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Question Paper Code	12671
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B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Second Semester

Artificial Intelligence and Data Science

20AIPC402 - BIOMEDICAL SIGNAL AND IMAGE PROCESSING

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

	Marks	K-Level	CO
1. Find the periodicity of the signal $x(t) = e^{(j\pi-2)t}$.	2	K2	CO1
2. Explain Deterministic signal with one example.	2	K2	CO1
3. State the importance of biological amplifiers.	2	K1	CO2
4. Define Resting Potential and Action Potential.	2	K1	CO2
5. Define – Histogram.	2	K1	CO3
6. List out the different types of derivative filters.	2	K1	CO3
7. Outline about Rayleigh noise model.	2	K2	CO4
8. What is segmentation?	2	K1	CO4
9. List out the color models.	2	K1	CO5
10. Define image translation and scaling.	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Write about elementary Continuous time and Discrete Signals in detail.	13	K2	CO1
OR			
b) i) Calculate the power and RMS value of the signal: $x(t) = A\cos(\Omega_0 t + \theta)$.	7	K2	CO1
ii) Determine whether the following signal is periodic. If periodic find its fundamental period $X[n] = e^{j2\pi n/3} + e^{j3\pi n/4}$.	6	K2	CO1
12. a) Draw the curves of ECG and diagnose any form of disturbance in heart rhythm.	13	K2	CO2
OR			
b) Explain the different types of electrodes used in measurement of biomedical signals.	13	K2	CO2
13. a) i) With example explain in detail about spatial averaging.	7	K2	CO3
ii) Describe in detail about various types of mean filters.	6	K2	CO3

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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OR

- b) List the various filters available under frequency domain for image enhancement and brief any two filters. 13 K2 CO3
14. a) Explain the use of wiener filter or least mean square filter in image restoration. 13 K2 CO4

OR

- b) i) Discuss the concept of inverse filter for image restoration. 7 K2 CO4
ii) What is spatial transformation techniques used for image restoration? Explain them in detail. 6 K2 CO4
15. a) i) State and explain sampling theorem in 2D. 7 K2 CO5
ii) Write about aliasing in Images. 6 K2 CO5

OR

- b) Outline in detail about: (i) RGB model and (ii) HSI model. 13 K2 CO5

PART - C (1 × 15 = 15 Marks)

16. a) Describe the recording setup used in EMG with neat diagram. 15 K2 CO6

OR

- b) Draw and explain the working principle of 3D ultrasound imaging technique. 15 K2 CO6