*R22 Regulation* *Subject code:4P5FD*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

## B.Tech V Semester Supplementary Examinations, April 2026

## BIOMETRICS

*(IT)*

*Maximum Marks: 60* Date:24.04.2026 Duration: 3 hours

**Note:** **1.This question paper contains two parts A and B.**
**2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.**
**3. Part B consists of 5 Units. Answer any one full question from each unit.**
**4. Each question carries 10 marks and may have a, b, c, d as sub questions.**

Part-A

| All the following questions carry equal marks (10X1M=10 Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 1.a) | Name two physiological biometric traits. | 1M | 1 | L1 |
| b) | State one drawback of traditional authentication methods. | 1M | 1 | L2 |
| c) | Define retina biometrics. | 1M | 2 | L1 |
| d) | How is biometric performance measured? | 1M | 2 | L2 |
| e) | What type of image is captured in retina biometrics? | 1M | 3 | L1 |
| f) | How is iris recognition used in border control? | 1M | 3 | L2 |
| g) | Mention one advantage of vein pattern recognition. | 1M | 4 | L1 |
| h) | How does SIFT handle image transformations? | 1M | 4 | L2 |
| i) | What is the goal of privacy-enhancing technologies in biometrics? | 1M | 5 | L1 |
| j) | How does multimodal biometrics help in enhancing privacy? | 1M | 5 | L2 |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 2 | Trace the evolution of biometric systems from ancient times to modern applications. Highlight key historical milestones. | 10M | 1 | L2 |
| | OR | | | |
| 3 | Discuss the various error rates in biometric systems, including FAR, FRR, EER, and ROC. How do they affect system performance? | 10M | 1 | L2 |
| 4 | a) Explain the use of Convolutional Neural Networks (CNNs) in face recognition.<br>b) Describe the role of transfer learning in improving face recognition using neural networks. | 5M<br>5M | 2 | L2<br>L2 |
| | OR | | | |
| 5 | a) Discuss the advantages of face recognition in public surveillance and law enforcement.<br>b) Discuss the factors that influence the accuracy and reliability of biometric systems. | 5M<br>5M | 2 | L2<br>L2 |

| | | | | |
|---|---|---|---|---|
| 6 | Explain how the iris region is isolated from a captured eye image. What challenges are faced during this stage, and how are they addressed? | 10M | 3 | L2 |
| | OR | | | |
| 7 | Critically analyze the strengths and weaknesses of iris recognition in terms of accuracy, cost, user acceptance, and environmental dependency. | 10M | 3 | L3 |
| 8 | a) Discuss any two fingerprint patterns and their characteristics with diagrams.<br>b) Differentiate between ridge endings and bifurcations with neat diagrams. | 5M<br>5M | 4 | L2<br>L3 |
| | OR | | | |
| 9 | a) Discuss how experimental results help in evaluating biometric system performance.<br>b) How can computer vision and machine learning be used to recognize Indian Sign Language gestures? | 5M<br>5M | 4 | L2<br>L2 |
| 10 | Describe the use of biometric template protection techniques (e.g., biometric salting, template transformation) in enhancing user privacy. | 10M | 5 | L2 |
| | OR | | | |
| 11 | Create a comparison table showing privacy, accuracy, spoof resistance, and user acceptance of different biometric systems. | 10M | 5 | L2 |