Roll No. ____________________ [Total No. of Pages : 4

7E 7078

7E7078

B.Tech. VII Semester (Main) Examination, Dec. - 2015
Electronic Instrumentation & Control Engg.
7EI3A Digital Image Processing
Commen with EC

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Discuss operation and working of CCD sensors. **(8)**

   b) What are important image file formats? Discuss their key features briefly. **(8)**

OR

1. a) Write coordinate equations for zooming operation & Discuss it briefly by taking a suitable example. **(8)**

   b) Briefly discuss the following

      i) Spatial resolution of an image

      ii) HSI color model **(4+4=8)**

Unit - II

2. a) Discuss Gamma correction used for contrast enhancement of under exposed and over exposed images. Show it by drawing suitable Gamma-correction curves. **(8)**

Unit - V

5. a) Discuss gradient operators in context to two-dimensional images. Write 3×3 region two-dimensional sobel masks and express their partial derivative equations. **(5+5=10)**

   b) Compare loss-less versus lossy compression techniques and state about some well known standards for both of these techniques. **(6)**

OR

5. a) Discuss differential PCM based image compression by drawing its block diagram. **(8)**

   b) Discuss Transform based image compression technique and state about a popular compression standard based on this technique. **(8)**

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7E7081

Roll No. ______________________ [Total No. of Pages : 3

7E7081

B.Tech. VII Semester (Main/back) Examination, Nov./Dec. - 2015

Electronics & Communication Engg.

7EC1A Antenna & Wave Propagation

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).*

Unit - I

1. a) Prove that the total power radiated by a Hertz Antenna is given by

$$W = 40X^2 I_0^2 \left(\frac{dl}{\lambda}\right)^2$$ **(10)**

b) If a dipole antenna of maximum dimension D = 20cm has to radiate a signal of 20 MHz then find the distance from this antenna

i) Up to which its array element can be placed.

ii) After which a receiving antenna can be placed **(3+3=6)**

OR

1. a) What is antenna polarization? Describe its types and state its relation with the physical orientation of transmitting antenna. If the radiated field from an antenna is given by $\varepsilon(\theta,\phi,t) = 100\cos 10^9 t\hat{a}_\theta + 50\sin 10^9 t\hat{a}_\phi$ then find its Polarization **(2+3+3=8)**

b) Define the following and find their value for an antenna has physical length = 20m, operating frequency 200 MHz and placed in ambient temperature of 300°k.

i) Antenna effective length

ii) Antenna aperture

iii) Antenna temperature.

iv) Antenna radiation resistance **(4×2=8)**

Unit-II

2. a) Design a two element antenna array to be working as broad side array at 30MHz **(6)**

b) State the conditions for non uniform antenna array. Give four example of such antenna array which are practically used in communication. **(6)**

c) If the phase between two elements in an antenna array of N-sources (all uniform) can changes from 0^0 to 180^0 then find the rotation of principal maxima **(4)**

OR

2. a) Find the 3-dB beam width for an antenna array having 20 uniform elements placed at a separation of $\lambda/4$ and operating at 200 MHz **(6)**

b) Explain the principle of pattern multiplication. Does this principle can be used for design an antenna array in which no side lobe is there. If yes then give such example **(6)**

c) Write the classification of antenna array and state the classification type for

i) Yagi uda antenna and

ii) Log periodic antenna. **(4)**

Unit-III

3. a) Draw the structure of following antenna and write their frequency operation and specific use.

i) Microstrip patch antenna

ii) Folded dipole

iii) Rhombic antenna

iv) Parabolic reflector. **(4×2=8)**

b) Design a log periodic antenna having maximum 10 element and working at 100MHz. Find its maximum horizontal and vertical dimension **(8)**

OR

3. a) Draw the different waveguide antenna and explain their radiation pattern operating frequency and state of polarization **(8)**

b) Give the experimental setup to measure antenna gain and directivity. Does the setup is applicable for all frequency range? **(6)**

c) Find the input resistance of a 3 element loop antenna. Let the impedance of each isolated element is 100Ω **(2)**

Unit-IV

4. a) Calculate the maximum usable and critical frequency for

i) D-layer having ion density $10^{12}/m^3$

ii) F-layer having ion density $10^{14}/m^3$ **(4+4=8)**

b) Calculate the minimum vertical length of a receiving antenna which is receiving a line of sight signal from a transmitter placed at 30Km distance and placed 30 meter above ground. Assume the operating frequency is 200KHz. **(6)**

c) State the nature of reflected wave from ground when the incident wave is

i) Plane polarized and

ii) Circularly polarized. **(2)**

OR

4. a) Define the following wave phenomena

   i) Reflection from ionosphere

   ii) Reflection from conductor

   iii) Scattering in troposphere

   iv) Refraction at interface of D & E layer **(4×3=12)**

   b) Explain the effects of

   i) Ground conductivity and

   ii) Earth curvature on wave propagation **(2×2=4)**

Unit -V

5. a) What is solar activity? How it effect wave propagation. Can be use these periodic solar activity for improve the performance of communication system? If yes then explain how? **(8)**

   b) What is Faraday rotation? What is the source of faraday rotation? How it effects wave propagation **(6)**

   c) How electrical properties of atmospheric layer charges with seasons. **(2)**

OR

5. a) If two atmospheric layer has ionization density 10^{12} and $10^{14}/m^3$ then find the angle of refraction at their interface if the incident angle is 45^0 **(6)**

   b) What is correlation between total internal reflection and ionospheric reflection. What is the incident angle for a 15MHz signal which has to reflected back from a layer at 3 Km above and having ion density $10^{15}/m^3$. **(6)**

   c) What is virtual height? How it changes antenna actual height? **(4)**

7E7083

Roll No. ____________________ [Total No. of Pages : 3

7E7083

B.Tech. VII Semester (Main/Back) Examination, Dec. - 2015
Electronics & Communication Engg.
7EC4A Wireless Communication

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) A DSSS system has a 1.2288 Mcps code clock rate and a 9.6 kbps information rate. Calculate the processing gain. How much improvement in information rate is achieved, If the code generation rate is changed to 5 Mcps and The processing gain to 256? **(8)**

   b) Explain the properties of spreading codes. How they are generated, briefly explain? **(8)**

OR

1. a) Explain DSSS with BPSK with neat diagrams, and write the properties of DSSS. **(8)**

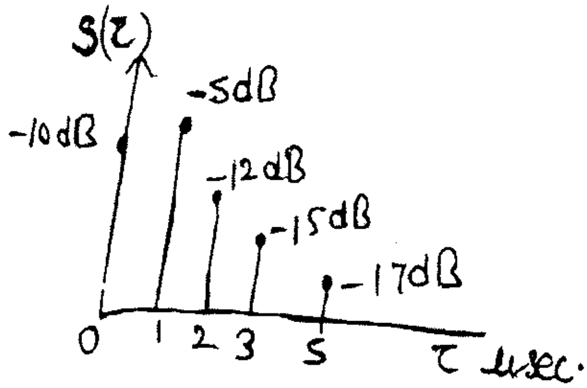
   b) Compare FHSS with DSSS. **(4)**

   c) In an FHSS system, a Hopping band width of 100 MHz and a frequency spacing of 10 KHz are used. What is the minimum number of PRN chips are required for each frequency symbol? **(4)**

Unit - II

2. a) What is small scale fading? Write the factors influencing fading. **(8)**

   b) The discrete power delay profile for multipath transmission is shown in figure calculate multipath power gain, mean delay and r.m.s delay spread **(8)**



OR

2. a) Explain the concept of diffraction loss as a function of path difference around an obstruction by fresnel zones. **(8)**

   b) Describe the free space propagation path model, when is two-ray propagation model suitable. **(8)**

Unit - III

3. a) Explain the principle of operation of CDMA. **(4)**

   b) What is near far problem in CDMA? **(3)**

   c) What is rake receiver? How it is useful for CDMA reception? Explain briefly. **(7)**

   d) Define soft Hand off. **(2)**

OR

3. a) Define TDMA frame structure and efficiency of TDMA systems. (6)

   b) Explain the basic principle of operation of OFDM technique and write its advantages and disadvantages. (6)

   c) A normal GSM time slot consists of 6 trading bits, 8.50 guard bits, 28 training bits and 2 traffic bursts of 58 bits of data, find the frame efficiency. (4)

Unit - IV

4. a) Write the advantages and disadvantages of wireless local area network. Briefly explain the IEEE 802.11 standards. (8)

   b) Write the short note on RFID Technology. (6)

   c) IEEE 802.11 WLAN system operates at 2 Mbps. Determine the data transfer time of a 20kb file. (2)

OR

4. a) Explain the different physical and control channels in GSM. (7)

   b) Draw and explain the frame format for GSM. (5)

   c) Compare wifi and Wi-max Technology. (4)

Unit - V

5. a) Explain the process of Link design of a satellite system and derive an expression for the received power. (8)

   b) What are the satellite subsystems? Draw a diagram of AOCS and explain. (8)

OR

5. a) Draw a neat diagram telemetry, tracking, command and monitoring system for successful operation of a communication satellite and explain it. (10)

   b) Write the short note on components of earthstation. (6)

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Roll No. ____________________ [Total No. of Pages : 3

7E7084

7E7084

B.Tech. VII Semester (Main) Examination, Nov. - Dec. 2015

Electronics & Communication Engg.

7EC5A VLSI Design

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

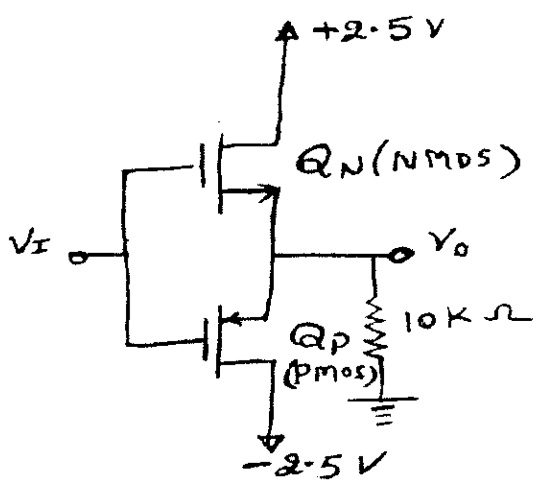
Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).*

Unit - I

1. a) Demonstrate CMOS n-well fabrication process using diagram for each step. **(8)**

b) The PMOS and NMOS transistors in the given figure are matched with $K_n'\left(\frac{W_n}{L_n}\right) = K_p'\left(\frac{W_p}{L_p}\right) = 1$ mA/v^2 and $V_{tn} = -V_{tp} = 1$V. Assuming $\lambda = 0$ for both the devices, find the drain currents I_{DN} and I_{DP} and voltage V_0 for $V_I = 2.5$V **(8)**



OR

1. a) Drive the expression of I_{D1}-V_{DS} relation for enhancement type MOSFET. Also calculate/drive the channel length modulation parameter (4+4)

b) An inverter fabricated in a 1.2 μm CMOS technology uses the channel length $L_n = L_p$=1.2 μm. If w_n =1.8 μm, Find the value of Wp that will result in NMOS & PMOS being matched. Calculate the output resistance of inverter when V_0=V_{OL}, For this given that $k_n^{'} = 80\,\mu A/V^2$, $k_p^{'} = 27\,\mu A/V^2$, V_{tn}=0.8V and V_{DD} = 5V. (8)

Unit- II

2. a) Implement the boolean expression $Y = \overline{(D+E+A)(B+C)}$ using CMOS logic. If $\left(\frac{W}{L}\right)_n = 10$ and $\left(\frac{W}{L}\right)_p = 15$,then find the equivalent $\left(\frac{W}{L}\right)$ratio of pullup network and pull down network. (8)

b) Consider a CMOS inverter with following parameters V_{DD}= 3.3V, V_{tn}= 0.6V, V_{tp}= -0.7V. K_n= 200 $\mu A/V^2$, K_p= 80 $\mu A/V^2$. Calculate the noise margins of the circuit. (8)

OR

2. a) Discuss the short circuit power dissipation in a CMOS circuit . Derive the expression for total power dissipation (8)

b) Consider a CMOS inverter with following parameters, V_{tn} = 0.6V,

$\mu_n C_{ox} = 60\mu A/V^2 \left(\frac{W}{L}\right)_n = 8$, $V_{tp} = -0.7$V, $\mu_p Co_x = 25\mu A/V^2, \left(\frac{W}{L}\right)_p = 12$ Calculate the noise margins and switching threshold of the circuit, the power supply voltage V_{DD} = 3.3V. (8)

Unit - III

3. a) Draw the eular's path and layout for CMOS implementation of boolean function $\overline{Y} = \overline{a}b + c + D$ (8)

b) Implement the given expression using pass-transistor logic $Y = \overline{a}b + \overline{b}c + \overline{c}a$ also draw its layout also. (8)

OR

3. a) Draw the model for physical organization of latch-up problem. Draw its V-I characteristics of this circuit and explain how latch-up triggers. (8)

b) Write necessary condition for latch-up prevention. Describe minimum three techniques for preventing internal and I/O latch-up (8)

Unit - IV

4. a) Draw the circuit diagram of 4-transistor DRAM cell . Explain its read and write operation. (8)

   b) How zipper CMOS logic differs from Domino CMOS logic. Write the difference in gate implementation and performance (8)

OR

4. a) Draw generalised circuit/block diagram of RAM.Explain read and write operation of a RAM cell using timing diagram (8)

   b) Compare clocked CMOS logic and dynamic CMOS logic for their implementation and performance. (8)

Unit - V

5. a) Write VHDL code for edge triggered S-R Flip-Flop in behavioural style using process statement. (8)

   b) Write a brief note on front-end and back-end ECAD tools used to design VLSI circuits. (8)

OR

5 a) Differentiate custom I_c and application specific I_c(ASIC) (4)

   b) Draw/write ASIC design flow graph and explain (4)

   c) Write VHDL code to realize full adder using Half adder in structural style. (8)

Roll No. ____________________ [Total No. of Pages : 3

7E7086

7E7086

B.Tech. VII Semester (Main) Examination Nov./Dec.- 2015
Electronics & Communication Engg.
7EC6.3A VHDL

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Draw the schematic design flow of ASICS and standard logic circuit and explain it. **(8)**

   b) What is VHDL? Explain how variables, signal and constants are declared and used in VHDL. **(8)**

OR

1. Explain the following.

   a) Different types of PLD.

   b) Place and route and timing simulation. **(8+8)**

Unit - II

2. a) Briefly explain history of HDL and compare various hardware description language. **(6)**

   b) Explain data flow, structural, behavioral, and RTL Style of combinational design. **(10)**

OR

2. a) Explain event driven simulation and simulation approaches. **(8)**

   b) Explain elaboration signal drivers simulator kernel process. **(8)**

Unit - III

3. a) Define multiplexer. How an 16×1 mux can be implemented using two 8×1 mux? **(6)**

   b) Write VHDL code for 4 - bit comparator **(10)**

OR

3. a) Write structural VHDL description for n-bit serial - in - serial out shift register. **(8)**

   b) Write a VHDL description for S-R latch

      i) Use two logic gates.

      ii) Use a characteristics equation

      iii) Use a conditional assignment statement. **(8)**

Unit - IV

4. a) Draw block and state diagram of vending machine **(6)**

   b) Derive the state diagram for an FSM that has input 'W' and output 'Z'. The machine has to generate z=1, when the previous four values of W were 1001 or 1111 else O. Overlapping input patterns are not allowed. Write VHDL codefor above FSM. **(10)**

OR

4. a) What are difference between mealy and Moore types of FSM **(6)**

   b) Explain Moore types FSM using state diagram, state table and state assigned table. **(10)**

Unit - V

5. a) Draw the schematic diagram for the data path circuit for the divide operation. **(8)**

b) Briefly explain the clock synchronization (8)

OR

5. Write short notes on:

a) SRAM

b) Shifting and sorting operation. (8×2)

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Roll No. ______________________ [Total No. of Pages : 3

7E4047

7E4047

B.Tech. VII Semester (Back) Examination, Dec.- 2015

Electronics &Communications.

7EC4(O) I.C Technology

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) Mention the types of defects and their effects in a semic nductor material. **(8)**

   b) Write steps to obtain E.G.S. from M.G.S. Also mention considerations for proper crystal growth. **(8)**

OR

1. a) Briefly describe characterization & evaluation techniques for crystals. **(8)**

   b) Mentioning the principle involved in Czochralski growth process, describe the interpretation of the equation given below:

   $H_o - H_i = AL\rho\ (dx/dt)$ **(8)**

Unit - II

2. a) Prove that the effect of field enhancement factor is to (atmost) double the magnitude of the diffusivity under field - free conditions. **(8)**

   b) With reference to the process of Ion implantation briefly describe the following:

      i) Nuclear and electronic stopping.

      ii) Range and annealing. **(8)**

OR

2. a) Derive due expressions to describe the kinetics of oxide growth. **(8)**

   b) Discuss the properties of thermal oxides of silicon . **(8)**

Unit - III

3. a) With reference to epitaxy process, describe briefly the following :

      i) Autodoping .

      ii) Slip.

      iii) VPE.

      iv) MPE. **(4×2=8)**

   b) Mention evaluation techniques of epitaxial layers. **(8)**

OR

3. a) How does low pressure chemical vapor deposition differs from normal chemical vapor deposition process. **(4+4=8)**

   b) Describe CVD process for deposition of dielectric & polysilicon. **(8)**

Unit - IV

4. a) Mention the properties of photoreactive materials . **(8)**

   b) What is meant by Image reversal with reference to photolithography .Also describe printing techniques. **(8)**

OR

4. a) Compare optical and electron beam lithography from following aspects:

      i) Complexity

      ii) Cost

      iii) Speed / yield

      iv) Resolution. **(4×2=8)**

   b) Compare wet etching and reactive ion etching . **(8)**

Unit - V

5. a) What is meant by bird beaks in the process of locos. Suggest one method to remove the above mentioned bird beaks . **(8)**

   b) What is meant by planarization why and how we obtain planarizations. **(8)**

OR

5. a) What are the various objectives surved by the process of metallization , describe them briefly. **(8)**

   b) Mention all the steps required to fabricate a bipolar IC. **(8)**

7E4048

Roll No. ____________________ [Total No. of Pages : 3

7E4048

B.Tech. VII Semester (Back) Examination, Dec. - 2015

Electronics & Communication Engg.

7EC5(O) VLSI Design

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any five questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Calculate the threshold voltage Ve_0 for a polysilicon gate n-channel MOS transistor with following parameters:

   Substrate doping density N_A = 10^{18} cm^{-3}

   Polysilicon gate doping density N_D = 10^{20} cm^{-3}

   Gate oxide thickness t_{ox} = $1000A^0$

   Assume oxide interface fixed charges = nil **(10)**

   b) Write the Fabrication steps difference between NMOS and CMOS **(4)**

   c) Define Accumulation phenomenon in MOS structure. **(2)**

OR

1. a) Draw the structure of depletion mode transistor. Also draw the fabrication steps to obtained this structure. **(8)**

   b) Draw the Energy band diagram of MOS capacitor structure under following conditions

   i) Accumulation

   ii) Depletion and

   iii) Inversion **(8)**

Unit - II

2. a) Find the $V_{gs_n}, V_{gs_p}, V_{ds_n}$ *and* V_{ds_p} in a CMOS inverter when I/P is **(8)**

   i) $V_{in} = 0$ volt

   ii) $V_{in} = 1.5$ V

   iii) $V_{in} = 3.5$ V and

   iv) $V_{in} = 4.8$ V

   Assume $V_{DD} = 5V$ and $V_{Tn} = |V_{TP}| = 0.8\,V$

   b) What is body-effect? Discuss the effects of body-bias on

   i) Threshold voltage V_T and

   ii) I_{ds}-V_{ds} characteristics

   (8)

OR

2. a) Design a resistive load NMOS inverter for obtain $V_{OL} = 0.5V$. Assume $V_{DD} = 5V$, $K_n' = 300\mu A/V^2$ and $V_{TO} = 0.0V$ **(8)**

   b) Draw the MOS transistor circuit model at low frequency, and discuss its all parameter. **(8)**

Unit - III

3. a) Draw the following circuits

   i) y = $A\bar{B}C$ Using CMOS

   ii) 4×1 mux using Transmission gate

   iii) y = $A \oplus B$ Using Transmission gate

   iv) 1 bit memory cell using CMOS

   (4×4=16)

OR

3. a) Design a 3-input NAND gate using CMOS such that its pull up to pull down ratio of equivalent size is 3. **(8)**

   b) Find the expression for average power dissipation of a CMOS inverter. Also discuss how it depends on

   i) Power supply V_{DD} and

   ii) Switching frequency f

   (8)

Unit - IV

4. Draw the layout of following without diffusion break.
   i) y = AB+CDE Using CMOS
   ii) $y = A+B\overline{C}D$ Using CMOS **(2×8=16)**

OR

4. a) Give the reasons for
      i) Using Eular path in Physical design
      ii) Following DRC rule in physical design. **(2×4=8)**
   b) Draw the layout of a Full Adder using CMOS **(8)**

Unit - V

5. Write the VHDL code for
   i) Half Adder in Data flow style
   ii) 2×1 mux in behavioral style
   iii) 2-input XOR gate
   iv) D-FF **(4×4=16)**

OR

5. a) Explain any two in VHDL
      i) Data type
      ii) ieee Library
      iii) Delay **(8)**
   b) Write VHDL Code for a 4 bit register **(8)**

Roll No. ______________________ [Total No. of Pages : 2

7E 4051

7E 4051

B.Tech. VII Semester (Main&Back) Examination, Dec. - 2015

Electronics & Communication Engg.

7EC6.3(O) Operating System

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).*

Unit - I

1. a) Explain Time shared system and Real time system (6)

   b) Why does LINUX is a preferred choice in big companies? What is a firmware? (6)

   c) Define System Calls (4)

OR

1. a) What is Operating System? How does it interact with devices? What are the main agents of OS. (8)

   b) Differentiate between Single user and Multiuser system. Explain batch processing also. (8)

Unit - II

2. a) Explain life cycle of process and distinguish between process and Thread (8)

   b) There are 4 processes with 7,4,1,4 CPU bursts and arrival time 0,2,4,5 respectively. Compute average waiting time and average turn arround time for preemptive SJF Scheduling. (8)

OR

2. a) There are 4 processes with 53,17,68,24 CPU bursts and assume time quantum as 24 unit. Calculate average waiting time and average turn arround time for round robin scheduling. (8)

   b) Which CPU Scheduling method will give the minimum average waiting time? and what is the main difficulty in its implementation. (8)

Unit - III

3. a) How many page faults would occur for the following replacement algorithm
   i) FIFO
   ii) Optimal replacement for the string
   1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
   Three frames are allocated in main memory only. **(8)**

   b) Write short note on
   i) Demand paging
   ii) Virtual Memory Management system using page table. **(8)**

OR

3. Explain the following terms of Memory Management **(4×4)**
   i) Fragmentation
   ii) Swapping
   iii) Paging
   iv) Segmentation

Unit - IV

4. a) i) Explain Firewall in detail. **(2×4)**
   ii) Explain file access methods.

   b) Write short note on User Authentication. **(8)**

OR

4. a) Write short notes on Implementation of files and directories management **(8)**

   b) Differentiate among Worms, Trapdoors and Viruses. **(8)**

Unit - V

5. a) Explain Readers and Writers Problem. How it can be solved? **(8)**

   b) Explain Deadlock detection and recovery methods. **(8)**

OR

5. a) Consider the following Scenario of a System. **(12)**

	Allocation				Max. Available			
	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2
P_1	1	0	0	0	1	7	5	0
P_2	1	3	5	4	2	3	5	6
P_3	0	6	3	2	0	6	5	2
P_4	0	0	1	4	0	6	5	6

   Answer the following questions using the Banker's Algorithm.
   a) What is the content of the matrix need?
   b) Is the system in a safe state.

   b) What do you mean by safe and unsafe states? **(4)**

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Roll No. ____________________ [Total No. of Pages : 2

7E 4054

7E4054

B.Tech. VII Semester (Back) Examination, Dec. 2015
Electronics Instrumentation & Control Engg.
7EI3(0) Computer Networks

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) In $M/M/\infty$ queuing, Calculate average wait time of a packet in the queue. **(8)**

1. b) Discuss the following terms briefly in context to queuing.
   - i) Pure birth process
   - ii) Pure death process
   - iii) Little's formula **(2+2+4=8)**

OR

1. a) Draw state transition diagram for M/M/1 queuing system with discouraged arrivals. Calculate probability of having no packets in the queue. **(4+4=8)**

1. b) Discuss M/G/1 queuing system stating requisite mathematical expression. **(8)**

Unit-II

2. a) Discuss Go back-5 sliding window protocol taking scenario of ten equal sized packets for transmission with sixth packet lost in transit (Assume zero time out interval). **(10)**

2. b) Compare briefly between packet switched network and circuit switched network by taking a suitable example for both of the cases. **(6)**

OR

2. a) Discuss different schemes of framing in the data link layer. (8)

   b) Name different protocols used for data link layer, Transport layer and Application layer. State briefly about working of these layers. (8)

Unit - III

3. a) Discuss static and dynamic channel allocation by stating suitable example for each of these. (8)

3. b) Draw frame format of IEEE 802.3 protocol and discuss working of tris. (8)

OR

3. a) Describe CSMA protocol. Discuss key features of 1-perisistent, p-persistent and non-persistent CSMA protocols. (8)

3. b) Compare pure ALOHA and slotted ALOHA by drawing & discussing their throughput diagrams (8)

Unit - IV

4. a) Draw header of IPv4 protocol and discuss each header detail. (8)

4. b) Discuss any congestion control algorithm for TCP/IP networks (8)

OR

4. a) Compare between adaptive and non-adaptive routing algorithms. (8)

4. b) Discuss TCP protocol architechture by drawing suitable header. (8)

Unit - V

5. a) Draw B-ISDN ATM reference model and discuss its detail. (8)

5. b) Draw ATM header and discuss each header detail in context to UNI and NNI. (8)

OR

5. a) Discuss recognition algorithm in ATM networks by drawing Suitable state diagram/flow chart. (8)

5. b) Describe following ATM network related parameters
   i) Cell loss priority
   ii) Unspecified Bit rate service.
   iii) Peak cell rate
   iv) Cell delay variation (2×4=8)

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7E4055

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7E4055

B.Tech. VII Semester (Back) Examination, Dec. - 2015

Bio Medical Engg.

7BM6.3 Fiber Optic Instrumentation

Common with EIC

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Define the following terms with respect to optical fibres:

   i) Refraction

   ii) Refractive Index

   iii) Critical Angle

   iv) Total internal reflection **(8)**

   b) A multimode step index fiber with a core refractive index of 1.4917 and that of claffing 1.4894 micrometer and wavelength of 1.3 micrometer

   Calculate :

   i) Numerical Aperture

   ii) Critical Angle of core claffing interface

   iii) Number of modes **(8)**

OR

1. a) Prove that for step index optical fiber, number of modes given by $MSI=V^2/2$ where MSI=Mode volume for step index fiber and V= Normalized frequency. **(8)**

b) Briefly explain the following techniques of fiber fabrication:

i) MCVD

ii) PCVD **(8)**

Unit - II

2. a) Explain the following terms for LED :

i) Life time

ii) Rise/Fall time

iii) Modulation response

iv) Output Power- Current characteristics

v) Radiated wavelength & spectral width **(2×5=10)**

b) Describe what is meant by the fusion splicing of optical fibers. Discuss the advantages and drawbacks of this jointing technique. **(6)**

OR

2. A planar LED is fabricated from GaAs which has a refractive index of 3.6

a) Calculate the optical power emitted into air as a percentage of the internal optical power for the device when the transmission factor at the crystal-air interface is 0.68

b) When the optical power generated internally is 50% of the electrical power supplied, determine the external power efficiency. **(2×8=16)**

Unit - III

3. a) Explain the following terms related to PIN Photodiode with proper expressions:

i) Cut-off wavelength

ii) Quantum Efficiency

iii) Responsivity **(8)**

b) The carrier velocity in a silicon p-i-n photodiode with a 25 μm depletion layer width is 3×10^4 ms^{-1}. Determine the maximum response time for the device. **(8)**

OR

3. a) Explain the Structure and principle of working of Avalanche photodiodes. Also deduce the expression for total current density for APD. **(10)**

b) The quantum efficiency of a silicon RAPD is 80% for the detection of radiation at a wavelength of 0.9 μm. When the incident optical power is 0.5 μw, The output current from the device is 11 μA. Determine the multiplication factor of the photodiode under these conditions. **(6)**

Unit - IV

4. a) Explain different methods of measurement of refractive index profile of an optical fiber with suitable diagrams. **(8)**

   b) A 2km length of multimode fiber is attached to apparatus for spectral loss measurement. The measured output voltage from the photo receiver using the full 2km fiber length is 2.1v at a wavelength of 0.85 μm. When the fiber is then cut back to leave a 2m length the output voltage increases to 10.7V. Determine the attenuation per Km. For the fiber at a wavelength of 0.85 μm and Estimate the accuracy of result. **(8)**

OR

4. a) Explain the method of measurement of Numerical Aperture & Diameter of an Optical fiber. **(8)**

   b) A trigonometrical measurement is performed in order to determine the numerical aperture of a step index fiber. The screen is positioned 10.0cm from the fiber end face. When illuminated from a wide angled visible source the measured output pattern size is 6.2 cm. Calculate the approximate Numerical Aperture of the fiber. **(8)**

Unit - V

5. Explain the following terms for a LASER
   a) Absorption of radiation
   b) Spontaneous Emission
   c) Stimulated Emission
   d) Population Inversion **(4×4=16)**

OR

5. Write technical notes on (Any **two**)
   a) LASER application for measurement of distance
   b) Holography
   c) Q-Switching **(2×8=16)**

7E 4056

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7E 4056

B.Tech. VII Semester (Back) Examination, Dec. - 2015
Electronic Instrumentation & Control Engg.
7EI5(O) Industrial Measurements

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any five questions, selecting **one** question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly).*

Unit - I

1. a) A platinum thermometer has a resistance of 80 Ω at 25°C. **(8)**
   i) Find its resistance at 55°C, if the platinum has a resistance temperature co-efficient of 0.00431°C.
   ii) If the thermometer has a resistance of 135°C. Calculate the temperature.

   b) Explain the construction and working of thermistors with characteristics. **(8)**

OR

1. a) A bimetallic strip element has one end fixed and other end free, with the length of cantilever being 40mm. The thickness of each metal is 1.5mm and the element is initially straight at 18°C. Calculate the movement of the free end in a perpendicular direction from the initial line when the temperature is raised to 165°C. One of the metals is invar with a negligible thermal expansion co-efficient while the second is a nickel chrome alloy with an expansion coefficient of 13.6×10^{-6}/°C. **(8)**

   b) Draw and explain the various characteristics of thermocouples. Discuss about its merits and demerits also. **(8)**

Unit - II

2. a) Explain the working principle and applications of Piezo-electric pressure transducers with neat diagram. **(8)**

b) How will you measure the pressure by differential pressure transmitters. (8)

OR

2. a) Explain the following:- (8)
   i) Diaphragms
   ii) Bellows.

   b) Explain the working and applications of capacitive pressure transducers. (8)

Unit - III

3. a) Explain the following:- (8)
   i) Orifice plates.
   ii) Rotameters.

   b) Discuss about the mass flow type meters with merits and demerits. (8)

OR

3. a) Explain the following:- (8)
   i) Venturi tubes.
   ii) Flow nozzles.

   b) Explain the construction and working of electromagnetic flow meters with suitable diagram. (8)

Unit - IV

4. a) Explain the impulse wheel methods for density measurement. (8)

   b) What do you mean by "Hydrostatic pressure". Explain the working of hydrostatic type level measurements. (8)

OR

4. Explain the following with merits and demerits:-
   a) Radiation densitometer. (8)
   b) Capacitance probes. (8)

Unit - V

5. a) Derive the expression of Gauge factor of strain gauge. Explain the importance of Gauge factor for strain measurements. (8)

   b) What are the different adhesives and protective coatings are used in strain gauges. (8)

OR

5. Write shot notes on the following:-
   a) Rosette strain gauges. (8)
   b) Compensation techniques of strain gauges. (8)

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7E4001

7E4001

B.Tech. VII Semester (Main/Back) Examination, Dec. - 2015
Applied Electronics & Instrumentation
7AI1 Neutral Network & Fuzzy Logic Control
(Common with EIC, AI, &BM)

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1. a) Draw the architecture of simple perceptron network. Explain briefly perceptron learning algorithm and develop a Perceptron network to implement AND function . (8)

   b) Draw and explain Discrete Hopfield network. Give any two applications of the same. (8)

OR

1. a) Draw and explain Mc-Culloch and Pitts Neuron architecture? (8)

   b) Explain the function of Dendrite, Soma and Axon in a biological neural network. Compare the operation of biological neural network with artificial neural network. . (8)

Unit - II

2. a) Write an algorithm for back propagation training and explain the process of updation of weights. Give the necessary formulae involved and their derivation. (12)

   b) Compare supervised learning with unsupervised learning. Give suitable examples to explain. (4)

OR

2. a) Explain Delta learning rule. **(4)**

b) Using perceptron learning rule, find the weights required to perform following classifications. Vector (1111) and (-1 1 -1 -1) are the members of the first class. Vectors (111-1) and (1 -1 -1 1) are the members of second class. Use two output neurons. Assume learning rate as 0.9 and initial weight of 0.25. Using training vectors, test the response of the net. **(12)**

Unit - III

3. a) If A is a fuzzy set defined by **(4)**

$$A=\left\{\frac{0.5}{X_1}+\frac{0.4}{X_2}+\frac{0.7}{X_3}+\frac{0.8}{X_4}+\frac{1}{X_5}\right\}$$ List all the cuts and strong α-cuts of A.

b) Two fuzzy sets are given as follows: **(12)**

$$P=\left\{\frac{0.1}{2}+\frac{0.3}{4}+\frac{0.7}{6}+\frac{0.4}{8}+\frac{0.2}{10}\right\}$$

$$Q=\left\{\frac{0.1}{0.1}+\frac{0.3}{0.2}+\frac{0.3}{0.3}+\frac{0.4}{0.4}+\frac{0.5}{0.5}+\frac{0.2}{0.6}\right\}$$

$$R=\left\{\frac{0.1}{0}+\frac{0.7}{0.5}+\frac{0.3}{2}\right\}$$

Perform the following operations over the fuzzy sets:

i) Two Cross Products.

ii) Max-min Composition.

iii) Max Product

OR

3. a) Write the properties of Fuzzy set theory and explain **(4)**

b) Two Fuzzy sets $\underset{\sim}{A}$ *and* $\underset{\sim}{B}$ are defined on X as: **(12)**

$$\underset{\sim}{A}=\left\{\frac{0.1}{X_1}+\frac{0.6}{X_2}+\frac{0.8}{X_3}+\frac{0.9}{X_4}+\frac{0.7}{X_5}+\frac{0.1}{X_6}\right\}$$

$$\underset{\sim}{B}=\left\{\frac{0.9}{X_1}+\frac{0.7}{X_2}+\frac{0.5}{X_3}+\frac{0.2}{X_4}+\frac{0.1}{X_5}+\frac{0}{X_6}\right\}$$

Explain the following λ cut sets.

i) $\left(\underset{\sim}{A} \cup \underset{\sim}{B}\right)_{0.7}$

ii) $\left(\underset{\sim}{A} \cap \underset{\sim}{B}\right)_{0.7}$

iii) $\left(\underset{\sim}{A} \cup \bar{\underset{\sim}{A}}\right)_{0.7}$

iv) $\left(\bar{\underset{\sim}{A}} \cup \bar{\underset{\sim}{B}}\right)_{0.7}$

Unit - IV

4. a) Write in short about **(8)**
   i) Adaptive Fuzzy System
   ii) Defuzzification

   b) Explain the important features of the fuzzy membership function. How do the fuzzy membership function participate in Defuzzification process. **(8)**

OR

4. a) Define the following: **(8)**
   i) Fuzzy Entropy
   ii) Temporal Fuzzy logic

   b) Explain in short about any **two** Defuzzification processes. **(8)**

Unit - V

5. a) Explain the operation of Fuzzy logic control with process inference block. **(8)**

   b) Discuss the application of Artificial Neural network in the field of control system and optimization. **(8)**

OR

5. Design a fuzzy controller for a train approaching station. Inputs are speed and distance and output is break-power. Use triangular membership function, Consider two descriptors for input and three description for output. Device a set of rules for control action and defuzzification. The design should be supported by figures wherever possible. Design a fuzzy controller for a train with high speed and small distance. **(16)**