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

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. Biomedical Engineering (Full Time) - END SEMESTER EXAMINATIONS, APRIL / MAY 2024

Department of Electronics and Communication Engineering

VI 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	What are different means of automatic identification ?	2	1	2
2	List the two types of classification based on biometric characteristics ?	2	1	2
3	What are the different levels of hierarchy order in which ridges are described?	2	2	1
4	State the purpose of using face as Biometric application.	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	Outline the observations of Iris under different lighting condition.	2	4	2
9	Write a note on MEAD Theory.	2	5	2
10	Define 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 details about the ideal characteristics of biometrics?	8	1	3
(ii)	Distinguish between active and passive biometric.	5	1	3
	OR			
11 (b)	Explain the taxonomy of Application environments in Biometrics and the metrics used to measure performance of Biometric systems.	13	1	3
12 (a)	Discuss the techniques used for fingerprint matching.	13	2	4
	OR			
12 (b)	Discuss in detail about the technologies used in Finger-scan and give a comparison of technologies in terms of their image region , resolution , durability, power and cost.	13	2	4

13 (a)	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).	**13**	3	4
	OR			
13 (b) (i)	Discuss in detail about the Face Detection algorithm in color images using neat block diagram.	**8**	3	4
(ii)	With a neat flowchart explain the hand feature extraction and matching.	**5**	3	4
14 (a)	Elucidate Daugman's approach of Iris Localization.	**13**	4	3
	OR			
14 (b)	Analyze the need for passive sensing approach of iris image capturing with the help of diagram detailing primary components of image capturing system.	**13**	4	3
15.(a)	Elucidate the Gaussian Mixture Model based speaker recognition.	**13**	5	4
	OR			
15 (b)	Explain about Mel Frequency Cepstral coefficient extraction from speech signal.	**13**	5	4

PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16.	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)} W2: X2=(x1,x2) = { (9,10) ,(6,8),(9,5),(8,7),(10,8)}	**15**	3	5