks)
- b. Compute the lengths of the shortest 4, 8 and m-path between p and q for the following image segment with $V = \{1, 2\}$. (06 Marks)

5	4	3	1	1	(q)
5	4	0	2	0	
3	2	0	2	4	
2	1	1	3	5	
(p)	1	3	5	1	3

- c. What is a distance function? Give the formula for calculating Euclidean distance and chessboard distance. (06 Marks)
 - 3 a. Explain the properties of unitary transforms. (06 Marks)
 - b. Calculate the transformed image V and the basis images for orthogonal matrix A and image U. (06 Marks)
- $$A = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}, \quad U = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$$
- c. Construct 4×4 DFT matrix. Discuss the following properties of 2 dimensional DFT: (08 Marks)
 - (i) Fast transform
 - (ii) Conjugate symmetry
 - 4 a. Explain Haar transformation with its properties, compute the Haar transformation of 2×2 image $F = \begin{bmatrix} 3 & -1 \\ 6 & 2 \end{bmatrix}$. (10 Marks)
 - b. Determine 4×4 Slant transform matrix. List its properties. (10 Marks)

PART – B

- 5 a. Explain the following: (10 Marks)
 - (i) Contrast stretching.
 - (ii) Bit plane slicing.
 - (iii) Gray level slicing.
- b. Perform histogram equalization of 5×5 image whose data is shown in Table Q5 (b) and draw the histogram of image before and after equalization. (10 Marks)

Gray level	0	1	2	3	4	5	6	7
Number of pixels	0	0	0	6	14	5	0	0

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

- 6 a. Explain with a block diagram, the basic steps for image filtering in frequency domain. (10 Marks)
b. Discuss homomorphic filtering. (10 Marks)
- 7 a. Explain the model of image degradation / restoration. (10 Marks)
b. Explain observation and experimentation ways to estimate the degradation function. (10 Marks)
- 8 a. Explain RGB and HSI colour models. (10 Marks)
b. What is pseudo colour image processing? Explain intensity level slicing of assigning pseudo colours. (10 Marks)

* * * * *

USN

1K S 1 3 T E 0 0 6

10TE765

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Embedded System Design

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

1.
 - a. With a neat diagram, explain the embedded system life cycle. (07 Marks)
 - b. Explain the major elements of building an embedded system. (08 Marks)
 - c. With a neat diagram, briefly explain simple embedded system. (05 Marks)
2.
 - a. Show how the error propagates under mathematical operations using below mentioned values, $E = 100V \pm 1\%$, $I = 10A \pm 1\%$, $R = 10\Omega \pm 1\%$ (06 Marks)
 - b. With a neat block diagram, enlighten the four major blocks of an embedded hardware core. (07 Marks)
 - c. Discuss the different types of execution flow. (07 Marks)
3.
 - a. Discuss typical memory segregation into user and system allocations. (06 Marks)
 - b. Write the inside and outside diagrams for ROM with read operations. (07 Marks)
 - c. Explain the classification of RAM and ROM. (07 Marks)
4.
 - a. Discuss system specifications versus system requirements. (06 Marks)
 - b. With a neat diagram, explain the waterfall life cycle model. (07 Marks)
 - c. With a neat diagram, explain the spiral life cycle model. (07 Marks)

PART – B

5.
 - a. With a neat diagram, explain operating system virtual machine model and typical high level operating system architecture. (10 Marks)
 - b. Explain the various types of stacks. (10 Marks)
6.
 - a. Explain duplicate hardware context with respect to memory management revisited. (08 Marks)
 - b. With a neat diagram, explain model of a single process. (07 Marks)
 - c. Discuss the difference between task and a process. (05 Marks)
7.
 - a. Write and analyze linear search algorithm for its time complexity. (08 Marks)
 - b. Explain the four basic elements of flow of control. (07 Marks)
 - c. Give the comparison table for evaluating performance methods, stages and criterion. (05 Marks)
8.
 - a. Write a C program to determine the sum of the elements in an array and analyze its time complexity. (08 Marks)
 - b. Explain briefly, comparing algorithms. (08 Marks)
 - c. Write a short note on hardware accelerators. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.