Eighth Semester B.E. Degree Examination, December 2011

Wireless Comunication

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 differences between 1G and 2G cellular systems.   **(06 Marks)**
     b. Explain CDMA 2000.   **(04 Marks)**
     c. Briefly explain the technique employed in an early AM wireless transmitter system, with a diagram.   **(10 Marks)**

2   a. Explain common cellular network components.   **(10 Marks)**
     b. Explain mobile terminated call operation in AMPS (advanced mobile phone system).   **(10 Marks)**

3   a. Mention the cellular capacity expansion techniques.   **(10 Marks)**
     b. Explain the concept of frequency reuse for cellular systems. For a mobile system of cluster size of 7, determine the frequency reuse distance if the cell radius is 5km. Repeat the calculation for a cluster size of 4.   **(10 Marks)**

4   a. Explain GSM logical channel concept.   **(10 Marks)**
     b. Mention the GSM identities.   **(10 Marks)**

PART – B

5   a. Explain the steps for call setup in GSM.   **(10 Marks)**
     b. How call handoff is done in GSM technology?   **(10 Marks)**

6   a. Compare FDMA, TDMA and CDMA air interfaces.   **(08 Marks)**
     b. Explain the CDMA spectrum spreading operation.   **(12 Marks)**

7   a. Briefly explain the different types of coding technique used in wireless telecommunications.   **(10 Marks)**
     b. Explain rake receiver for a diversity technique, with a block diagram.   **(10 Marks)**

8   a. Explain the architecture of a Bluetooth/WPAN, with a diagram.   **(10 Marks)**
     b. Describe the basic wireless MAN and its four antenna scheme.   **(10 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
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. What is market window? Why is it important for products to reach the market early in window? Justify. **(08 Marks)**

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

   c. Using the revenue model of Fig.Q1(c), derive the percentage revenue loss equation for any rise angle, rather than just for 45 degrees. **(06 Marks)**
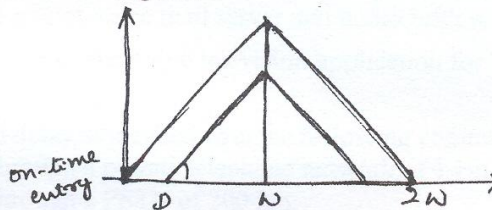

Fig.Q1(c)

2 a. Write a simple algorithm for finding the GCD of two integer numbers. Write the FSMD for this algorithm. Explain how it can be optimized. Write the optimized FSMD and its advantages. **(10 Marks)**

   b. Briefly explain the purpose of the data path and controller, in a single purpose processor. **(10 Marks)**

3 a. Explain how stepper is controlled using driver. Give relevant hardware and software details. **(10 Marks)**

   b. In successive approximation, ADC, calculate the correct encoding of 5V, given an analog signal whose voltage ranges from 0 to 15V and a 8-bit digital encoding. Also, determine the resolution of the ADC. **(10 Marks)**

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

   b. Describe the I^2C and IEEE 802.11 protocols. **(10 Marks)**

PART – B

5 a. Explain how the interrupt works in a microprocessor. With an example, explain the classic shared data problem, when the data is shared between an interrupt and a task. **(10 Marks)**

   b. Explain the real time OS architecture. **(05 Marks)**

   c. What is the interrupt latency? What factors affect it? **(05 Marks)**

6 a. Explain with an example, how round robin architecture works. What is its limitation? **(10 Marks)**

   b. What are the three different states of task in RTOS? How is the state of each task tracked? **(05 Marks)**

   c. How does a typically RTOS binary semaphore works? Explain. **(05 Marks)**

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

   b. Compare characteristics of the four software architectures for scheduling. **(05 Marks)**

8 a. Illustrate with suitable examples, the problems of 'delay embrace' and 'priority inversion' **(12 Marks)**

   b. Explain the methods to solve the memory space and methods to save power. **(08 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
Multimedia 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. With a neat diagram, explain how voice mail and teleconferencing is supported in relation to speech only interpersonal communication involving both public (PSTN/ISDN) and private network. Also, explain the role of voice mail server and audio bridge.   **(10 Marks)**

   b. Explain with neat diagrams, the interactive television application for both cable and satellite network.   **(07 Marks)**

   c. Determine the propagation delay associated with the following communication channels:
       i)   A connection through a private telephone network of 1 km.
       ii)   A connection through a PSTN of 200 km.
       iii)   A connection over a satellite channel of 50,000 km
       Assume that the velocity of propagation of a signal in the case of i) and ii) is $2 \times 10^8 \text{ ms}^{-1}$ and in the case of iii) is $3 \times 10^8 \text{ ms}^{-1}$.   **(03 Marks)**

2   a. With the neat diagram, explain the principle of operation of a PCM speech CoDEC. Also explain the compressor and expander.   **(10 Marks)**

   b. With the aid of a diagram, explain how an image produced by a scanner or digital camera is captured and stored within a computer memory?   **(07 Marks)**

   c. Assuming the bandwidth of a speech signal is from 50 Hz through to 10 kHz and that of a music signal is from 15 Hz through to 20 kHz, derive the bit rate that is generated by the digitization procedure in each case assuming the Nyquist sampling rate is used with 12 bits per sample for the speech signal and 16 bits per sample for the music signal. Derive the memory required to store a 10 minutes passage of stereophonic music.   **(03 Marks)**

3   a. With a neat diagram, explain the JPEG encoder, in detail   **(10 Marks)**
   b. Compare the arithmetic coding and Huffman coding. A message comprising of a string of characters with probabilities e = 0.3, n = 0.3, t = 0.2, w = 0.1, · = 0.1 is to be encoded. The message is went·. Compute the arithmetic codeword.   **(07 Marks)**
   c. Explain the features of TIFF.   **(03 Marks)**

4   a. Explain the video compression principles. With a neat diagram, explain the B frame encoding.   **(08 Marks)**
   b. Explain the error tracking procedures of H.263, with neat diagrams.   **(07 Marks)**
   c. A digitized video is to be compressed using MPEG-I standard. Assuming a frame sequence of IBBPBBPBBPBBI……. and average compression ratios of 10:1(I), 20:1(P) and 50:1(B), derive the average bit rate that is generated by the encoder for NTSC digitization format with y = 352×240 and c_b, c_r = 176×120.   **(05 Marks)**

PART – B

5 a. Explain in detail, with diagrams, the token ring configurations, frame formats, frame transmission and reception with priority operation. **(10 Marks)**

   b. Explain in detail, with diagrams LAN protocols and protocol framework. **(10 Marks)**

6 a. Explain the operation of internet with a neat diagram of protocol associated networking components. Also, explain IP adjunct protocols, with a neat diagram. **(10 Marks)**

   b. What is QoS support for internet application? Explain the control mechanism used in each class to meet QoS requirement. **(08 Marks)**

   c. The administrator of a campus LAN is assigned a single class B IP address 150.10.0.0. Assuming the LAN comprises 100 subnets, each of which is connected to FDDI backbone network, using a subnet router, define a suitable address mask for the site if the maximum number of hosts connected to each subnet is 70. **(02 Marks)**

7 a. Explain the principles of routing in an ATM network, with a neat schematic. **(06 Marks)**

   b. Explain the unicast and multicast protocol architecture with reference to ATM. **(08 Marks)**

   c. Explain the general structure of ATM switch. **(06 Marks)**

8 a. Explain the real time transport protocol and real time transport control protocol usage and package format. **(10 Marks)**

   b. Explain the TCP connection establishment procedure for client server model and simultaneous model. List the difference in control procedure of TCP as compared to HDLC. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
GSM

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 a neat diagram of a GSM reference model. Explain the various functional entities, indicating the interfaces, used for their interconnections.   **(08 Marks)**
    b.   With a neat diagram, explain the mapping of GSM on to OSI layers.   **(06 Marks)**
    c.   Explain the general objectives and services of GSM PLMN.   **(06 Marks)**

2   a.   Explain the current and future techniques that are used to reduce the interference, in a GSM network.   **(10 Marks)**
    b.   Explain for which areas, the use of adaptive array antenna is beneficial.   **(05 Marks)**
    c.   With a neat diagram, explain all the logical channels, used in a GSM system.   **(05 Marks)**

3   a.   With the help of neat diagrams, explain the various bursts that are used in GSM.   **(06 Marks)**
    b.   Describe the mobile identification process in the GSM, with the help of a diagram. **(06 Marks)**
    c.   Explain the attributes of speech codec.   **(08 Marks)**

4   a.   With a neat block diagram, explain the working of a full rate vocoder, used in a GSM.   **(04 Marks)**
    b.   Explain with flow diagram, how the call setup is done by a mobile station (MS).   **(08 Marks)**
    c.   Describe the intra-MSC handover, in a GSM   **(08 Marks)**

PART – B

5   a.   List all the data services provided by GSM. Explain the SMS in detail, with relevant diagrams.   **(08 Marks)**
    b.   With a neat diagram, explain the GSM-GPRS.   **(08 Marks)**
    c.   What are the uses of data interworking, in a GSM?   **(04 Marks)**

6   a.   Explain with neat diagrams, the functions and working of a SIM card.   **(08 Marks)**
    b.   Briefly explain the security algorithms, used in a GSM system.   **(06 Marks)**
    c.   Briefly explain the wireless security requirements, in a GSM.   **(06 Marks)**

7   a.   Explain the planning of a wireless network.   **(06 Marks)**
    b.   Describe the factors to be considered while designing a wireless system.   **(08 Marks)**
    c.   What are the models, used in modelling framework, for cellular/PCS network?   **(06 Marks)**

8   a.   What are the five TMN layers in 3010? Explain the pertinent three TMN layers.   **(08 Marks)**
    b.   Draw the diagram of a simplified TMN physical architecture. Explain its nodes and interfaces.   **(06 Marks)**
    c.   Explain the management requirements for wireless networks.   **(06 Marks)**

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Eighth Semester B.E. Degree Examination, December 2011
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. For the cylindrical shape objects with the diameter 'd' and height 'h' develop a membership function for each of the following shapes using the ratio $\dfrac{d}{h}$ and discuss the reason for any overlapping among the membership function:
   i) Rod   ii) Cylinder and   iii) Disk   **(06 Marks)**

b. Why excluded middle laws are not valid for fuzzy set? Explain.   **(06 Marks)**

c. For an universe of discourse $X = \{0, 20, 40, 60, 80, 100\}$, two fuzzy sets are given as,

$$S_1 = \left\{\frac{0}{0} + \frac{0.5}{20} + \frac{0.65}{40} + \frac{0.85}{60} + \frac{1.0}{80} + \frac{1.0}{100}\right\} \quad \text{and} \quad S_2 = \left\{\frac{0}{0} + \frac{0.45}{20} + \frac{0.6}{40} + \frac{0.8}{60} + \frac{0.95}{80} + \frac{1.0}{100}\right\}$$

Find the following:
   i) $S_1 \cup S_2$ ii) $S_1 \cap S_2$ iii) $\overline{S_1 \cup S_2}$ iv) $\overline{S_1 \cap S_2}$ v) $S_1 \cup \bar{S}_1$

   vi) $S_1 \cap \bar{S}_1$ v) $S_2 \cup \bar{S}_2$ vi) $S_2 \cap \bar{S}_2$ **(08 Marks)**

2 a. Two fuzzy sets A and B are defined on X and Y universe, respectively, as follows:

$$A = \left\{\frac{0.2}{10} + \frac{0.5}{20} + \frac{0.8}{40} + \frac{1.0}{60} + \frac{0.6}{80} + \frac{0.1}{100}\right\}, \ B = \left\{\frac{0.3}{0.5} + \frac{0.6}{1} + \frac{0.9}{1.5} + \frac{1.0}{4} + \frac{0.6}{8} + \frac{0.3}{20}\right\}$$

   i) Find $R = A \times B$ another set C is defined on X as given below:

$$C = \left\{\frac{0.3}{10} + \frac{0.6}{20} + \frac{0.7}{40} + \frac{0.9}{60} + \frac{1.0}{80} + \frac{0.5}{100}\right\}$$

   ii) Find S = CoR using max-min composition.
   iii) Find S = CoR using max-products composition.   **(12 Marks)**

b. Explain fuzzy tolerance and equivalence relation. How a fuzzy tolerance relation can be recompose into equivalence relation??   **(08 Marks)**

3 a. Define the following for a membership function:
   i) Core   ii) Support   iii) Boundary   iv) Height   v) Normality
   vi) Crossover point   vii) Convexity   viii) Fuzzy number   **(08 Marks)**

b. Write short notes on Genetic Algorithm (GA). How GA can be used for generation of membership function? Explain with a simple example.   **(12 Marks)**

4 Two fuzzy sets B^1 and B^2 are shown in Fig. Q4. Find the defuzzified value Z* using all the seven methods mentioned below: **(20 Marks)**
   i) Max-membership principle.
   ii) Centroid method.
   iii) Weighted average method.
   iv) Mean-max method.
   v) Centre of sum.
   vi) Centre of largest area.
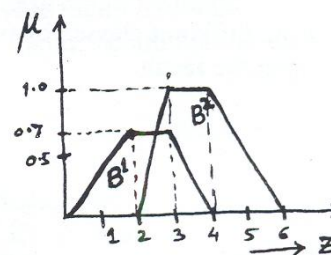   vii) First (and last) of maxima.

Fig. Q4

PART – B

5 a. Differentiate among Tautologies, Contradiction and Equivalence in the context of predicate logic. **(05 Marks)**

b. State and prove Modus Tollen and Modus Ponem. **(05 Marks)**

c. Consider two discrete universe of discourse: $X = \{160, 165, 170, 175, 180, 185, 190, 195\}$ and $Y = \{77, 80, 83, 86, 89, 92, 95, 98\}$. Two fuzzy sets A and B are defined on X and Y respectively. $A = \left\{ \dfrac{0}{175} + \dfrac{0.7}{180} + \dfrac{1.0}{185} + \dfrac{0.4}{190} \right\}$ and $B = \left\{ \dfrac{0}{89} + \dfrac{0.5}{92} + \dfrac{0.8}{95} + \dfrac{1.0}{98} \right\}$

Determine the proposition IF A THEN B (or symbolically A→B) using $R = (A \times B) \cup (\overline{A} \times Y)$. Another fuzzy set A' is defined on X. $A' = \left\{ \dfrac{1.0}{170} + \dfrac{0.8}{175} + \dfrac{0.5}{180} + \dfrac{0.2}{185} \right\}$ and for new rule IF A' and B', find B' using max-min composition. Comment upon the result. **(10 Marks)**

6 a. What are linguistic hedges? Illustrate the following using graphs and mathematical functions:

i) Contraction   ii) Dialation and   iii) Intensification. **(08 Marks)**

b. Explain fuzzy inference system (FIS) using graphical technique with following considerations:

i)   Two input and single output.

ii) Two 'IF-THEN' rules.

iii) Inference method is 'max-min'.

iv) Both inputs are fuzzy sets. **(12 Marks)**

7 a. State weighted multi-objective decision making problem. Describe the algorithm. Explain the case of tie among two or more than two alternatives. **(12 Marks)**

b. Three fuzzy sets are given below:

$I_1 = \left\{ \dfrac{1.0}{3} + \dfrac{0.8}{7} \right\}$; $I_2 = \left\{ \dfrac{0.7}{4} + \dfrac{1.0}{6} \right\}$; and $I_3 = \left\{ \dfrac{0.8}{2} + \dfrac{1.0}{4} + \dfrac{0.5}{8} \right\}$

Determine their ranking. **(08 Marks)**

8 a. State fuzzy C-mean problem. Explain its algorithm. **(12 Marks)**

b. A fuzzy equivalence relation matrix is given below:

$$R = \begin{bmatrix} 1 & 0.8 & 0.4 & 0.5 & 0.8 \\ 0.8 & 1 & 0.4 & 0.5 & 0.9 \\ 0.4 & 0.4 & 1 & 0.4 & 0.4 \\ 0.5 & 0.5 & 0.4 & 1 & 0.5 \\ 0.8 & 0.9 & 0.4 & 0.5 & 1 \end{bmatrix}$$

Find different classes by taking λ-cut of relation matrix at λ = 1, 0.9, 0.8, 0.5, 0.4. Comment upon the result. **(08 Marks)**

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