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06EC81

Eighth Semester B.E. Degree Examination, May/June 2010
Wireless Communication

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Briefly explain the different generations of cellular systems. **(10 Marks)**

b. Explain the AMPS (advanced mobile phone system) network operations, for a mobile originated call. **(10 Marks)**

2 a. What is the function of the visitor location register? **(04 Marks)**

b. Explain the purpose of global title and global title translation for a cellular system. **(06 Marks)**

c. What are the functions of the mobile switching centre (MSC)? With a neat block diagram, explain the components of the MSC. **(10 Marks)**

3 a. Explain the differences between cell splitting and cell sectoring. **(06 Marks)**

b. Explain the concept of mobility management. With a figure, explain the three basic functions performed by the location management. **(10 Marks)**

c. Write a note on network security. **(04 Marks)**

4 a. Explain with a neat schematic, the GSM network interfaces and protocols. **(10 Marks)**

b. Briefly explain the GSM channel concept. **(10 Marks)**

PART – B

5 a. Define MSRN. What is the purpose of mobile station roaming number? Also explain the GSM call setup using the MSRN. **(10 Marks)**

b. Explain the TDMA concept. How it is implemented in GSM? **(10 Marks)**

6 a. Explain with a neat diagram, the network nodes found in a CDMA 2000 wireless system. **(10 Marks)**

b. Explain with a neat block diagram, the generation of the CDMA paging channel signal. **(10 Marks)**

7 a. Define OFDM. Briefly explain this OFDM technique. **(06 Marks)**

b. Explain the basic operation and characteristics of spread spectrum modulation systems. **(10 Marks)**

c. Define ultra – wide band radio technology. **(04 Marks)**

8 a. Explain the details of Bluetooth protocol stack, with a figure. **(10 Marks)**

b. Describe the basic wireless MAN. **(04 Marks)**

c. Describe the basic difference between a wireless LAN and a wireless PAN. **(06 Marks)**

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06TE81

Eighth Semester B.E. Degree Examination, May/June 2010
Optical Communication and Networking

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. With the help of a diagram, explain the evolution of optical fiber transmission system. **(07 Marks)**

b. What are the different multiplexing techniques for increasing transmission capacity of an optical fiber? **(07 Marks)**

c. What are solitons? Explain why solitons are said to be the key to realize very high bit rates. **(06 Marks)**

2 a. Briefly explain the functions and principle of operation of :
i) Directional coupler ; ii) Isolator ; iii) Circulator. **(12 Marks)**

b. What are fiber gratings? Describe a simple optical add/drop element based on fiber Bragg gratings. **(08 Marks)**

3 a. Briefly explain the structure of :
i) Distributed feedback laser and distributed Bragg reflector laser.
ii) External cavity laser.
iii) Vertical cavity surface emitting laser. **(10 Marks)**

b. What are the main considerations in building large switches? **(04 Marks)**

c. What is wavelength conversion? What are the different methods of wavelength conversion? **(06 Marks)**

4 a. What is cross talk? Explain different approaches to reduce switch cross talk. **(10 Marks)**

b. What is an optical amplifier? How to introduce equalization at each amplifier stage? Explain. **(10 Marks)**

PART – B

5 a. Describe the advantages of SONET/SDH over PDH. **(06 Marks)**

b. What type of hierarchical multiplexing structures is employed in SONET and SDH? **(06 Marks)**

c. Describe the second generation optical network layers. **(08 Marks)**

6 a. What are various kinds of wavelength routing networks? **(10 Marks)**

b. In the wavelength routing networks, what are architectural variations? **(10 Marks)**

7 a. Describe the virtual topology design problems. **(10 Marks)**

b. What are the different types of protection techniques for point – to – point links? **(10 Marks)**

8 Write short notes on :
a. HFC hybrid fiber coax.
b. FTTC fiber to the curb.
c. A broadcast and select PON.
d. Upgrading transmission capacity. **(20 Marks)**

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06EC82

Eighth Semester B.E. Degree Examination, May/June 2010
Embedded System Design

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Mention the characteristics and briefly list the design metrics of an embedded system. **(08 Marks)**

b. Determine the percentage of revenue loss if the products life time is 86 weeks and the delay in the market is 8 weeks. Derive the formula used for this calculation. **(06 Marks)**

c. Explain how the top-down design process improves the productivity. **(06 Marks)**

2 a. Briefly explain the purpose of the data path and controller in a single purpose processor. **(06 Marks)**

b. Write an efficient algorithm for finding the GCD of two integer numbers. Also explain how the FSMD for this can be optimized. **(08 Marks)**

c. Explain various addressing modes that are commonly used by processors, with an example. **(06 Marks)**

3 a. Explain how UART is used for communication. List its advantages. **(08 Marks)**

b. What is a watch dog timer? List its uses. A 16 bit timer operates at a clock frequency of 12 MHz. Determine the resolution and range of this timer. **(06 Marks)**

c. The analog input range for a 8-bit ADC is from -2.5V to 8.5V. Determine the resolution of ADC and digital output in hexadecimal, when the input voltage is 1.2V. Trace successive approximation steps and show the binary output of the ADC. **(06 Marks)**

4 a. What is memory hierarchy? How does the cache operate? Discuss the cache mapping techniques. List their merits and demerits. **(10 Marks)**

b. Briefly explain OTPROM, EEPROM, RDRAM and FPM DRAM. **(10 Marks)**

PART – B

5 a. Explain the need for interrupts in processors and mention briefly the various events that take place when a processor is interrupted. **(10 Marks)**

b. Explain the problems of shared-data interrupts and suggest the solution to solve the problems. **(10 Marks)**

6 a. Explain with an example, how the Round-Robin architecture works. What is its limitation? **(12 Marks)**

b. List the characteristics of four software architectures available for building embedded software. **(08 Marks)**

7 a. Mention the two rules of interrupt routines in an RTOS environment. With an example, briefly explain, what happens when each rule is violated. **(15 Marks)**

b. Describe the use of message queues. **(05 Marks)**

8 a. What is meant by encapsulating the semaphores? Bring out the need for it. **(08 Marks)**

b. Explain any six problems of semaphores. **(06 Marks)**

c. Explain the methods to solve memory space and methods to save power. **(06 Marks)**

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06EC832

Eighth Semester B.E. Degree Examination, May/June 2010
Network Security

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Draw the model of network security. Explain it briefly. **(06 Marks)**

b. Classify the various security attacks and define them. **(06 Marks)**

c. Encrypt the plaintext = "SECURITY" using Hill Cipher technique. Key=$\begin{pmatrix} 7 & 8 \\ 19 & 3 \end{pmatrix}$. **(08 Marks)**

2 a. In S-DES, 10 bit key is 1010000010. Find the subkeys k_1 and k_2 , if
P_{10} = 3 5 2 7 4 10 1 9 8 6 and
P_8 = 6 3 7 4 8 5 10 9 **(06 Marks)**

b. With a neat diagram, explain the single round of DES encryption. **(08 Marks)**

c. Discuss the evaluation criteria of AEs. **(06 Marks)**

3 a. Write the RSA algorithm. **(04 Marks)**

b. Define the elliptic curve over Z_p. Also write the corresponding addition formula. **(04 Marks)**

c. In Diffie – Hellman key exchange, q = 71, its primitive root α = 7. A's private key is 5, B's private key is 12. Find i) A's public key ii) B's public key iii) Shared secret key. **(06 Marks)**

d. With neat diagrams, describe any three ways in which hash functions can be used. **(06 Marks)**

4 a. What is a digital signature? What are its requirements? Discuss direct digital signatures and arbitrated digital signatures. **(08 Marks)**

b. Write the digital signature algorithm. With block diagrams, explain functions of signing and verification of digital signatures. **(12 Marks)**

PART – B

5 a. Explain secure socket layer (SSL) protocol stack with a neat diagram and define the different parameters used in session and connection states. **(10 Marks)**

b. What is the need of dual signature in SET? Describe with block diagram, how they are constructed. **(10 Marks)**

6 a. Write short notes on:
i) Statistical anomaly detection ii) Rule based intrusion detection. **(10 Marks)**

b. What are the four basic techniques of choosing passwords? Compare their relative merits. **(10 Marks)**

7 a. Give the taxonomy of malicious programs. List the software threats and explain them. **(10 Marks)**

b. Discuss the following: i) Email viruses ii) Digital immune system. **(10 Marks)**

8 a. What is a firewall? Explain the various types of firewall configurations, with relevant diagrams. **(10 Marks)**

b. With reference to the concept of trusted systems, explain i) Multilevel security requirements ii) Reference monitor property. **(04 Marks)**

c. With a neat diagram, explain the working of a packet-filtering router. **(06 Marks)**

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06EC836

Eighth Semester B.E. Degree Examination, May/June 2010
Fuzzy logic

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Distinguish between fuzziness and randomness. **(08 Marks)**

b. Explain the operations of fuzzy set, with an example. **(12 Marks)**

2 a. Explain the fuzzy cartesian product and composition, with an example. **(10 Marks)**

b. Explain the membership values that are contained in a relation. **(10 Marks)**

3 a. Describe the features of the membership function. **(08 Marks)**

b. What is fuzzification process? Explain. **(04 Marks)**

c. Describe inductive reasoning type of membership assignment. **(08 Marks)**

4 a. Explain the different defuzzification methods. **(08 Marks)**

b. Suppose we have a crisp set $A = \{0,1\}$ or $A\left[\frac{0}{-2}+\frac{0}{-1}+\frac{1}{0}+\frac{1}{1}+\frac{0}{2}\right]$ and it is deified on the universe. X = {-2, -1, 0, 1, 2] and mapping is y = |4x| + 2. Find the resulting crisp set B on an output universe Y using the extension principle. **(12 Marks)**

PART – B

5 a. What are the logical connectives used in fuzzy logic? **(08 Marks)**

b. Given fuzzy set for speed of motor, slow speed = $A\left[\frac{1}{1}+\frac{0.5}{2}+\frac{0}{3}+\frac{0}{4}+\frac{0}{5}\right]$

Mostly counters clockwise $B = \left[\frac{0}{0^\circ}+\frac{0}{45^\circ}+\frac{0}{90^\circ}+\frac{0.5}{135}+\frac{1}{180^\circ}\right]$

around neural direction $C = \left[\frac{0}{0^\circ}+\frac{0.5}{45^\circ}+\frac{1}{90^\circ}+\frac{0.5}{135}+\frac{0}{180}\right]$

Find $A \times B$, $\overline{A} \times B$, $R = [A \times B] \cup [\overline{A} \times y]$. **(12 Marks)**

6 a. Explain the canonical rule forms. **(06 Marks)**

b. Explain decomposition of compound rules. **(06 Marks)**

c. Explain the graphical techniques of interference. **(08 Marks)**

7 a. Explain the fuzzy ordering method of decision making. **(10 Marks)**

b. Explain the multiobjective decision making process in a fuzzy system. **(10 Marks)**

8 Write short notes on :

a. Fuzzy relations

b. Hard C-means (HCM)

c. Fuzzy C- means (FCM). **(20 Marks)**

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06EC841

Eighth Semester B.E. Degree Examination, May/June 2010
Multimedia Communications

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. With the help of a diagram, describe the main components of PSTN, and show how a high – speed modem provides multiple services in addition to basic telephony. **(10 Marks)**

b. Explain the working of CO packet switched network including routing table. **(08 Marks)**

c. Briefly explain the following operational modes of a communication channel :
i) Duplex ; ii) Multicast. **(02 Marks)**

2 a. Explain the principle of operation of a PCM speech codec, with a block diagram. **(06 Marks)**

b. Find out the time taken to transmit the following digitized images at both 64 Kbps and 1.5 Mbps.
i) a 640 x 480 x 8 VGA compatible image
ii) a 1024 x 768 x 24 SVGA compatible image. **(04 Marks)**

c. With the aid of diagrams describe the following digitization formats : i) 4 : 2 : 2 ; ii) QCIF. For each format, state the temporal resolution, spatial resolution, bit rate and give an example application of each format. **(10 Marks)**

3 a. A series of messages is to be transmitted between computers over a PSTN. The messages comprise the characters A through H. The probability of each character is as follows :
A and B = 0.25 C and D = 0.14 E, F, G and H = 0.055.
i) Use Shanon's formula to derive the minimum average number of bits/character.
ii) Use Huffman coding to derive the codeword and prove that this is the minimum set by constructing the corresponding Huffman code tree. **(14 Marks)**

b. With the help of a block diagram, identify the five main stages associated with the baseline mode of operation of JPEG encoder and give a brief description of the role of image/block preparation. **(06 Marks)**

4 a. Explain how better sound quality can be obtained using subband coding ADPCM, with the help of block diagrams and signal encoder and signal decoder. **(10 Marks)**

b. Draw the block diagram of H.261 video encoder and explain the role of FIFO buffer and the associated high and low threshold values. **(10 Marks)**

PART – B

5 a. In relation to the spanning tree algorithm, explain the meaning of the following terms:
i) Root bridge
ii) Designated cost
iii) Root path cost and root port
iv) Designated bridge and designated port. **(10 Marks)**

b. Explain the principle of operation of a token ring network, with the help of a diagram. **(10 Marks)**

6 a. With respect to IP datagram/packet format, explain the role of the following header fields.
   i) IHL
   ii) TOS
   iii) Total length
   iv) Flag bits. **(08 Marks)**

   b. What is the meaning of IP address class? With the help of a diagram, explain the different types of IP address formats. **(08 Marks)**

   c. Explain how RARP is used to enable a diskless host to determine its own IP address from its local server. **(04 Marks)**

7 a. With the help of a diagram, explain broadband ATM cell formats. **(10 Marks)**

   b. Explain the general structure of ATM switch architecture. **(10 Marks)**

8 a. Explain the meaning of the following terms in relation to the operation of TCP :
   i) Reliable stream service
   ii) Segment
   iii) Maximum segment size.
   State why both flow control and congestion control procedures are required with TCP. **(08 Marks)**

   b. With the aid of a diagram, explain briefly UDP datagram header fields. **(04 Marks)**

   c. In relation to the RTP packet format, explain briefly the meaning and use of the following fields :
   i) CC and CSRC
   ii) M and payload type
   iii) Sequence number. **(08 Marks)**

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06EC844

Eighth Semester B.E. Degree Examination, May/June 2010
GSM

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting at least TWO questions from each part.*
2. Use of Erlang table allowed.

PART – A

1 a. With relevant figures, explain GSMPLMN. What are its objectives and services? **(08 Marks)**
b. With a neat block diagram, explain mapping of GSM on to OSI layers. **(07 Marks)**
c. Write a note on MS subsystem. **(05 Marks)**

2 a. What are the future techniques to reduce interference in GSM? **(10 Marks)**
b. Calculate the number of calls required with :
i) Normal antenna and ii) Adaptive array antenna having four elements for the following data : (Assume hexagonal cell). **(10 Marks)**

Coverage area	= 60,000 mile^2
One - way system band width	= 12.5 MHz.
Channel spacing	= 200 kHz
Frequency reuse factor	= 4
MS output power	= 800 mW
BS antenna gain	= 20 dB
Receive cable/connector loss	= 2dB
MS antenna gain	= 0 dB
Required S/I ratio	= 12 dB
Information rate	= 271 kbps
Receiver noise figure	= 7 dB
Propagation path loss exponent	= 4
One-mile path loss intercept	= 80 dB
Lognormal fading margin	= 10 dB
KT	= -174 dB m/Hz.

3 a. Explain various bursts used in GSM, with the help of diagrams. **(10 Marks)**
b. Describe the mobile identification process. **(05 Marks)**
c. Explain the data encryption method used in GSM. **(05 Marks)**

4 a. List the speech coding methods and explain the attributes of speech coder. **(08 Marks)**
b. Explain with illustration, working of full rate vocoder. **(06 Marks)**
c. Write short note on ITU-T standards. **(06 Marks)**

PART – B

5 a. Explain message flow diagram for call set up by mobile station. **(10 Marks)**
b. Describe intra-MSC hand over in GSM. **(10 Marks)**

6 a. Name all the data services provided by GSM network. Explain SMS in brief with relevant figures. **(08 Marks)**

b. Explain the call flow for token based registration. **(07 Marks)**

c. What are the security algorithms used in GSM? Explain them briefly. **(05 Marks)**

7 a. What are the factors considered for design of a wireless system? **(04 Marks)**

b. Write short note on spectral efficiency of wireless system. **(08 Marks)**

c. Using the following data for a GSM system calculate :

i) Average busy – hour traffic per subscriber

ii) Traffic capacity per cell

iii) Required number of BSs per zone and the hexagonal cell radius for the zone.

Given :

Subscriber usage per month	= 120 min
Days per month	= 24
Busy hours per day	= 5
Allocated spectrum	= 5 MHz
Frequency reuse plan	= 4/12
RF channel width	= 200 kHz, full rate
Capacity of a BTS	= 32 Erlangs
Subscribers in the zone	= 60,000
Area of the zone	= 500 km^2
(Traffic capacity of a sector at 2% GoS for 16 channels	= 9.82)

(08 Marks)

8 a. What are the five TMN layers in M3010? Explain the pertinent three TMN layers. **(08 Marks)**

b. What are the management requirements for a wireless network? **(06 Marks)**

c. Explain simplified TMN physical architecture with necessary diagram. **(06 Marks)**

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