**U.S.N** [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

# 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; August - 2023
### Biometrics

*Time: 3 hrs*                                                  *Max. Marks: 100*

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### Course Outcomes

*The Students will be able to:*
*CO1: Explain the basics of biometric modalities and features of the biometrics.*
*CO2: Apply the various morphological operations for feature extraction in various biometrics.*
*CO3: Analyze the use of various biometrics.*
*CO4: Understand the role of watermarking techniques in biometrics.*
*CO5: Summarize the privacy issues and concerns related to biometric cryptography.*

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**Note: I) PART-A** *is compulsory.* **Two** *marks for each question.*

   **II) PART-B**: *Answer any* **TWO** *sub questions (from a, b, c) for a Maximum of* **18 marks** *from each unit.*

| Q. No. | Questions | Marks | BLs | COs | POs |
|--------|-----------|-------|-----|-----|-----|
| | **I : PART - A** | **10** | | | |
| 1 a. | Mention the differences between verification and identification. | 2 | L1 | CO2 | PO1 |
| b. | List the steps involved in typical retina scanning system. | 2 | L2 | CO2 | PO2 |
| c. | Mention some Level 1, Level 2 and Level 3 features of fingerprint. | 2 | L1 | CO1 | PO1 |
| d. | Define cryptography and cryptanalysis. | 2 | L1 | CO5 | PO3 |
| e. | List the attacks on watermarks. | 2 | L2 | CO4 | PO2 |
| | **II : PART - B** | **90** | | | |
| | **UNIT - I** | **18** | | | |
| 2 a. | Explain general architecture of Biometrics systems with in neat block diagram. | 9 | L2 | CO1 | PO1 |
| b. | Explain the character recognition process with flowchart and algorithm. | 9 | L2 | CO1 | PO1 |
| c. | List the basic biometric functionalities. Also explain Biometric template matching process with neat diagram. | 9 | L2 | CO2 | PO2 |
| | **UNIT - II** | **18** | | | |
| 3 a. | Discuss the steps included in feature extraction and face recognition. | 9 | L2 | CO2 | PO2 |
| b. | List the advantages of the following: i) Face ii) Iris iii) Retina | 9 | L2 | CO3 | PO3 |
| c. | Explain the design of an iris recognition system with neat flow diagram. | 9 | L2 | CO2 | PO2 |

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| **UNIT - III** | **18** | | | |
| 4 a. Explain the vein recognition system along with its pattern retraction process. | 9 | L2 | CO2 | PO2 |
| b. Explain the process of steps involved in removal of false minutiae points in fingerprint biometrics. Also explain minutiae matching steps with equations. | 9 | L2 | CO2 | PO2 |
| c. Discuss the major stages of SIFT algorithm with neat flow diagram. | 9 | L2 | CO2 | PO2 |
| **UNIT - IV** | **18** | | | |
| 5 a. Discuss the comparative study of various biometrics in terms of privacy. | 9 | L1 | CO5 | PO3 |
| b. Discuss the following fusion methods with its advantages and disadvantages. i) Sensor – Level Fusion ii) Scora – Level Fusion iii) Decision – Level Fusion | 9 | L2 | CO1 | PO1 |
| c. Explain characteristics and advantages of multimodal biometric. | 9 | L2 | CO5 | PO3 |
| **UNIT - V** | **18** | | | |
| 6 a. Explain a general block diagram of watermarking process along with the list of characteristics of watermarks. | 9 | L2 | CO4 | PO2 |
| b. Discuss the sole of biometrics in enterprise security and border security. | 9 | L3 | CO3 | PO3 |
| c. Explain DNA biometrics with its salient features and its benefits. | 9 | L3 | CO5 | PO3 |

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