COLLEGE OF ENGINEERING, PUNE.
(An Autonomous Institute of Government of Maharashtra)
End Semester Examination
(ET 408) Broadband Communication

Program: Final Year B. Tech (E & TC)   Specialization: E & TC
Year: 2011-12   Semester: Spring
Duration: 3 hrs   Max. Marks: 50

Instructions:
1. Figures to the right indicate full marks.
2. Assume suitable data wherever necessary.
3. Draw neat figures wherever required

Q 1 a) Draw the architecture of Wi-MAX system. State significant features of Wi-MAX. Also compare this system with Wi-Fi.   5

b) Explain FTTH system with reference to its architecture and advantages. In which special circumstances, FTTH is the most suitable broadband alternative?   5

Q 2 a) What is PON? What are types of PONs? Draw the general architectural diagram of PON and explain its working.   5

b) Explain the LMDS system of broadband communication. What is the frequency range and bandwidth of this system? What are the broadband applications for which LMDS is intended?   5

Q 3 a) Draw a neat block schematic of MMDS system. State important features of MMDS and also the applications which it is proposed for.   5

b) Compare 3G and 4G cellular communication systems.   5

Q.4 a) What are the principal frequencies of interest in the radio spectrum and to which applications, these frequencies are allocated? Also state the advantages and disadvantages of use of higher frequencies in the radio spectrum.   5

b) Write short notes on i) UNII ii) Considerations while choosing between wire line or wireless options.

5

Q.5 a) How is the term 'Quality of Service' (QoS) defined in the TRAI notification? State important QoS parameters and their benchmarks as defined by TRAI.

5

b) Answer the following in relation to satellite communication:
i) What are the key differences between satellite based and terrestrial wireless systems?
ii) Explain the types and sub-types of multiple access schemes used in satellite communication.

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iii) Why TDMA is preferred over FDMA in satellite communication?

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iv) What is the difference between multiplexing and multiple access in the context of satellite communication?

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COLLEGE OF ENGINEERING PUNE
Final Year B. Tech (E and TC)
Speech Processing (Elective -II)
End Semester Examination

Day and Date: **Saturday, 05/05/2012**
Duration: **3 Hrs**

Semester: **II**
Maximum Marks: **50**

Instruction to the candidate:
  i.   All questions are compulsory.
  ii. Assume suitable data if necessary.

Q 1 A A speech signal is sampled at 16000 samples per second. A 25 msec window   **5**
is used for short time spectral analysis, and window is moved by 10 msec in
consecutive analysis frames. Assume that radix-2 FFT is used to compute
DFT's
  i.   Is the sampling rate adequate for telephone quality speech signal?
  ii.   How many speech samples are in each segment?
  iii. What is the frame rate for short time spectral analysis?
  iv.   What size of DFT and FFT are required to guarantee that no time
        aliasing occur?
  v.   What is resulting frequency resolution between adjacent spectral
        samples?

  B Find the minimum edit distance between the following two strings   **5**
  i.   SPEECH , SPEAKER
  ii.   ROUND , AROUND

Q 2 A With the help of suitable expressions and relevant diagrams explain procedure   **5**
to extract the following features from the frame of an audio file?
  i.   Energy.
  ii.   Pitch frequency.
  iii. Zero Crossing Rate.
  iv.   Power Spectrum.
  v.   Voiced/Unvoiced type.

  B Explain the working of LPC – VQ based Speaker Identification System.   **5**

Q 3 A What do you mean by the Segmental K- means Algorithm?   **5**
How is it useful for generalization of template from training data?

  B Explain the Lloyds and LBG Algorithm for design of VQ codebook.   **5**
What is the main advantage of LBG algorithm?

1

Q 4 What do you mean by Hidden Markov Model? What are the different types of   **10**
HMM? Which type of HMM is used for speech recognition? Explain the
Forward algorithm to evaluate the $P(O|\lambda)$. How this algorithm is
computationally efficient?

Evaluate $P(O|\lambda)$ for the given observation sequence **O** =[**HHTHT**] and the
following model parameters.

State transition probability matrix, $\mathbf{A} = \begin{bmatrix} 0.9 & 0.1 \\ 0.9 & 0.1 \end{bmatrix}$

Observation probabilities as:

	State 1	State 2
P(H)	0.25	0.75
P(T)	0.75	0.25

and initial probability matrix, π =[0.5, 0.5]

Q 5 Write Short Note on (Any Two)
  i.   Text To Speech Conversion System   **10**
  ii.   Computer based Voice Response System
  iii. Speech Aid for hearing Impaired.
  iv.   Formant Analysis Methods.

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E4TC

College of Engineering, Pune
END SEMESTER EXAM
Year (B.Tech, 2012)
(ET 443)- (Embedded Software and RTOS)

Day & Date-

Max. Marks-50

Timing-

Duration -3 Hrs

Instructions:
1. Figures to the right indicate full marks.
2. All questions are compulsory.
3. Draw neat figures wherever needed.
4. Assume Suitable data wherever necessary.
5. Strictly follow the sequence of questions for the answers.

Q. 1 A Explain how OSTaskCreateExt () is different than OSTaskCreate ()   **(3)**
          service.

      B How does a counting semaphore differ from a mutex? How is   **(3)**
          counting semaphore used?

      C Illustrate the priority inversion scenario in the real time systems.   **(4)**
          How priority inversion is avoided in real time kernel.

Q. 2 A Explain how SemDel () function works.

      B Describe how OsMemCreate () function partition a memory?   **(3)**

      C How does a mailbox message differ from a queue message? Can   **(3)**
          you use message queue as a counting semaphore? How?   **(4)**

Q. 3 A Describe the relationship between event flag, event flag nodes and   **(3)**
          TCBs.

      B Describe data structure needed to implement a message queue?   **(3)**

      C Compare preemptive and non preemptive kernels. Which is better?   **(4)**
          Why?

Q 4   A   What is meant by porting of µCOS-II? Is µCOS-II portable? Why?   **(3)**

B   What are the requirements, a processor must satisfy to run µCOS-II.   **(3)**

C   Mention essential fields of a TCB (Task control block) in µCOS-II. When and how a TCB is created and deleted? What are the global variables associated with TCB?   **(4)**

Q 5   A   When does µCOS-II create statistics task? What is the role of OSStatInit () function. Which & how does statistics task set the global variables?   **(5)**

B   Explain how OSSemAccept () function works.   **(3)**

C   What is relationship between Tasks, ISRs and a semaphore in µCOS-II.   **(2)**

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