

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: BTECH
BRANCH: IT

SEMESTER : VI
SESSION : SP2023

SUBJECT: IT307 IMAGE PROCESSING

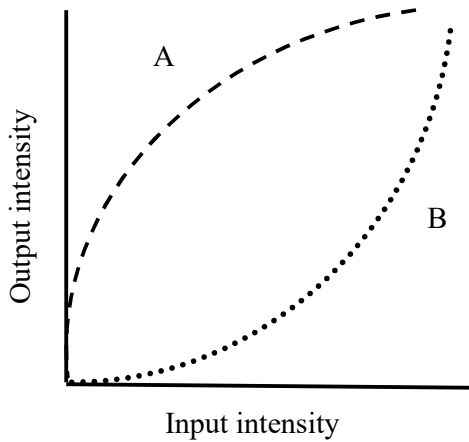
TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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|--|-----|----|----|
| Q.1(a) What are the side effects of using low spatial and intensity resolutions? | [2] | CO | BL |
| Q.1(b) Describe the transformation achieved on a grayscale image with following transformation curves A and B. | [3] | 1 | 2 |



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|--|-----|---|---|
| Q.2(a) What is the criteria for two pixels p and q to be m - adjacent? | [2] | 1 | 1 |
| Q.2(b) Compute the transformed intensity values for the given frequency of intensity levels in the input image | [3] | 1 | 3 |

r_k	0	1	2	3	4	5	6	7
n_k	2	4	6	8	10	12	14	16

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|--|-----|---|---|
| Q.3(a) Discuss the role of histograms in inferring about the contrast of an image. | [2] | 1 | 2 |
| Q.3(b) Calculate the DFT coefficients for $f(x)=\{1,2,8,9\}$. | [3] | 2 | 3 |

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|---|-----|---|---|
| Q.4(a) State the process of framing the 2d Laplacian operator. | [2] | 1 | 1 |
| Q.4(b) Prove that Discrete Fourier Transform is periodic in nature. | [3] | 2 | 2 |

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|--|-----|---|---|
| Q.5(a) State the reason behind DCT being a popular choice for image compression. | [2] | 2 | 1 |
| Q.5(b) Compute the filter output $H(u, v)$ for a frequency at $u= 50, v= 60$ for a Butterworth Low Pass filter with order $n=2$ and cut off frequency $D_0=50$ | [3] | 2 | 3 |