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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Electronics and Communication Engineering

Semester End Examination; May/June - 2018

Multimedia Communication

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. Explain the main network components and their functions of telephone network with a block diagram. 10

b. A web page of 10 Mbytes is being retrieved from a Web server. Assuming negligible delays within the server and trunk network, quantify the time required to transfer the page over the following types of access circuit :

i) A PSTN modem operating at 28.8 kbps

ii) A primary rate ISDN access line operating at 1.5 Mbps

iii) A high speed modem operating at 6 Mbps

iv) A cable modem operating at 27 Mbps 6

c. With relevant to communication channel, explain the meaning of the terms;

i) Broadcast ii) Multicasting 4

2 a. With the aid of block diagrams, explain the speech-and-video interpersonal communications for the following multimedia applications :

i) Two-party video telephone call ii) Video conferencing using a broadcast network. 10

b. Identify and explain the various QoS parameters associated with constant bit rate channel set up through a circuit-switched network. 6

c. A packet switched network with a worst case jitter of 10 ms is used to transfer data with constant bit rate of 64 kbps. Determine the minimum amount of memory (FIFO buffer) that is required at the destination and the suitable packet size. Assume the mean packet transfer rate of the network exceeds the Equivalent input bit rate. 4

UNIT - II

3 a. Describe the three types of text that are used to produce pages of documents in multimedia applications. 6

b. Explain the 4:2:2 formats used for digitization of video, with a diagram.

Derive the bit rate and the memory requirements to store each frame that result from the digitization of video signals based on a 625 line system assuming 4:2:2 formats. Also find the total memory required to store 90 minutes movie/video, assuming 50 frames per second 10

c. Differentiate between Luminance and Chrominance parameters. 4

4 a. Describe the features of the following digitization formats :

i) 4:2:0 format ii) QCIF format iii) SIF format 10

b. Derive the time required to transmit the following digitized images at both 64 kbps and 1.5 Mbps :

i) A 640 x 480 x 8 VGA compatible image

ii) A 1024 x 768 x 24 SVGA compatible image 6

Contd…2

c. State and explain the three main properties of a color source that the eye makes of. 4

UNIT - III

5 a. Two computers are communicating with each other over a data network. The message comprises the following characters: A, B, C, D, E, and F with their probabilities of occurrence 0.25, 0.1, 0.15, 0.1, 0.2 and 0.2 respectively. Calculate the entropy of the messages. 4

b. Explain the main steps in JPEG encoding for image compression with a neat block diagram of an encoder. 10

c. An MPEG-1 System uses the frame sequence: IBBPBBPBBPBBIBBP……..

i) Determine the values of prediction span and GOP span, N.

ii) Derive a suitable reordered sequence that ensures firstly, only two frames must be stored in the decoder, and secondly, the required I and / or P-frames are available to decode each P- and B-frame as they are received. 6

6 a. Explain the principle of operation of the LZW compression algorithm. 6

b. With the help of a diagram, explain the operation of basic DPCM signal encoder. 6

c. A digitized video is to be compressed using MPEG-1 Standard. .Assuming a frame sequence of IBBPBBPBBPBBI……. And average compression ratio of 12:1(I), 20:1(P) and 40:1(B); determine average compression ratio, frame size without compression and frame size with compression. Also derive the average bit rate that is generated by the encoder for the NTSC digitization format. Assume 30 fps for NTSC. 8

UNIT - IV

7 a. Explain the roll of each of the five layers that make up the TCP/IP reference model. 10

b. In relation to the set of standards relating to H.323, explain the following

i) Role of gatekeeper during the setting up of a call 10

ii) Roll of gateway during interworking with end systems attached to circuit mode network.

8 a. Explain how email is sent across the internet with a block diagram of text-based email system 10

b. With block diagrams, explain the working of MPEG-1 encoder and decoder, as applicable to movie/video-on-demand applications, 10

UNIT - V

9 a. With a block diagram, explain the working of a cable TV network communication system. 10

b. What is a satellite transponder? With a neat block diagram, explain the working of a satellite transponder in a satellite television network communication system. 10

10 a. With the aid of a diagram, explain the ASN.1 compiler function. 6

b. Explain the meaning of the following terms relating to a secure communication :

i) Authentication 6

ii) Non repudiation

c. Explain the RSA algorithm with an example. Assume the Two prime numbers as P = 7 and q = 17, and prime relative number for encryption E = 5. Obtain the cipher text C for the plaintext (message), M = 19. 8

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