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8E8021

8E8021

B.Tech. VIII Semester (Main/Back) Examination, April/May -2017
Electronics and Communication Engg.
8EC1A IC Technology

Time : 3 Hours   **Maximum Marks : 80**
                                            Min. Passing Marks : 26

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 suitable by assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) List out the steps of EGS preparation with suitable diagrams. How will you recover HCL and trichlorosilane.   **(12)**

   b) Discuss about getting treatments.   **(4)**

OR

1. a) Explain silicon shaping and wafer preparation.   **(8)**

   b) Draw the czochralski growth reactor.   **(4)**

   c) Discuss 4 point probe technique for resistivity measurement.   **(4)**

Unit-II

2. a) State and explain pick's first law and second law.   **(8)**

   b) Draw and explain linear and parabolic rate co-efficient.   **(8)**

OR

2. a) Define the term diffusion.Explain Ion implantation system with suitable diagrams.   **(12)**

   b) What are oxide properties?   **(4)**

8E8021/2017   (1)   [Contd....

Unit-III

3. a) Explain the physical significance of chemical equilibrium and the law of mass action. Discuss the phenomena by taking an example. (12)

   b) What are the possible defects that could occur in an epitaxial growth. (4)

OR

3. a) Explain the process of Molecular Beam epitaxy in detail. Discuss the utility of khudcell with diagram. (10)

   b) Draw the hot wall reactor and cold wall reactor of LPCVD. (6)

Unit-IV

4. a) Define the term lithography and optical lithography. Explain the process of projection printing. (8)

   b) What are the types of photoresist and their chemical composition? Describe the growth system for DQ photo resist and ketone formation. (8)

OR

4. a) Explain the process of reaction Ion etching with suitable diagram. (10)

   b) Draw the flow chart of Mask generation. (6)

Unit-V

5. a) What are the fundamental consideration for IC processing? (8)

   b) Draw the processing steps of NMOS IC technology. (8)

OR

5. Write short note on : (2×8)

   a) LOCOS method

   b) Metallization and planarization

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8E4088

8E4088

B.Tech. VIII Semester (Back) Examination, April/May - 2017

Electronics & Communication Engg.

8EC1 Computer Network

Time : 3 Hours   Maximum Marks : 80

Min. Passing Marks : 26

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 suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) State and explain little's theorem for Queuing system in detail. **(10)**

b) A rural telephone exchange usually experiences four calls originates per minutes evaluate the probability that exactly 8 calls occur in 30 sec. interval. **(6)**

OR

1. a) Explain pure birth and pure death process. **(10)**

b) Explain the Mathematical Model for M/M/l/K Queues. **(6)**

Unit - II

2. a) Explain the stop and wait protocol and also discuss the piggy backing method. **(8)**

b) Explain in brief the concept of framing. What are the different framing methods? **(8)**

OR

2. a) What is HDLC and also explain frame structure and frame types in HDLC. **(8)**

b) Draw the following reference Models used in computer communication. **(8)**

i) OSI Model   ii) TCP/IP Model

8E4088 /2017   (1)   [Contd....

Unit - III

3. a) Measurement of slotted ALOHA channel with an infinite number of users show that 20% slots are idle. **(3×4=12)**

    i)   What is the channel load?

    ii) What is the through put?

    iii) Is the channel under load or overload? Show with graph.

    b) Define Fiber Distributed Data Interface (FDDI). **(4)**

OR

3. a) Consider Building a CSMA/CD network running at 1 Gbps over a 1km cable with no repeaters. The signal speed in the cable is 2,00,000 km/sec. What is the minimum frame size. **(12)**

    b) Explain the different types of channel allocation problem. **(4)**

Unit - IV

4. a) Write short note on Adaptive and non-adaptive routing algorithm. **(8)**

    b) An address in a block is given as 73.22.17.25. **(8)**

    i)   Find the total number of address in the block.

    ii) First and last address.

OR

4. a) Write short note on : **(2×4=8)**

    i)   OSPF   ii) BGP

    b) A company is granted a site address 201.70.64.0 the company needs six subnets. Design the subnets. **(8)**

Unit - V

5. a) What is the difference between open-loop congestion control and closed loop congestion control? **(8)**

    b) What is ATM architecture? Where it is used? Describe various switching fabrics used to the route the cell from a source end point to the destination end point. **(8)**

OR

5. a) Explain clearly the AAL protocol AAL- Type 1. **(8)**

    b) Write short note on **(8)**

    i)   B- ISDN   ii) Frame Relay

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Roll No. _____

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8E8022

8E8022

B.Tech. VIII Semester (Main/Back) Examination, April/May - 2017
Electronics and Communication Engg.
8EC2A Radar and TV Engineering

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) What is Radar? Draw the neat and clean block diagram of Radar. (4)

   b) Write Radar frequency bands and application of Radar. Explain with example. (4)

   c) Explain the working of LORAN system. (6)

   d) When a CW transmitter has 10 GHz frequency, calculate the Doppler frequency, seen by the stationary Radar. Target radial velocity is 250 km/h? (2)

(OR)

1. a) A radar operating at 12GHz, has a maximum range of 45km with an antenna gain of 5dB. If the transmitter has a power of 300kw and minimum detectable signal is 2×10^{-13} watt. Calculate Radar cross section of target. (4)

   b) Explain microwave landing system using neat and clean diagram. (8)

   c) Write short note on Radar display. (4)

Unit-II

2. a) Draw the block diagram of Monochrom TV transmitter and explain each block. (8)

   b) What is the limitation of NTSC system and how it is overcomes in PAL system? Explain the PAL system. (8)

(OR)

2. a) Explain plumbicon camera tube with its constructional diagram. **(6)**

    b) Draw the waveform of composite video signal and write the significance of **(6)**

       i) Pedestal height

       ii) Horizontal sync. pulse

    c) What is Flicker problem and how is it overcome? **(4)**

Unit-III

3. a) What is vestigial sideband transmission and why it is used for transmission of TV picture signals? **(8)**

    b) What do you understand by compatibility in TV transmission? **(5)**

    c) Define Luminance, Hue and saturation. **(3)**

(OR)

3. a) Explain how the 'y' and colour difference signals are developed from camera outputs? Why is the 'y' signal set **(5+3=8)**

    "$y = 0.3 R + 0.59G + 0.11B$"?

    b) Describe briefly the different type of TV transmission and reception antennas, with constructional diagram. **(8)**

Unit-IV

4. a) Draw the circuit diagram of direct coupled video amplifier and explain its main features. **(4+4=8)**

    b) What are the advantages of using AGC in television receivers? **(8)**

(OR)

4. a) Explain the use of **(3×4=12)**

       i) R.F Tuner,

       ii) Video detector,

       iii) Deflection oscillator and

       iv) EHT generation in TV receiver.

    b) Compare HDTV with normal TV receiver in terms of complexity and picture quality. **(4)**

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Unit-V

5. a) Compare the analog TV and digital TV. (8)

    b) Explain the transmission of TV signal through satellite and transponders. (8)

(OR)

5. Write short note on : (8+8=16)

    a) DTH and cable TV

    b) IPTV and DBS-TV

B.Tech. VIII Semester (Old Back) Examination, April/May - 2017

Electronics & Communication Engg.

8EC2 Radar & TV Engineering

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Sketch the block diagram of MTI RADAR with power amplifier transmitter and explain the function of each block.

   b) Briefly describe the method of lobe switching. How is conical scanning improved over lobe switching?

OR

1. a) What are pulse compression techniques? Explain them with their merits and demerits.

   b) What is meant by blind speed in a MTI RADAR? What is the effect of blind phase on i) I-channel ii) Q-channel in MTI RADAR?

Unit - II

2. a) Explain:

   i) Principle of operation of RADAR direction finder.

   ii) Block diagram of DME.

   b) Give the applications of LORAN system also explain how the range is increased.

OR

2. Write short note on :

   a) Air craft tracking systems.

   b) TACAN System.

Unit - III

3. a) Justify the need for pre and post equalizing pulses? Why is it necessary to keep their duration equal to the half line period.

   b) Sketch composite video signal wave forms for at least three successive line and indicate :

      i) Extreme white level

      ii) Blanking level

      iii) Pedestal hight

      iv) Sync pulse level

      Also justify the choice of p/s ratio $= \dfrac{10}{4}$ in the composite signal.

OR

3. a) What are the main features of PAL system? How does cancellation of phase error occur in the above system? Explain.

   b) Explain with the help of suitable sketches, how video signal is developed in vidicon camera tube? How is the vidicon different from an image orthicon and what are its special applications.

Unit - IV

4. a) What is VSB transmission and why is it used for transmission of TV picture signal? Write demerits of VSB transmission.

   b) Draw block diagram of TV transmitter and label its various sections, explain the function of each block.

OR

4. a) Explain following :

   i) Compatibility of colour and monochrome TV system.

   ii) Chrominance modulation.

   b) Explain the functions of :

   i) Colour killer.

   ii) Colour matrix.

Unit - V

5. a) Sketch the circuit diagram of vertical sync separator and explain its working.

   b) Draw complete block diagram of a monochrome TV receiver and discuss briefly each section of the receiver indicating the various waveshapes at the input and output of each block of the receiver.

OR

5. a) Briefly discuss basic idea of HDTV.

   b) Write short notes on :

   i) Common faults and their diagnosis in TV receiver.

   ii) DBS - TV.

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8E8023

8E8023

B.Tech. VIII Semester (Main&Back) Examination, April/May-2017
Electronic Instrumentation & Control Engg.
8EI4.2A MEMS and Nanotechnology
EC & EI

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

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 suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Unit-I

1. Explain Methods of Synthesis of Nano particles in details. **(16)**

OR

1. a) Discuss Various Wall Structure of Carbon nano tube with suitable diagram. **(8)**

   b) Explain Single Electron tunneling and its Current voltage Characteristics. **(8)**

Unit-II

2. Explain following Si processing methods **(any two)** : **(16)**

   a) Etching

   b) Gettering

   c) CVD

OR

2. Write a note on Lithography. **(16)**

Unit-III

3. a) Explain SEM and TEM with functional and Schematic diagram. **(16)**

OR

3. Explain NMR Spectroscopy and ESR Spectroscopy in details. **(16)**

Unit-IV

4. Explain the concept of quantum mechanics in quantum dots and explain nano sensors. **(16)**

OR

4. Explain one dimensional and two dimensional system in Quantum Mechanism. **(16)**

Unit-V

5. a) Write short note on MEMS. **(8)**

   b) What do you mean by MEMS Packaging? Explain shortly **(8)**

OR

5. Write an essay on Application of MEMS in various fields. **(16)**

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8E8025

8E8025

B.Tech. VIII Semester (Main & Back) Examination, April/May-2017
Electronics & Communication Engg.
8EC4.2A Operating Systems

Time : 3 Hours   **Maximum Marks : 80**
                                                             Min. Passing Marks : 26

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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. Describe an essential properties of the following types of operating system.

   a) Time sharing system   (5)

   b) Multiprocessor system   (6)

   c) Distributed system   (5)

OR

1. a) List and discuss the various services provided by the operating system. (8)

   b) What considerations are important in designing a real time system? (8)

Unit-II

2. a) Explain the five state process model with the help of diagram.   (8)

   b) Write short note on :

      i) Semaphore   (4)

      ii) Monitor   (4)

OR

2. a) Describe the following :

      i) Virtual Machine   (6)

      ii) Process control block   (6)

   b) Explain the turn around time and response time.   (4)

Unit-III

3. Write short note on page replacement algorithm. (16)

OR

3. a) Compare FIFO and LRU page replacement technique (8)

   b) How multi level paging and inverted page table improve the efficiency of paging? Explain paging in detail. (8)

Unit-IV

4. a) Discuss user Authentication in detail. (8)

   b) What is meant by file type and file structure? (8)

OR

4. a) Write short note on firewall. (8)

   b) Explain protection domain of access matrix. (8)

Unit-V

5. Write about deadlock avoidance algorithm in detail. How does deadlock avoidance differ from deadlock prevention? (16)

OR

5. a) What is deadlock? Explain the deadlock condition and its modeling. (8)

   b) Explain the use of resource allocation graph for deadlock avoidance. (8)

8E8103

8E8103

B.Tech. VIII Semester (Main&Back) Examination, April/May-2017
Electronic Inst. & Control Engg.
8EI3A Distributed Control Systems

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. Explain centralized and distributed control system with the help of diagram. **(16)**

OR

1. What are functional requirements of DPCS? Explain DPCS system configuration and integration with PLCs and computers. **(16)**

Unit-II

2. Explain the following : **(2×8=16)**

   a) DPCS elements

   b) State of art in DPCS

OR

2. a) Explain different cards of DPCS.

   b) Compare different DPCS systems. **(2×8=16)**

Unit-III

3. What are different types of displays for Distributed Control System (DCS)? Explain each with the help of diagram. **(16)**

OR

3. a) Explain the following : (8)

   i) Graphic Display

   ii) Loop Display

   iii) Tuning Panel

   b) Write short note on : (8)

   i) Batch/sequence display

   ii) Annunciator Display

   iii) Instrument faceplate

Unit-IV

4. Explain the following : (16)

   i) Network Topologies

   ii) Bus access methods

   iii) MAP and TOP protocols

OR

4. a) Give comparision of MODBUS, PROFIBUS and FIPBUS

   b) Write short note on :

   i) HART PROTOCOL

   ii) IEEE project 1002 on LAN implementation (2×8=16)

Unit-V

5. Explain feedback control builder, security and process reporting function. (16)

OR

5. Explain control unit, sequential control, system maintenances and utility for Distributed Control System (DCS). (16)

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8E8024

8E8024

B.Tech. VIII Semester (Main/Back) Examination, April/May - 2017
Electronic Instrumentation and Control Engg.
8EI4.3A Computer Networks
EC & EI

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. In M/M/1 queuing system calculate average waiting time of packet in the queue (Time until the start of service to the packet). (4)

   i) Draw state transition diagram for M/M/m/m queuing system. Write flow balance equation for the given queue. (6)

   ii) What is the queuing model? How you characterize queuing model? (6)

(OR)

1. Explain little's law with an example. (4)

   i) Describe pure birth and birth-death processes with the help of suitable example. (8)

   ii) Explain Kendalls Notation in detail. (4)

Unit-II

2. What is TCP/IP model? Explain the functions, and protocols and Services of each layer? Compare it with OSI model. (16)

(OR)

2. a) Discuss the principal of stop and wait flow control algorithm. Draw time line diagram and explain how loss of a frame and loss of an ACK are handled. What is the effect of delay-bandwidth product on link utilization. Differentiate it with sliding window protocol. **(8)**

   b) What are the disadvantages of circuit switching? Compare it with packet switching in detail. Also write, which of these switching you prefer for telephone networks and why? **(8)**

Unit-III

3. a) What is pure ALOHA and slotted ALOHA? Compare both. Consider the delay of both at low load, which one is less? Explain your answer. **(8)**

   b) Explain the token passing technologies used in FDDI. How are new tokens generated on FDDI network? What advantages does this method have when adding and deleting stations to/from the network of when error occurs. **(8)**

(OR)

3. a) Explain in detail CSMA/CD protocol and comment on its performance for medium access. How it detect collision. **(8)**

   b) How does ATM differ from relay? Explain the ATM layered architecture in detail. **(8)**

Unit-IV

4. a) What is the difference between adaptive and non adaptive algorithm? Explain each algorithm briefly. **(8)**

   b) Explain OSPF and types of links defined by OSPF. **(8)**

(OR)

4. a) Explain IPV6 fixed header. Also explain the various extension headers used in IPV6. **(8)**

   b) What are ARP and RARP explain in detail? **(8)**

Unit-V

5. Answer the following questions associate with congestion control. **(4×4=16)**

   i) Differentiate between token bucket and leaky bucket algorithm.

   ii) Describe all the parameters used in flow specification technique.

   iii) Rate based congestion algorithm.

iv) Choke packets and jitter control.

(OR)

5. a) Discuss the need of name resolution. Illustrate the domain name hierarchy and the steps in resolution. **(8)**

   b) Describe the message format and the message transfer and the underlying protocol involved in the working of the electronic mail. **(4)**

   c) Let the value of the RTT (Round Trip Time) is to be measured. The value of previous RTT be 350 μ sec. Let the value of L be 90% calculate the new RTT. Hence calculate the transmission time. Assume it takes segment at this moment to be acknowledgment in 90 μs. **(4)**

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8E8026

8E8026

B.Tech. VIII Semester (Main/Back) Examination, April/May - 2017
Electronics and Communication Engg.
8EC4.3A Microcontroller and Embedded Systems

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. a) Explain different flags that are stored in PSW.   (4)

   b) How 8031 microcontroller can access a 4kb external RAM? Explain it with a neat diagram?   (8)

   c) Explain the machine cycle and T state.   (4)

(OR)

1. a) Explain the function of the PIN ALE and PSEN of μ C 8051.   (4)

   b) Draw and explain the programming model of μ C 8051.   (8)

   c) What is the role of SCON and PCON register for serial data transmission in μ C 8051?   (4)

Unit-II

2. a) Explain various addressing modes of μ C 8051.   (4)

   b) Write a program to add 89F79AH to 34BC48H and save the result in RAM memory location starting at 60H.   (8)

   c) Compare long Jump and short jump instructions present in μ c 8051 programming.   (4)

(OR)

2. a) What memory locations are assigned to the interrupt present in μc 8051. **(4)**

    b) In a semester, a student has to take six cources. The marks of the student out of 80 is stored in RAM location 60H onwards. Write a program to find the average marks and save the result in memory location at 70H. **(8)**

    c) A microcontroller 8051 has crystal frequency 16MHz. Find the period of machine cycle. **(4)**

Unit-III

3. a) Explain how TMOD and TCON registers are used to provide delay in μC 8051. **(6)**

    b) Write a program creating square wave of 50% duty cycle on the port P1.5bit. Use timer 0 to generate time delay. **(6)**

    c) How a real time system is different from other computer based system. **(4)**

(OR)

3. a) Explain the structure of Interrupt Enable (IE) register. **(6)**

    b) Write a program to design a counter for counting the pulses of an input signal. The pulses to be counted are fed to pin P3.4. take XTAL = 22MHz. **(6)**

    c) Compare level triggered interrupt and edge triggered interrupt. **(4)**

Unit-IV

4. a) Draw the schematic and explain the method to connect 16×2 LCD with μC 8051 at port 3. **(8)**

    b) Write a program to interface 8LED's in such a way that they blink in alternate way. **(4)**

    c) Calculate the step size for 8 bit ADC, if V_{ref} is 5Volt. **(4)**

(OR)

4. a) Explain the interfacing of ADC with μc 8051 with the help of suitable diagram. **(8)**

    b) What is difference between band rate and bit rate? **(4)**

    c) In a given byte-addressable computer, memory location 4000H to 7FFFH, calculate total number of bytes available (in decimal). **(4)**

Unit-V

5. a) What is a real-time operating system? Explain how task swapping method works for multitasking system. **(8)**

    b) Explain the architecture and requirements for development process of embedded system. **(8)**

(OR)

5. a) Design an embedded system for industrial automation and control system. Also discuss the challenges and issues in embedded system design software development. **(8)**

    b) List out the features supported by real time linux operating system. How disk partitioning process is performed in Linux OS. **(8)**

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8E4090

B.Tech. VIII Semester (Old/Back) Examination, April/May - 2017
Electronics & Communication Engg.
8EC3 (O) Optical Communication

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to the 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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain the difference between single and multi mode fibers in detail? **(8)**

   b) What is difference between Intra model dispersion and Inter model dispersion? **(8)**

OR

1. a) Explain Plasma Activated chemical Vapor deposition (PEVD) process for optical fiber manufacturing and what are the merits of PEVD? **(8)**

   b) Define : **(4×2=8)**

   i) Snell's law   ii) Acceptance angle

   iii) Numerical aperture   iv) acceptance cone.

Unit - II

2. a) Compare the properties of LASER diode and Light emitting diode (LED) used for optical communication? **(8)**

   b) Explain the population inversion and single mode process in LASER? **(8)**

OR

2. a) Explain necessary requirements of an optical sources used for the purpose of optical communication? **(8)**

   b) What is the difference between a surface emitting LED and an edge emitting LED? **(8)**

Unit - III

3. a) Explain the quantum efficiency and responsivity of a photodiode. Determine the wavelength at which quantum efficiency and responsivity are equal? **(10)**

   b) Write applications of Avalanche photo diode (APD)? **(6)**

OR

3. a) Define the following : **(4×2=8)**

   i) Dark-current noise

   ii) Thermal noise

   iii) Signal to Noise ratio (SNR) in APD (Avalanche photodiode)

   iv) Noise equivalent power (NEP)

   b) Write advantages and disadvantages of Avalanche photodiode? **(8)**

Unit - IV

4. a) Explain various types of splices with neat diagram in fiber communication? **(8)**

   b) Explain various types of optical couplers? **(8)**

OR

4. a) Explain Losses in couplers? **(8)**

   b) Explain four basic components used in optical connectors? **(8)**

Unit - V

5. a) What are the methods of refractive index measurement explain one of them? **(8)**

   b) Explain the method (any one) of Numerical Aperture (NA) measurement? **(8)**

OR

5. Write short note on (any **two**) : **(8+8=16)**

   i) Fiber attenuation.

   ii) Fiber dispersion.

   iii) Frequency domain measurement in optical fiber.

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Roll No. _____   [Total No. of Pages : 2]

8E8046

8E8046

B.Tech. VIII Semester (Main/Back) Examination, April/May-2017
Electrical and Electronics Engineering
8EX4.3A VHDL

Time : 3 Hours   Maximum Marks : 80
                                                        Min. Passing Marks : 26

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 suitable by assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) What is the history of VHDL?   (8)

   b) What are the five design constructs of VHDL? Explain briefly. (8)

OR

1. a) Explain briefly various types of data-types in VHDL?   (8)

   b) Explain briefly various types of operators in VHDL.   (8)

Unit-II

2. a) Write a program of 4:1 multiplexer in VHDL?   (8)

   b) Write VHDL program of binary to grey convertor with diagram. (8)

OR

2. a) Draw and explain BCD to 7-segment display decoder with diagram. (8)

   b) Write VHDL program of 2 to 4 decoder with diagram.   (8)

Unit-III

3. a) Write VHDL program of JK flip flop with diagram.   (8)

   b) Write VHDL program of D flip flop with diagram.   (8)

OR

3. a) Write VHDL program of 4-bit shift register with diagram. (8)

    b) Draw and explain sequential circuit with diagram. (8)

Unit-IV

4. a) What Finite State Machine (FSM)? Explain mealy and moore type FSM.

    (4+4=8)

    b) Design a synchronous sequential circuit using D flip flop for sequence detector, that detect the occurence of particular pattern on its input and that follows below condition : (8)

    - One input w, one output z, circuit and positive edge triggered,

    - The output z =1, if during two immediate preceding clock cycles the input 'w' was equal to 1, otherwise z = 0?

OR

4. a) Write VHDL code of serial adder. (8)

    b) Explain vending machine using state diagram and block diagram. (8)

Unit-V

5. a) Draw and explain CPU organization and its design concepts. (8)

    b) Draw and explain clock synchronization. (8)

OR

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

    b) What is memory organization? Draw a diagram of a single SRAM cell.

    (4+4=8)

52+

8E4096

8E4096

B.Tech. VIII Semester (Main/Back) Examination, April/May-2017
Applied Electronics and Instrumentation Engg.
8AI1 Instrumentation in Industries
AI & EI

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) How standardization of instrumentation is achieved in process industries. **(8)**

   b) Explain the use of specialized process plant instrumentation in overcoming the effects of corrosive nature of materials and hazardous environment. **(8)**

OR

1. a) Draw the chart of various levels and positions of different engineers and compare the role of process instrumentation engineer with them. **(8)**

   b) Draw and explain the man power distribution curve for process industries. **(8)**

Unit-II

2. a) Draw and explain the C&I of reactor pressure control by throttling flow of rent. **(8)**

   b) Draw and explain the C&I of reactor temperature control with recirculation. **(8)**

OR

2. a) Explain the control loops of continuous control of reactor pressure. **(8)**

   b) Explain the C&I of cascade temperature control with heating and cooling capability. **(8)**

Unit-III

3. Explain the following control loops with neat sketches :

   a) Control valve in condensate line of heat exchanger. (8)

   b) Hot gas by pass control of condensers. (8)

OR

3. Explain the following control loops with neat sketches :

   a) Temperature-flow cascade control loop on steam reboiler. (8)

   b) Condenser control by changing the wetted surface area. (8)

Unit-IV

4. a) Explain the principles and classifications of dryers with neat diagrams. (8)

   b) Explain the C&I of falling film evaporators. (8)

OR

4. a) Explain the control schemes of centrifugal pumps with applications, merits and demerits. (8)

   b) Explain the C&I of long tube vertical evaporators. Discuss its merits and demerits also. (8)

Unit-V

5. a) What are the selection criteria of instrumentation for steam power plants. Explain the various control techniques are implemented in steam power plants. (8)

   b) What do you mean by data logging? Explain the control loops of feed water control system for power plant. (8)

OR

5. Write short notes on the following :

   a) Boiler drum level control. (8)

   b) Interlocking and safety system in power plants. (8)

Roll No. _____   [Total No. of Pages : 2]

8E8101

8E8101

B.Tech. VIII Semester (Main/Back) Examination, April/May-2017
Electronic Instrumentation & Control Engg.
8EI1A Industrial Electronics

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

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 suitable be dassumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) Explain the working of SCR in Reverse blocking mode.   (8)

    b) Discuss the I-V characteristic of Triac.   (8)

OR

1. a) Explain the turn-on and turn-off process of GTO.   (8)

    b) Discuss the IGBT functioning.   (8)

Unit-II

2. a) Explain the working of single phase half wave rectifier with R load.   (8)

    b) Find the time required to deliever a charge of 200 Ah through a single phase half wave diode rectifier with an O/P current of 100 A rms and with sinusoidal input voltage. Assume diode conduction over a half cycle.   (8)

OR

2. Draw the current and voltage wave forms of single phase current source inverter with R load and explain.   (16)

Unit-III

3. a) What is the principle of chopper operation?   (8)

    b) Explain the functioning of step-up chopper.   (8)

OR

3. Write technical note on :   **(2×8=16)**

    a)   Fly back converter

    b)   Uninterruptible power supply

Unit-IV

4. Explain the power control of DC motor using chopper drive.   **(16)**

OR

4. Explain the speed control of three phase induction motor using frequency control methods.   **(16)**

Unit-V

5. Explain the permanent magnet and hybrid stepper motors in detail.   **(16)**

OR

5. Write technical note on :   **(2×8=16)**

    a)   Variable reluctance

    b)   Induction and dielectric heating control.

Roll No. _____   [Total No. of Pages : 4]

8E8102

8E8102

B.Tech. VIII Semester (Main&Back) Examination, April/May-2017
Electronic Inst. & Control Engg.
8EI2A Non-Linear Control Systems

Time : 3 Hours   Maximum Marks : 80
                                                           Min. Passing Marks : 26

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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit-I

1. The non-linear dynamic equation for a pendulum is given by

    $$ml\ddot{\theta} = -mg\sin\theta - kl\dot{\theta}$$

    Where $l > 0$, $m > 0$ and $k > 0$ and l is the length of the pendulum, m is the mass and k is a friction parameter. θ is the angle subtended by the rod and the vertical axis through the pivot point.
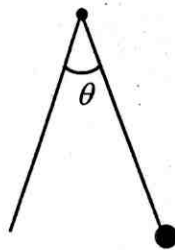

Fig. The Pendulum

   a) Choose appropriate state variable and write down the state equations.   (4)

   b) Find all equilibria of the system   (4)

   c) Linearize the system around the equilibrium points, and determine if the system equilibria are locally asymptotically stable.   (8)

OR

1. Consider the model of a motor with a non linear valve in fig. Assume that the valve characteristics is given by $f(x) = x^2$ (this is unrealistic for $x < o$).

   a) Choose appropriate state variable and write down the state model. **(4)**

   b) For which constant input amplitudes $r > 0$ does the system have a locally stable equilibrium. **(4)**

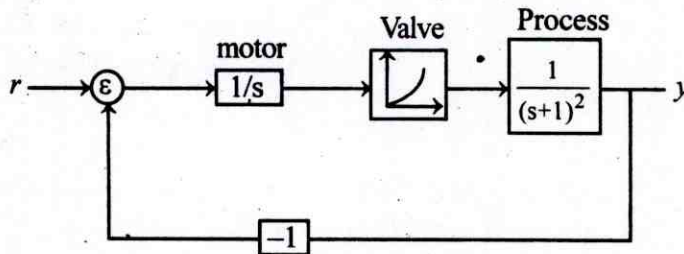   c) What would be a more realistic valve model for $x < o$. **(8)**

Fig. Block diagram of system

Unit-II

2. The system shown in fig. represents a satellite control system with rate feedback provided by a gyroscope. Draw phase portrait of the system and determine the system's stability. **(16)**
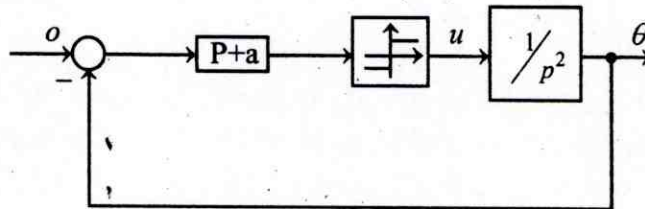

Fig. Satellite control system with rate feedback

OR

2. Consider the non linear system

$$\dot{x} = y + x\left(x^2 + y^2 - 1\right)\sin\left(\frac{1}{x^2 + y^2 - 1}\right)$$

$$\dot{y} = -x + y\left(x^2 + y^2 - 1\right)\sin\left(\frac{1}{x^2 + y^2 - 1}\right)$$

Solve the above equations, shown that the system has infinite number of limit cycles. Determine the stability of these limit cycles. **(16)**

8E8102   (2)

Unit-III

3. Determine whether the system in fig. exhibits a self-sustained oscillation if so determine the stability; frequency and amplitude of the oscillation. **(16)**
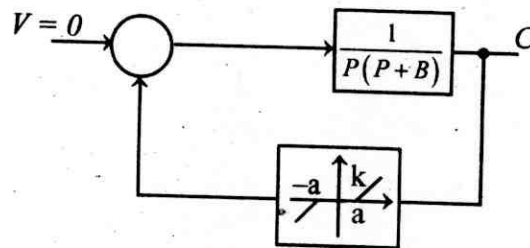

Fig. a non-linear system containing a dead-zone

OR

3. a) Compute the describing function for a static non-linearity of the form $f(x) = k_1 x + k_2 x^2 + k_3 x^3$. How does the form $k_2 x^2$ influence the analysis. **(8)**

   b) Show that all odd, static non-linearities f such that $\dfrac{df(x)}{dx} > 0, \dfrac{d^2 f(x)}{dx^2} > 0$ for $x > 0$, have a real describing function $\psi(\cdot)$ that satisfies the in equalities.
   $\psi(a) < \dfrac{f(a)}{a}; a > 0$. **(8)**

Unit-IV

4. a) Use krasovskii's method to justify lyapunov's linearization method. **(8)**

   b) Consider the system

   $$\dot{x} = 4x^2 y - f_1(x)\left(x^2 + 2y^2 - 4\right)$$

   $$\dot{y} = -2x^3 - f_2(y)\left(x^2 + 2xy^2 - 4\right)$$

   Where the continuous function f_1 and f_2 have the same sign as their argument. Show that the system tends towards a limit cycle independent of the explicit expressions of f_1 and f_2. **(8)**

OR

4. Consider the system

$$\dot{x}_1 = x_2$$

$$\dot{x}_2 = x_1 - \text{sat}\left(2x_1 + x_2\right)$$

a) Show that the origin is asymptotically stable. **(5)**

b) Show that the origin is not globally asymptotically stable. **(5)**

c) Show that all trajectories starting in the first quadrant to the right of the curve. $x_1 x_2 = C$ for sufficiently large C, cannot reach the origin. **(6)**

Unit-V

5. Put in normal form the non-linear system

$$\dot{y} + yz^2 \ln\left(z^4 + 1\right) = u$$

$$\ddot{z} + \dot{z}^5 + z^3 + yz^2 = 5u$$

Where u is the control input. Can the system be locally/globally stabilized. Is the system minimum phase. **(16)**

OR

5. Consider the system :

$$\dot{x}_1 = x_1 + u$$

$$\dot{x}_2 = x_1$$

$$y = x_2$$

Show that the control law $u = -2x_1 - \text{sign}\left(x_1 + x_2\right)$ will make $\sigma(x) = x_1 + x_2 \to 0$ into a sliding mode. Determine the equivalent dynamics on the sliding plane $\sigma(x) = 0$. **(16)**

Roll No. _____   [Total No. of Pages : 2]

8E4097

B.Tech. VIII Semester (OldBack) Examination, April/May-2017
Electronics Instrumentation & Control Engg.
8EI2(O) Non-Linear Control Systems

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

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. Explain the construction of phase trajectories. Give suitable example in support of your answer. **(16)**

OR

1. Define Non-linearities. Explain non linear system behaviour and discuss its analysis. **(16)**

Unit-II

2. a) List down the fundamentals of Lyapunov theory. **(10)**

   b) Discuss the concept of stability. **(6)**

OR

2. a) Differentiate Autonomous and non autonomous systems. **(8)**

   b) What do you mean by local and global stability. Justify your answer with suitable example? **(8)**

Unit-III

3. Explain with suitable diagram, functions of common non-linearities. **(16)**

OR

3. a) Define continuous and discontinuous non-linearities. **(6)**

   b) Describe function analysis and basic assumptions of non linearities. **(10)**

Unit-IV

4. What are available methods of non linear control design? Explain with example.

    (16)

OR

4. a) List down non linear control problems.   (8)

    b) Explain stabilization and tracking of non-linear control system.   (8)

Unit-V

5. Write short note on :   (2×8)

    a) Robustness of adaptive control systems

    b) Extention to non-linear plants

OR

5. a) Discuss control of first order systems.   (8)

    b) Explain the concept of reference adaptive control.   (8)