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14ECS254

Second Semester M.Tech Degree Examination, June/July 2015
Multimedia Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Explain Simplex, Duplex, Broadcast and Multicast operational modes of communication with diagrams. **(08 Marks)**

b. Briefly explain the network QoS associated with circuit switched and packet switched networks. **(06 Marks)**

c. A web page of 10Mbytes is being retrieved from a web server. Assuming negligible delays within the server and trunk network, quantify the time transfer the page over the following types of access circuit : i) a PSTN modem operating at 28.8 kbps ii) an aggregated basic rate access line of 128 kbps iii) a primary rate ISDN access line of 1.5 Mbps. iv) a high speed modem operating at 6 Mbps v) a cable modem operating at 27 Mbps. **(06 Marks)**

2 a. Explain briefly the types of text that are used to produce pages of documents. **(06 Marks)**

b. Assuming the CD – DA standard is being used, derive i) the storage capacity of a CD – ROM to store a 60 minute multimedia tille ii) the time transient a 30 second portion of tille using a transmission channel of bit rate of 64 Kbps and 1.5Mbps. **(05 Marks)**

c. Derive the memory requirements to store each frame that result from the digitization of both 525 – line and 625 – line system assuming 4:2:2 format. Also find the total memory requirement to store a 1.5 hour movie / video. **(09 Marks)**

3 a. Messages comprising seven different characters 'A' through 'G' are to be transmitted over a data link. Analysis has shown that the relative frequency of occurance of each character is A = 0.10 B = 0.25 C = 0.05 D = 0.32 E = 0.01 F = 0.07 G = 0.02 i) Derive the entropy of messages ii) Use static Huffman coding to derive a suitable set of code words iii) Derive the average number of bits per code word for your codeword and compare this with both the fixed length binary and ASCII code words. **(12 Marks)**

b. Describe the operation of JPEG decoder, with a schematic diagram. **(08 Marks)**

4 a. Describe the principles of Linear predictive coding (LPC) with the schematics of encoder and Decoder. **(10 Marks)**

b. Define frequency masking and temporal masking. **(02 Marks)**

c. A digitized video is to be compressed using the MPEG – 1 standard. Assuming a frame sequence of I B B P B B P B B P B B I ..... and average compression ratios of 12 : 1 (I), 20 : 1(P) and 40:1 (B), derive the average bit rate that is generated by the encoder for both the NTSC and PAL digitization formats. **(08 Marks)**

5 a. Explain the additional functionalities provided by the MPEG – 4 Audio Version 2. **(07 Marks)**

b. Discuss the hierarchical description of MPEG – 4 video bit stream. **(08 Marks)**

c. Describe MPEG – 4 video coding and decoding, with a block diagram. **(05 Marks)**

6 a. Describe MPEG – 7 architecture, with a neat diagram. **(05 Marks)**
b. List the seven technologies that are needed to achieve the MPEG – 21 goals. **(07 Marks)**
c. Explain the significant features of JPEG 2000. **(08 Marks)**

7 a. Explain Intra – object synchronization, Inter object synchronization, Live and synthetic synchronization with examples. **(08 Marks)**
b. Define Soft deadline and Hard deadline with examples. **(03 Marks)**
c. What are the different real time requirements present in multimedia systems that were not used in traditional real time scenarios? **(04 Marks)**
d. What are the assumption that are pre requisites to apply the rate monotonic algorithm? **(05 Marks)**

8 a. Describe the delivery of multimedia application across IP networks with relevant diagrams. **(06 Marks)**
b. Describe the Real – time Transport Control Protocol (RTCP) and its application. **(08 Marks)**
c. Explain Mobile video encoder, with a block diagram. **(06 Marks)**

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