

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, December 2022-23
B. Tech. (CSE-V sem, ECE-VII sem).

Roll No.....

EE1224: Digital Image Processing and Introduction to Quantum Computing

Time: 2.5 hours

Max. Marks: 30

OPEN BOOK/ OPEN NOTES

Instructions to students:

1. Do not write anything other than your roll number on question paper.
 2. Mention all the assumptions for your answers clearly.
 3. All questions are compulsory and carry equal marks.
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Q. 1.1 How does human eye perceive different colors in an image? How can you compare this perception with cameras? What are the classes of colormaps used in matplotlib, explain function of each class. 5.0
(EE1224.1)

Q. 1.2 Explain with a diagram the difference between RGB, multispectral and hyperspectral cameras. 5.0
(EE1224.1)

Q. 2.1 Apply DCT to the following matrix and show that the inverse DCT can be obtained using properties of unitary transforms. 5.0
(EE1224.2)

$$\begin{bmatrix} 30 & 70 & 0 & 8 \\ 10 & 5 & 20 & 1 \\ 0 & 5 & 10 & 30 \\ 10 & 20 & 40 & 30 \end{bmatrix}$$

Q. 2.2 Write Hadamard matrix of 4x4 and prove that it works for the image in Q2.1 5.0
(EE1224.2)

Q. 3.1 Explain Quantum Fourier transform using circuit for 3 qubits, explaining the phase angle calculations. 5.0
(EE1224.5)

Q. 3.2 Explain FRQI image representation for 2x2 image and write the state equations when pixel intensities are 55, 180, 255, 40. 5.0
(EE1224.5)

all the best!