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06EC81

Eighth Semester B.E. Degree Examination, June 2012

Wireless Communication

Time: 3 hrs.

Max. Marks: 100

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

PART - A

- 1 a. Compare 1G, 2G and 3G cellular systems. (06 Marks)
- b. Explain the different steps involved in AMPS mobile-originated call. (10 Marks)
- c. What are the basic characteristics of 4G cellular systems? (04 Marks)
- 2 a. Describe the home location register (HLR) implementation and its operation. (06 Marks)
- b. With a neat sketch, explain the hardware view of a cellular network. (08 Marks)
- c. Explain mobile station ISDN (MSISDN) Identification Number. Give an example. (06 Marks)
- 3 a. Explain the capacity expansion techniques: cell splitting and cell sectoring. (08 Marks)
- b. What is mobility management? Explain location management of a mobile station. (08 Marks)
- c. For a particular radio transmission technology, a minimum S/I ratio of 15 dB is needed for proper operation. What is the minimum required cluster size if the path loss exponent is $\alpha = 4$? Assume that there are six co-channel cells in the first tier and all of them are at the same distance from the mobile. (04 Marks)
- 4 a. With a neat sketch, explain GSM network architecture. (10 Marks)
- b. Describe the GSM TDMA time slot. (04 Marks)
- c. Contrast the GSM hyper frame, super frame, multi frame and TDMA frame. (06 Marks)

PART - B

- 5 a. With a neat sketch, explain the detailed steps required for radio resource connection establishment in GSM cellular systems. (10 Marks)
- b. What is the basic difference between intra-BSC handover and inter-BSC handover? (06 Marks)
- c. Why is a modified version of LAPD necessary for the Um interface? (04 Marks)
- 6 a. Explain the network nodes found in a 'Cdma 2000' wireless system. (08 Marks)
- b. Describe the CDMA mobile operation known as access channel probing. (06 Marks)
- c. Explain the following briefly in case of CDMA systems: (06 Marks)
 - i) Soft handoff
 - ii) Softer handoff
 - iii) Soft softer handoff
 - iv) Hard handoff
- 7 a. Explain the error detection and correction codes used for wireless telecommunications. (08 Marks)
- b. Describe an OFDM modulation system. (08 Marks)
- c. What is the received power in dBm for a signal in free space with a transmitting power of 10 Watts, frequency of 1900 MHz and distance from the receiver of 2 km if the transmitting antenna and receiving antenna have the same gain of approximately 1.6? What is the path loss in dB? (04 Marks)
- 8 a. What are the basic goals of the IEEE 802.11 wireless LAN standards? (06 Marks)
- b. Explain the components of the Bluetooth architecture. (08 Marks)
- c. How is system capacity typically increased for a wireless MAN? (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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06EC82

Eighth Semester B.E. Degree Examination, June 2012
Embedded System Design

Time: 3 hrs.

Max. Marks:100

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

PART - A

1.
 - a. What is an embedded system? Why is it so hard to define? (04 Marks)
 - b. Define time-to-market and NRE cost matrices? The life time of a product is 58 weeks. If the product is delayed by 5 weeks, determine the percentage revenue loss? Determine the per product cost if NRE cost is Rs.500000.00 and unit cost is Rs.8000.00 and company produces 6000 units of that product. (08 Marks)
 - c. Explain how the top-down design process improves the productivity. (08 Marks)

2.
 - a. Explain the purpose of controller and datapath in a single purpose processor. (04 Marks)
 - b. Write a simple algorithm to find GCD of two integer numbers. Write FSM D for this algorithm and explain how it can be optimized. Also write its optimized FSM D. (08 Marks)
 - c. Explain in brief, standard software development process used in embedded system. (08 Marks)

3.
 - a. What is watch-dog timer? What is its use? A 16-bit timer operates at a clock frequency of 20 MHz. Determine the resolution and range of this timer. If a ÷ 4 prescaler is also used, what is the range and resolution of this design? (06 Marks)
 - b. Highlight the advantages of using data in digital form over its analog form. Explain the working of successive approximation type of analog to digital converter, with an example. (10 Marks)
 - c. Explain the features of flash memory and DRAM. (04 Marks)

4.
 - a. Explain in brief, the memory hierarchy and cache operation. Given the following three cache designs, find the one with the best performance, by calculating the average cost of access.
 - i) 4 kbytes, 8-way set associative cache with 6% miss rate. Cache hit costs 1-cycle, cache miss costs 12-cycles.
 - ii) 8 kbytes, 4-way set associative cache with 4% miss rate. Cache hit costs 2-cycles, cache miss costs 12-cycles.
 - iii) 16 kbytes, 2-way set associative cache with 2% miss rate. Cache hit costs 3-cycles, cache miss costs 12-cycles. (10 Marks)
 - b. Design a 2k×16 ROM using 1k×8 ROM using an address decoder. (04 Marks)
 - c. Write the features of USB and IEEE 802.11 protocol. (06 Marks)

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PART – B

- 5 a. With an example, explain shared data problem. Also explain how an interrupt facility can solve this shared data problem. (10 Marks)
- b. Define interrupt latency. Mention the factors that affects interrupt latency. (04 Marks)
- c. Explain in brief, Function-Queue-Scheduling architecture. (06 Marks)
- 6 a. Briefly compare the methods for intertask communication. (10 Marks)
- b. Explain in brief, three different states of task in RTOS. (05 Marks)
- c. Briefly compare the three methods of protecting shared data. (05 Marks)
- 7 a. What are the two rules, that interrupt routines in most RTOS environment must follow, that do not apply to task codes? (05 Marks)
- b. Illustrate with suitable examples and explain what happens when each rule of question no.7a is violated. (15 Marks)
- 8 a. With suitable example, explain encapsulating semaphores. (08 Marks)
- b. Briefly explain any six problems with semaphores. (07 Marks)
- c. Give the hard real-time scheduling considerations. (05 Marks)

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06EC836

Eighth Semester B.E. Degree Examination, June 2012
Fuzzy Logic

Time: 3 hrs.

Max. Marks:100

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

PART - A

- 1 a. What are the utilities and limitations of fuzzy logic? (06 Marks)
 b. What are the properties of classical sets? (08 Marks)
 c. Mention the various fuzzy set operations. (06 Marks)

- 2 a. For the two discrete fuzzy sets given, calculate the value of the operations $\bar{A}, \bar{B}, A \cup B, A \cap B, A/B = A \cap \bar{B}, B/A = B \cap \bar{A}, A \cup \bar{B} = \bar{A} \cap \bar{B}, A \cap \bar{B} = \bar{A} \cup \bar{B}$

$$A = \left\{ \frac{1}{2} + \frac{0.5}{3} + \frac{0.3}{4} + \frac{0.2}{5} \right\} \text{ and } B = \left\{ \frac{0.5}{2} + \frac{0.7}{3} + \frac{0.2}{4} + \frac{0.4}{5} \right\}$$

(Membership for element 1 in both A and B is 0).

Assume any missing data suitably. (08 Marks)

- b. What are the different ways of performing value assignments? Explain cosine amplified and Min-Max method in detail. (08 Marks)

- c. For the following fuzzy relations

$$R = \begin{matrix} & y_1 & y_2 \\ x_1 & \begin{bmatrix} 0.7 & 0.5 \end{bmatrix} \\ x_2 & \begin{bmatrix} 0.8 & 0.4 \end{bmatrix} \end{matrix} \text{ and } S = \begin{matrix} & z_1 & z_2 & z_3 \\ y_1 & \begin{bmatrix} 0.9 & 0.6 & 0.2 \end{bmatrix} \\ y_2 & \begin{bmatrix} 0.1 & 0.7 & 0.5 \end{bmatrix} \end{matrix}, \text{ Where}$$

R denotes relationship for $X \times Y$

S denotes relationship for $Y \times Z$.

Determine fuzzy max-min composition and fuzzy max-product composition. Assume any missing data suitably. (04 Marks)

- 3 a. Explain the features of membership functions in detail. (10 Marks)
 b. What is defuzzification? Mention any 4 methods of defuzzification to scalar. (10 Marks)

- 4 a. Explain the vertex method of extensions. (07 Marks)

- b. Consider the expression $y = f(x) = x(2-x)$, where the fuzzy i/p variable x, has a membership function shown in Fig.Q4 (b). Determine B_λ using vertex method at λ - cut levels for $\lambda = 0^+, 0.5, 1$ Let $I_{0^+} = [0.5, 2], I_{0.5} = [0.75, 1.5], I_1 = [1, 1]$ and $E_1 = 1$. Represent the interval corresponding to the λ -cuts on a graph. Assume any missing data suitably. Also plot $B_{0^+}, B_{0.5}$ and B_1 to form fuzzy o/p. (07 Marks)

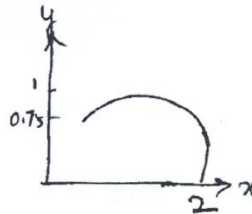


Fig.Q4 (b)

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- c. Write short notes on fuzzy transform mapping. (06 Marks)

PART – B

- 5 a. Mention the 5 logical connectives used to form logical expressions for a given proposition.
 $P: x \in A, \bar{P}: x \notin A$. Write the logical connectives. (06 Marks)
- b. What are tautologies? Give some common tautologies. Write the proof for modus ponens deduction. (10 Marks)
- c. What are contradictions and equivalence? (04 Marks)
- 6 a. Establish a formal model of mapping a linguistic atom α to a cognitive interpretation A. (08 Marks)
- b. What are linguistic hedges? Explain dilation concentration and intensification hedges, with figure. (12 Marks)
- 7 a. Explain the conjunctive system of rules and disjunctive system of rules. (06 Marks)
- b. Explain multiobjective decision making. (08 Marks)
- c. What are type 1, type 2 and type fuzzy consensus? (06 Marks)
- 8 Write short notes on:
- a. Clustering
- b. Genetic algorithms
- c. Inductive reasoning
- d. DSW algorithm. (20 Marks)

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06EC841

Eighth Semester B.E. Degree Examination, June 2012
Multimedia Communication

Time: 3 hrs.

Max. Marks: 100

**Note: Answer 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 principle of circuit-mode and packet-mode of operation of multimedia networks. List out salient features of each type of networks. (10 Marks)
2. a. Explain the principle of operation of a PCM speech codec, with a block diagram. (06 Marks)
- b. 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 for each format. (10 Marks)
- c. Find out the time taken to transmit the following digitized images at both 64 Kbps and 1.5 Mbps :
 - i) A 640×480×8 VGA compatible image.
 - ii) A 1024×768×24 SVGA compatible image. (04 Marks)
3. a. With the help of a diagram, identify the main stages of operation of JPEG and explain each stage in detail. (Encoder and decoder) (14 Marks)
- b. Code the given string “ABACADABACADABACABAB” using Huffman coding. Derive Huffman code tree. Determine the savings in transmission band width over normal ASCII and binary coding. (06 Marks)
4. a. Explain MPEG-4 coding principles with the help of a neat diagram. (10 Marks)
- b. With the help of a neat diagram, explain LPC encoder and decoder. (10 Marks)

PART – B

5. a. Explain in detail, with diagrams, the token ring wiring configurations, frame formats, frame transmission and reception with priority operation. (10 Marks)
- b. Explain in detail, with diagrams LAN protocols and protocol frame work. (10 Marks)
6. a. Explain datagram, format of IPV6. (10 Marks)
- b. With example, explain fragmentation and reassembly in the internet. (10 Marks)
7. a. Write the cell format of ATM. With the help of cell switching schematic, explain how cells are routed through ATM switch. (12 Marks)
- b. Explain classical IP over ATM (IPOA) LAN. (08 Marks)
8. a. Explain TCP/IP protocol suite. (10 Marks)
- b. Explain RTP and RTCP. (10 Marks)

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06EC844

Eighth Semester B.E. Degree Examination, June 2012
GSM

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. With relevant figures explain GSM PLMN structure. Explain its general objectives and services. (08 Marks)
- b. Write a short note on MS subsystem. (06 Marks)
- c. With a neat diagram, explain the mapping of GSM layers on to OSI layers. (06 Marks)
- 2 a. List the radio link measurements used in GSM. Discuss the current techniques used in GSM to reduce interference. (12 Marks)
- b. Write a short note on channel borrowing. (08 Marks)
- 3 a. Explain the logical channel structure of GSM, discussing the functionalities of each. (10 Marks)
- b. With a flow diagram, explain mobile identification process. (06 Marks)
- c. Give the structures of various bursts used in GSM. (04 Marks)
- 4 a. What are the attributes of a speech codec? Explain. (10 Marks)
- b. What are vocoders? Explain the working of a full-rate vocoder with relevant figure. (10 Marks)

PART – B

- 5 a. Discuss the message flow between MS and BSS, listing the primitives and types of messages. (10 Marks)
- b. What is handover? Explain intra MSC handover, using a flow diagram. (10 Marks)
- 6 a. What are wireless security requirements? (08 Marks)
- b. Explain the file structure of a SIM card. (06 Marks)
- c. What is token based challenge? (06 Marks)
- 7 a. Discuss teletraffic models. (10 Marks)
- b. Explain planning of a wireless network. (10 Marks)
- 8 a. What are the management requirements of a wireless network? (08 Marks)
- b. What are the five TMN layers? Explain the pertinent three layers briefly. (12 Marks)

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06TE81

Eighth Semester B.E. Degree Examination, June 2012
Optical Communication and Networking

Time: 3 hrs.

Max. Marks:100

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

PART – A

1. a. Explain the two multiplexing techniques used for optical fiber communication. (06 Marks)
b. Explain cross phase modulation using mathematical expressions. (08 Marks)
c. What is four wave mixing? Briefly explain using mathematical expressions. (06 Marks)
2. a. Explain polarization dependent and independent types of isolators. (10 Marks)
b. What are the different types of couplers? Explain their principle of operation briefly. (10 Marks)
3. a. What is a wavelength converter? Explain different techniques of optoelectronic regeneration. (10 Marks)
b. Explain the operation of photo detector and discuss how its efficiency can be increased. (10 Marks)
4. a. What are the sources of interchannel and intra-channel cross talk? Explain them. (10 Marks)
b. What are the important types of dispersion mechanisms in optical communication system? Explain. (10 Marks)

PART – B

5. a. List the advantages of SONET/SDH. (05 Marks)
b. Explain SONET Frame structure. (10 Marks)
c. Explain different SONET configurations with figure. (05 Marks)
6. a. Explain wave length Routing network with neat diagram and also write the features of this architecture. (10 Marks)
b. Explain how traffic can be handled by No optical add/drop and with add/drop with an example. (10 Marks)
7. a. Explain the network management functions. (10 Marks)
b. Explain the three light path topologies that can be deployed over a fiber ring. (10 Marks)
8. a. Give the architecture of an access network with neat figure and explain. (10 Marks)
b. Explain the bandwidth allocation in an enhanced HFC. (10 Marks)

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