Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. Biomedical Engineering (Full Time) - END SEMESTER EXAMINATIONS, NOV / DEC 2023

Department of Electronics and Communication Engineering
VII Semester
BM5008 BIOMETRIC SYSTEMS
(Regulation 2019)

Time: 3hrs | Max.Marks: 100

CO 1	**Demonstrate the principles of biometric systems.**
CO 2	**Develop fingerprint recognition technique.**
CO 3	**Design face recognition and hand geometry system.**
CO 4	**Design iris recognition system.**
CO 5	**Develop speech recognition and multimodal biometric systems.**

BL – Bloom's Taxonomy Levels
(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

PART- A (10 x 2 = 20 Marks)
(Answer all Questions)

Q. No	Questions	Marks	CO	BL
1	How is identity of an individual defined?	**2**	1	2
2	Differentiate active and passive biometrics	**2**	1	1
3	What are the different levels of hierarchy order in which ridges are described?	**2**	2	1
4	How finger scan technology work (block diagram) ?	**2**	2	2
5	Is LDA always better than PCA approach?	**2**	3	1
6	Draw the block diagram of Neural Network for Face recognition.	**2**	3	2
7	Why iris to be used as biometric?	**2**	4	1
8	List the Considerations in Iris Image Acquisition?	**2**	4	2
9	Define Mel frequency? State its significance.	**2**	5	2
10	What is Dynamic time warping?	**2**	5	1

PART- B (5 x 13 = 65 Marks)
(Restrict to a maximum of 2 subdivisions)

Q. No	Questions	Marks	CO	BL
11 (a) (i)	Explain in detail characteristics of ideal biometric system.	**7**	1	3
(ii)	Elucidate the metrics of accuracy used in Biometric systems	**6**	1	3
	OR			
11 (b)	Explain the taxonomy of Application environments in Biometrics.	**13**	1	3
12 (a)	Discuss the techniques used for fingerprint matching.	**13**	2	3
	OR			
12 (b)	Explain the Fingerprint biometric that can be used and classified using Poincare index method with neat diagram. Also list their applications.	**13**	2	3
13 (a)	Define Fisher Linear Discriminant criterion and Compute the linear discriminant projection for the following two-dimensional dataset: W1: X1=(x1,x2) = { (4,2) ,(2,4),(2,3),(3,6),(4,4)}	**13**	3	4

	OR			
13 (b) (i)	Describe face recognition technique using shape and texture.	**6**	3	4
(ii)	Discuss face recognition performance using 3D model ? State its merits	**7**	3	4
14 (a)	Elucidate Daugman's approach of Iris Localization.	**13**	4	3
	OR			
14 (b)	Explain in detail the Wilde's approach of Iris localization and representation.	**13**	4	3
15 (a)	Elucidate the Gaussian Mixture Model based speaker recognition.	**13**	5	4
	OR			
15 (b) (i)	Explain about Mel Frequency Cepstral coefficient extraction from speech signal.	**7**	5	4
(ii)	Explain in detail about the tasks involved in the NIST annual evaluations and discuss about the performance measure.	**6**	5	4

PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16.	Consider a digital Medical image is acquired using DSLR camera in png format where RGB values are given as R={1,3,2 ; 4,1,2 ;1,5,2 } G={ 1,2,3; 3,2,1 ; 0,1,1} B= { 1,3,2; 3,2,2; 1,1,0}.Discuss the steps in calculating the eigen values and Calculate the eigen values using Principal Component Analysis(PCA).	**15**	3	5