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06EC81

**Eighth Semester B.E. Degree Examination, December 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. Explain with a neat flow diagram, mobile-to-mobile call establishment in an AMPS system. (08 Marks)  
b. Describe the sequence of events that occur when an AMPS cellular telephone is first turned ON. (06 Marks)  
c. Compare the UMTS 3G cellular system and the CDMA2000 3G cellular system. (06 Marks)
- 2 a. With a neat flow diagram, explain the mobile terminated call within the cellular network. (08 Marks)  
b. Define and explain the generation of MSISDN, IMST and IMEI. (08 Marks)  
c. What is the purpose of ILR and IWU. (04 Marks)
- 3 a. Explain capacity expansion techniques: Cell splitting, cell sectoring and overlaid cells. (10 Marks)  
b. Explain the location management in a wireless cellular network. (10 Marks)
- 4 a. With a neat diagram, explain the GSM signaling model and various protocols used. (10 Marks)  
b. Explain various signaling and control channels used within the GSM TDMA system. (10 Marks)

**PART – B**

- 5 a. With neat flow diagrams, briefly explain GSM Intra-BSC & Inter-BSC handover. (10 Marks)  
b. Explain the layer-3 mobility management and power management in GSM system. (10 Marks)
- 6 a. Explain basic spreading procedure used on CDMA forward channels. (06 Marks)  
b. Explain mobile station initialization / registration procedure in CDMA system. (08 Marks)  
c. Explain access channel probing in CDMA system. (06 Marks)
- 7 a. Explain encoding voice data interleaving with an example. (08 Marks)  
b. Briefly explain the spread spectrum modulation techniques: FHSS and DSSS. (08 Marks)  
c. With a neat block diagram, explain the RAKE receiver. (04 Marks)
- 8 a. Explain basic WPAN characteristics (06 Marks)  
b. Explain the Bluetooth WPAN piconet and scatternet architecture. (08 Marks)  
c. Explain evolution of wireless LAN. (06 Marks)

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

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06EC82

**Eighth Semester B.E. Degree Examination, December 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 are the characteristics of an embedded system? List the design metrics of such a system. (08 Marks)
- b. Compare three processor technologies, along with block diagrams. (08 Marks)
- c. The design of a Disk drive has an NRE cost of \$100,000 and a unit cost of \$20. How much we have to add, to the cost of each product, to cover the NRE cost, assuming that the number of units sold are i) 100 units ii) 10,000 units. What is the total unit cost? (04 Marks)
- 2 a. Explain RT-level components. (06 Marks)
- b. Explain various steps involved in designing single purpose processor. (06 Marks)
- c. Explain in various events that takes place when a processor executes an instruction. How pipelining improves the execution speed? (08 Marks)
- 3 a. Explain how DC motor is controlled, using PWM? Assuming an 8-bit up-counter, calculate the count to be loaded in cycle-high register to get pulses of 75% duty-cycle. (08 Marks)
- b. Explain how serial communication is achieved using UART. (04 Marks)
- c. Write necessary hardware and function-pseudocode to
  - i) send control word, to initialize LCD display
  - ii) send a character to display on LCD. (08 Marks)
- 4 a. Explain flash memory, SRAM, PSRAM and OTP ROM, highlighting their features. (08 Marks)
- b. What is cache memory? Explain how it helps in improving the speed of execution. (06 Marks)
- c. Explain the protocols I<sup>2</sup>C and IEEE 802.11. (06 Marks)

**PART – B**

- 5 a. Explain how interrupt works in micro-processor. With an example, explain the classic shared data problems, when data is shared between an interrupt and a task. (08 Marks)
- b. What is interrupt latency? What are the factors affecting it? (04 Marks)
- c. Explain with example, Round-Robin architecture. What are its limitations? How do you overcome the limitations of RR architecture. (08 Marks)
- 6 a. List the characteristics of four software architectures of embedded system software. (08 Marks)
- b. Explain the following with respect to tasks in RTOS-based embedded system:
  - i) Task status
  - ii) Task data. (12 Marks)
- 7 a. Explain the concept of semaphores. Discuss how it helps in solving shared data problem in embedded system. (08 Marks)
- b. Briefly explain the two rules that the interrupt routines in an RTOS environment must follow. (04 Marks)
- c. Explain the working of message Ques and compare it with pipes. (08 Marks)
- 8 a. What are encapsulating semaphores? Specify their need with an example. (08 Marks)
- b. Explain the methods to save power and memory. (08 Marks)
- c. Write a brief note on hardware-software co-design aspects in embedded system. (04 Marks)

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**Eighth Semester B.E. Degree Examination, December 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. Define fuzzy set and its membership function. (06 Marks)  
 b. Explain the operations – Union, intersection and complement with respect to fuzzy sets. (06 Marks)  
 c. The fuzzy sets do not validate the law of excluded middle and law of contradiction. Why? (08 Marks)

- 2 a. Let  $X = \{a, b, c, d\}$  be the universal set. P and Q are two fuzzy sets defined on X. The membership degrees for P and Q are represented in the table below:

	P	Q
a	0	0.9
b	0.3	0.7
c	0.5	0.1
d	0.8	0

Find: i)  $\underline{P} \cup \underline{Q}$  ; ii)  $\underline{P} \cap \underline{Q}$  ; iii)  $\overline{\underline{P}}$  and iv) verify  $\overline{\underline{P} \cup \underline{Q}} = \overline{\underline{P}} \cap \overline{\underline{Q}}$ . (08 Marks)

- b. What is a fuzzy relation? Explain. (04 Marks)  
 c. Explain any two operations and two properties that apply for fuzzy relations. (08 Marks)

- 3 a. Two fuzzy sets  $\underline{A}$  and  $\underline{B}$  are defined as,

$$\underline{A} = \left\{ \frac{1}{L} + \frac{0.4}{M} + \frac{0.2}{H} \right\}; \quad \underline{B} = \left\{ \frac{1}{S} + \frac{0.5}{R} + \frac{0.25}{F} \right\}$$

Find the fuzzy relation  $\underline{R} = \underline{A} \times \underline{B}$ . (04 Marks)

- b. What is fuzzy composition? Explain. (04 Marks)  
 c. Two fuzzy sets  $\underline{I}$  and  $\underline{V}$  are defined as

$$\underline{I} = \frac{0.4}{0.8} + \frac{0.7}{0.9} + \frac{1}{1} + \frac{0.8}{1.1} + \frac{0.6}{1.2}$$

$$\underline{V} = \frac{0.2}{30} + \frac{0.8}{45} + \frac{1}{60} + \frac{0.9}{75} + \frac{0.7}{90}$$

Find:

i) Relation  $\underline{P} = \underline{V} \times \underline{I}$

ii) If another fuzzy set C is defined as  $C = \frac{0.4}{0.5} + \frac{1}{0.6} + \frac{0.5}{0.7}$  find  $\underline{T} = \underline{I} \times \underline{C}$

iii) Find  $\underline{E} = \underline{P} \circ \underline{T}$  using max-min composition.

iv) Find  $\underline{F} = \underline{P} \circ \underline{T}$  using max-product composition. (12 Marks)

- 4 a. What is defuzzification? Explain any one method of defuzzification. (04 Marks)
- b. Using the inference approach, find the membership values for each triangular shapes  $(\underline{I}, \underline{R}, \underline{IR}, \underline{E}, \underline{T})$  for the triangle having A, B, C as  $A = 80 > B = 75 > C = 25$  and  $A + B + C = 180^\circ$ . (08 Marks)
- c. Given the following fuzzy numbers and using extension principle, calculate  $\underline{K} = \underline{I} \cdot \underline{J}$
- $$\underline{I} = 3 = \frac{0.2}{2} + \frac{1}{3} + \frac{0.1}{4} ; \quad \underline{J} = 2 = \frac{0.1}{1} + \frac{1}{2} + \frac{0.3}{3}. \quad (08 \text{ Marks})$$

## PART - B

- 5 a. What is modus Ponens? Give the proof for modus ponens. (08 Marks)
- b. For the proposition of the form  $P \rightarrow Q$  show that  $(P \rightarrow Q) \leftrightarrow (\overline{Q} \rightarrow \overline{P})$ . (08 Marks)
- c. Show by contradiction that,  $(P \wedge Q) \rightarrow P$  is a tautology. (04 Marks)

- 6 a. Two fuzzy sets are defined as,

$$\underline{A} = \left\{ \frac{0}{-2} + \frac{0.5}{-1} + \frac{1.0}{0} + \frac{0.5}{1} + \frac{0}{2} \right\} ; \quad \underline{B} = \left\{ \frac{0}{0} + \frac{0.5}{1} + \frac{1.0}{2} + \frac{0.5}{3} + \frac{0}{4} \right\}$$

Construct the relation for the rule IF  $\underline{A}$ , THEN  $\underline{B}$  using  $\mu_R(x, y) = \min [\mu_A(x), \mu_B(y)]$ .

If a new antecedent  $\underline{A}'$  is introduced as,

$$\underline{A}' = \left\{ \frac{0}{-1} + \frac{0.5}{0} + \frac{1.0}{1} + \frac{0.5}{2} + \frac{0}{3} \right\}$$

Find the new consequent  $\underline{B}'$  using max-min composition. (10 Marks)

- b. The membership functions for the two fuzzy sets are as follows:

$$\text{"somewhat straight"} = \left\{ \frac{1}{0} + \frac{0.9}{1} + \frac{0.8}{2} + \frac{0.7}{3} + \frac{0.6}{4} + \frac{0.5}{5} + \frac{0.4}{6} + \frac{0.3}{7} + \frac{0.2}{8} + \frac{0.1}{9} \right\}$$

$$\text{"curved"} = \left\{ \frac{0}{0} + \frac{0.1}{1} + \frac{0.2}{2} + \frac{0.3}{3} + \frac{0.4}{4} + \frac{0.5}{5} + \frac{0.6}{6} + \frac{0.7}{7} + \frac{0.8}{8} + \frac{0.9}{9} \right\}$$

Calculate the membership functions for

- Very curved
  - Fairly curved ( $= [\text{curved}]^{2/3}$ )
  - Very very some what straight
  - Not fairly curved and very, very some what straight. (10 Marks)
- 7 a. Explain the preference and consensus with respect to fuzzy decision making. (10 Marks)
- b. Discuss about multi objective decision making. (10 Marks)
- 8 Write note on:
- C-means clustering
  - Bayesian decision method
  - Classification by equivalence relations
  - Graphical technique of inference. (20 Marks)

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06EC841

### Eighth Semester B.E. Degree Examination, December 2012

### Multimedia Communications

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 multimedia data networks. (06 Marks)
  - b. Explain the operational modes of multipoint conferencing. (06 Marks)
  - c. Derive the maximum block size that should be used over a channel which has a mean BER probability of  $10^{-4}$ , if probability of a block containing an error and hence being discarded is to be  $10^{-1}$ . (03 Marks)
  - d. Explain the principle of operation of packet switched network. (05 Marks)
2.
  - a. Describe the raster scan operation associated with TV/computer monitor. (08 Marks)
  - b. Define three types of texts. Discuss the hypertext that enables integrated set of documents. (08 Marks)
  - c. Find:
    - i) The storage capacity of CD-ROM to store a 60 minute multimedia title assuming the CD-DA standard.
    - ii) The time to transmit a 30 second portion of the title using a transmission channel of 1.5 Mbps bit rate. (04 Marks)
3.
  - a. Explain transform encoding procedure related to source encoding. (04 Marks)
  - b. Apply arithmetic coding algorithm to code the given string went. The transmission of a message comprising a string of characters with probabilities of : e = 0.3, n = 0.3, t = 0.2, w = 0.1, 0 = 0.1. (10 Marks)
  - c. Explain GIF image compression principle. (06 Marks)
4.
  - a. Explain third order predictive DPCM signal encoder and decoder. (08 Marks)
  - b. Discuss the various steps that are required in encoding P-frame assuming 4:1:1 digital format. (12 Marks)

#### PART – B

5. a. The bridged LAN shown in Fig.Q5(a) is to operate using source routing. Assume that all bridges have equal priority and all rings have the same designated cost (bit rate). Derive the following when station A wishes to send a frame to station B.
  - i) The active spanning tree for the LAN
  - ii) All the paths followed by the single route broadcast frame (s)
  - iii) All the paths followed by the all routes broadcast frame (s)
  - iv) The route (path) selected by A.

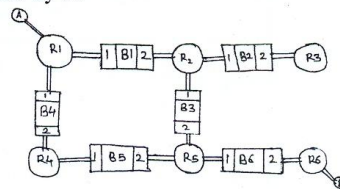


Fig.Q5(a)

(10 Marks)

- b. Explain spanning tree algorithm (04 Marks)  
c. Explain CSMA/CD MAC method used in IEEE 802.3 standard. (06 Marks)
- 6 a. Give the format for IP datagram and explain how the various fields in each packet header are used to perform fragmentation and reassembly by considering transport protocol in a host that is attached to token ring LAN transferring a block of 7000 bytes. Assume the MTU associated with token ring LAN is 4000 byte and that of Ethernet is 1500 bytes. The header of each IP datagram requires 20 bytes. (12 Marks)  
b. Explain the operation of ARP and RARP. (08 Marks)
- 7 a. Explain ATM protocol architecture. (10 Marks)  
b. Explain the communication across ATM network. (10 Marks)
- 8 a. Explain TCP protocol operation. (10 Marks)  
b. Give the packet format of RTP and describe its usages. (10 Marks)

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06EC844

**Eighth Semester B.E. Degree Examination, December 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. Explain mobile identification process? (07 Marks)  
b. What are objectives and services of a GSMPLMN? (07 Marks)  
c. What are GSM subsystems with relevant figure? Explain. (06 Marks)
- 2 a. What is LA and LAI? Explain paging procedure. (08 Marks)  
b. What are the current and future techniques used to reduce interference in GSM network? Explain any one of the future techniques. (08 Marks)  
c. Write a note on MS subsystem. (04 Marks)
- 3 a. Explain the dynamic power control and DTX features of GSM radio link. (08 Marks)  
b. Explain TCH and CCH multiframe. (04 Marks)  
c. Explain frame structure of GSM. Which are allowed logical channel combinations? (08 Marks)
- 4 a. What are supplementary services? Explain number identification services, call offering services and call restriction services. (08 Marks)  
b. List the speech coding methods and explain the attributes of speech codec. (06 Marks)  
c. Write short note on ITU-T standards. (06 Marks)

**PART – B**

- 5 a. Explain the message flow diagram for call set up by mobile station. (08 Marks)  
b. Explain SMS in brief with relevant figures. (06 Marks)  
c. With neat diagram, explain the process of call release – mobile initiated. (06 Marks)
- 6 a. 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.
    - Subscriber usage per month = 120 minutes.
    - 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
    - Subscriber in the zone = 60,000
    - Area of the zone = 500 km<sup>2</sup>
- b. Explain the call flow for token based registration. (08 Marks)
- c. What is the information required to design a traffic plan for wireless network? (04 Marks)

- 7 a. Design a TDMA frame for a cellular system to support variable bit rates from 8Kbps to 128 Kbps. A user can be assigned multiple carriers (not more than 2). Assume GMSK modulation, a coding rate of  $R_C = \text{one-half}$ , frame efficiency of 75%, and the symbol rate of the SACCH –  $a_1 = 0.1$  Rs. The cell radius is limited to 5 km and maximum processing delay to 90 ms. The velocity of light is  $C = 3 \times 10^8$  mPS. (08 Marks)
- b. Derive receiver sensitivity and link budget at the BS receiver of a GSM system. (08 Marks)
- c. What are the models used in modeling framework for a cellular / PCS network? (04 Marks)
- 8 a. Explain the TMN management services. (08 Marks)
- b. What are the fine TMN layers in 3010? Explain the pertinent 3 TMN layers. (08 Marks)
- c. Draw the GSM TMN architecture and explain its functions. (04 Marks)

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