

FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI  
 DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING  
 2019/2020 HARMATTAN SEMESTER EXAMINATION  
 ECE 409: MULTIMEDIA SYSTEMS AND TECHNOLOGIES

Instruction: Answer four questions, two from each section. Time: 2hrs 30 mins

SECTION A

- 1a) What is multimedia? 3 marks
  - b) List and briefly explain three of the basic elements of multimedia 6 marks
  - c) With the recent outbreak of corona virus and the need for physical distancing as a protective measure, businesses have relied on multimedia to sustain their daily operations. Briefly discuss this, outlining four benefits and listing 3 multimedia tools employed in this regard. 7 marks
  - d) Outline the activities involved in a good HCI Design 4 marks
- 2a) Briefly explain the following terms: (i) HCI (ii) Hypertext (iii) Hypermedia 6 marks
- b) File Formats is a major concern in the production of multimedia resources. To this end, list three multimedia file formats and give two examples of each. 6 marks
  - c) Explain and give an example each of the two multimedia presentation categories 4 marks
  - d) List four applications of multimedia 4 marks
- 3a) Name three types of user interfaces commonly adopted in HCI designs and give three characteristics of a good user interface 6 marks
- b) Write short notes on the following as it concerns the choice of multimedia infrastructure and give two examples of each: (i) Output devices (ii) Storage devices and (iii) Communication devices. 8 marks
  - c) Outline four advantages of multimedia 4 marks
  - d) Outline four strategies to improve usability during HCI Design 4 marks

SECTION B

- 1a) Explain the concept of aircraft control system as a core example of a distributed multimedia system. 6 marks
- b) List and explain four demerits of distributed computing. 5 marks
- c) List five multimodal technologies and classify them with respect to their input modes. 5 marks
- d) Why do CDs generally require a sampling rate of 44.1kHz? 4 marks

Messages can be lost in the network  
 Bandwidth problem due to large amount of data generated

BCOS of NYQUIST theorem principle -  
 We know that for a maximum freq. to be rep. at a given sampling rate its freq. must be half the sampling rate hence,

NYQUIST theorem

AWOZGBE Johnson

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- 2a) List and explain the ways of delivering multimedia contents. 4 marks
- b) Animations do not move but depict illusions of motion. Explain. 5 marks
- c) With the aid of a block diagram, explain the process of data compression. 6 marks
- d) Compute the signal-to-noise ratio in decibels of a networked multimedia system for a bit error rate of  $10^{-6}$ . 5 marks
- American Standard Code for Information Interchange
- 3ai) Define ASCII codes and state the full meaning of ASCII. 2 marks
- ii) Show the binary representation of OK given that the ASCII values of O and K are 79 and 75 respectively. 3 marks
- b) Using the Huffman encoding technique, find the percentage compression of COMPRESSIONS. 5 marks
- c) An actor's image in a movie scene is 6 inches by 8 inches with a resolution of 1200dpi. If the said image is capable of storing 8388608 colours and the scene contains a frame of 600x500 pixels at 64 bits per pixel, a real time rate of 25frames/s and a running time of 15mins, calculate the file size of the scene for a 1min background music sampled at 20.05kHz with an 80-bit resolution for stereo. 6 marks
- d) State four applications of multimedia conferencing. 4 marks