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## APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

### Scheme for Valuation/Answer Key

*Scheme of evaluation (marks in brackets) and answers of problems/key*

**SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), MAY 2019**

**Course Code: CS463**

**Course Name: DIGITAL IMAGE PROCESSING**

Max. Marks: 100

Duration: 3 Hours

#### PART A

*Answer all questions, each carries 4 marks.*

	Marks
1	(4)
i) Defn of digital image (1 mark).	
ii) Defn. of digital image processing – 1 mark	
iii) Types: Gray, binary, color images – 2 marks	
2	(4)
Explanation of 4-connectivity- 1mark	
Explanation of 8-connectivity- 1mark	
Explanation of m- connectivity- 1mark	
Example – 1 mark	
3	(4)
• Energy Conservation	
• Rotation	
• De-correlation	
• Energy Compaction (Any two-2 marks each)	
4	(4)
Significance – 1mark	
Explanation of log transformation- 3 marks	
5	(4)
Explanation- 3 marks	
Figure – 1mark	
6	(4)
Explanation- 3 marks	
Equation – 1mark	
7	(4)
Explanation- 4 marks	
8	(4)
Explanation- 4 marks	
9	(4)
Dilation -2 marks	
Erosion – 2marks	
10	(4)
Boundary – 1 mark ,explanation on representing images- 3 marks	

#### PART B

*Answer any two full questions, each carries 9 marks.*



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- 11 a) Steps - 6 marks (9)  
Diagram – 3 marks
- 12 a) 1D Walsh Transformation Function – 2 marks (4)  
2D Walsh Transformation Function– 2 marks
- b) Statement(translation property) – 1 mark , proof – 1.5 marks (5)  
Statement(rotation property) – 1 mark , proof – 1.5 marks
- 13 a) sampling - 2 marks , quantization – 2 marks (5)  
Diagram – 1 mark
- b) Steps – 3 marks, final answer – 1 mark (4)

**PART C**

*Answer any two full questions, each carries 9 marks.*

- 14 a) Explanation of Power Law Transformation with Diagram – 2.5 marks (5)  
Explanation of gray level slicing with Diagram – 2.5 marks
- b) Linear filter with example- 2 marks (4)  
Nonlinear filter with example – 2 marks
- 15 a) Explanation with equation on Low pass filters– ideal, Butterworth, Gaussian( 2marks each) (6)
- b) steps involved in frequency domain filtering – 3 marks (3)
- 16 a) unsharp masking – 2marks (4)  
highboost filtering – 2 marks
- b) Definition of Histogram – 1 mark, histogram of four image types( 1 mark each) (5)

**PART D**

*Answer any two full questions, each carries 12 marks.*

- 17 a) Line detection and masks for detecting horizontal, vertical and diagonal lines- 4 marks (4)
- b) Thresholding concepts- 2 marks, local thresholding – 2 marks (4)
- c) edge detection done using Sobel + mask – 3 marks, advantage – 1 mark (4)
- 18 Explanation – Concepts (3 Marks), Algorithm (6 Marks), Example (3 Marks) (12|)
- 19 a) Explanation on boundary segments, convex hull, convex deficiency– 4 marks (6)  
Example – 2 marks
- b) Explanation on isolated point detection – 5 marks (6)  
Mask – 1 mark

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