

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2023****Subject Code:2151101****Date:20-12-2023****Subject Name: Audio Video Systems****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

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| <b>Q.1</b> | (a) Discuss the concept of pitch in relation to sound. How is pitch determined, and what factors influence our perception of high or low-pitched sounds?                                                                                                                                                                                                            | <b>03</b>    |
|            | (b) Discuss the principles behind Helmholtz resonators and their applications in sound engineering and musical instrument design.                                                                                                                                                                                                                                   | <b>04</b>    |
|            | (c) Explain the nature of sound and the characteristics of sound waves in detail. Discuss how the pressure and intensity of sound waves are measured and their significance in the context of audio systems. Additionally, describe the sensitivity of the human ear to different sound levels and frequencies, and the relationship between these characteristics. | <b>07</b>    |
| <b>Q.2</b> | (a) What are the key characteristics that define a good microphone? Explain why these characteristics are important in the selection and use of microphones in various applications.                                                                                                                                                                                | <b>03</b>    |
|            | (b) Define a multi-way speaker system, including woofers and tweeters. Explain the purpose of crossover networks in such systems and their importance in achieving high-quality audio.                                                                                                                                                                              | <b>04</b>    |
|            | (c) Compare and contrast moving coil microphones and ribbon microphones. Highlight their distinctive features and typical usage scenarios.                                                                                                                                                                                                                          | <b>07</b>    |
|            | <b>OR</b>                                                                                                                                                                                                                                                                                                                                                           |              |
|            | (c) Discuss the differences between moving-coil cone-type loudspeakers and electrodynamic loudspeakers. How do their designs affect sound reproduction, and in what applications are they commonly used?                                                                                                                                                            | <b>07</b>    |
| <b>Q.3</b> | (a) Explain why audio is considered as data. How does digitizing audio differ from analog recording, and what advantages does digital audio offer?                                                                                                                                                                                                                  | <b>03</b>    |
|            | (b) Describe the basics of audio compression in the digital domain. Discuss the importance of audio compression in various applications and the trade-offs involved in achieving smaller file sizes.                                                                                                                                                                | <b>04</b>    |
|            | (c) Provide a detailed explanation of the concept of pixels in television. Discuss how the number and arrangement of pixels influence image quality and resolution in both standard-definition and high-definition TV systems.                                                                                                                                      | <b>07</b>    |
|            | <b>OR</b>                                                                                                                                                                                                                                                                                                                                                           |              |
| <b>Q.3</b> | (a) Define the term "aspect ratio" in the context of television. Why is aspect ratio important, and how has it evolved in the history of television broadcasting?                                                                                                                                                                                                   | <b>03</b>    |
|            | (b) Describe the basic elements of a TV communication system. Explain the key components and their roles in transmitting and receiving television signals.                                                                                                                                                                                                          | <b>04</b>    |
|            | (c) Provide a detailed explanation of luminance and chrominance signals in color television. How are these signals processed and transmitted to create a color image?                                                                                                                                                                                               | <b>07</b>    |

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| <b>Q.4</b> | <b>(a)</b> Briefly outline the basic principles of video compression. How does compression reduce the size of video files while maintaining acceptable video quality?                                                                     | <b>03</b> |
|            | <b>(b)</b> Discuss the various compression formats for video, such as the MPEG-x format and the H.26x format. What are the key differences between these formats, and in what applications are they typically used?                       | <b>04</b> |
|            | <b>(c)</b> Provide an overview of Closed-Circuit Television (CCTV) systems and their applications. Discuss the role of CCTV in security and surveillance.                                                                                 | <b>07</b> |
| <b>OR</b>  |                                                                                                                                                                                                                                           |           |
| <b>Q.4</b> | <b>(a)</b> Explain the key components and features of stereo sound systems. What are the advantages of stereophonic audio in enhancing the viewer's audio experience?                                                                     | <b>03</b> |
|            | <b>(b)</b> Discuss the technology behind three-dimensional (3-D) television. How do 3-D TVs create the illusion of depth and immersive viewing experiences, and what are the challenges in implementing this technology?                  | <b>04</b> |
|            | <b>(c)</b> Explain the concept of Community Antenna Television (CATV) and how it relates to digital television systems. What is the significance of CATV in delivering a wide range of television channels to subscribers?                | <b>07</b> |
| <b>Q.5</b> | <b>(a)</b> Describe the conduction of charge in plasma television screens. What makes plasma technology suitable for large-screen displays, and what are its characteristics as a display technology?                                     | <b>03</b> |
|            | <b>(b)</b> Explain the basic principles of LCD technology. How do liquid crystals function in LCD screens, and what are the advantages of this technology in television displays?                                                         | <b>04</b> |
|            | <b>(c)</b> Introduce LED TV technology, including RGB dynamic LEDs and edge-LEDs. Explain the differences between LED-backlit and backlit LCD displays and their impact on image quality and power efficiency.                            | <b>07</b> |
| <b>OR</b>  |                                                                                                                                                                                                                                           |           |
| <b>Q.5</b> | <b>(a)</b> Describe the key differences between direct view and rear projection television systems. What are the advantages and disadvantages of each approach?                                                                           | <b>03</b> |
|            | <b>(b)</b> Discuss the features and functions of a surround sound stereo receiver in the context of home theaters. How does this component contribute to the immersive audio experience, and what are the key specifications to look for? | <b>04</b> |
|            | <b>(c)</b> Provide an introduction to OLED TVs and their key features. How do OLED TVs differ from LCD and Plasma displays, and what are the potential advantages of OLED technology in television screens?                               | <b>07</b> |

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