Sea	ıt No.:	: Enrolment No	
GUJARAT TECHNOLOGICAL UNIVERSITY			
ME – SEMESTER II (OLD) – • EXAMINATION – SUMMER 2016 Subject Code: 1720104 Date:19/05/2			16
Subject Name: Digital Image Processing			
Time: 10:30 am to 01:00 pm Total Mai			<b>70</b>
Instructions: 1. Attempt all questions.			
	2.	<ul> <li>Make suitable assumptions wherever necessary.</li> <li>Figures to the right indicate full marks.</li> </ul>	
Q.1	(a)	<ul><li>Explain following in relation to digital image processing</li><li>i) Spatial resolution</li><li>ii) Gray level resolution</li></ul>	07
	<b>(b)</b>	The image $f(x,y) = 4\cos 2\pi(2x+y)$ is to be sampled. Find minimum sampling rate required.	07
Q.2	(a)	<ul><li>Explain following techniques used for image enhancement</li><li>i) Point processing</li><li>ii) Mask processing</li></ul>	07
	<b>(b)</b>	Part of an image matrix is given below, replace marked pixels using 3x3 median	07
		filter. What kind of noise can be removed using such filter?  18 22 33 25 32	
		34         128         24         172         26	
		22 19 32 31 28	
	<b>(b)</b>	OR Explain histogram equalization technique	07
Q.3	(a)	Explain difference between image enhancement and image restoration. Discuss	07
	<b>(b)</b>	image restoration model.  Explain Wiener filter and compare it with inverse and pseudo-inverse filter.	07
	(6)	OR	07
Q.3	(a) (b)	Discuss PDF and properties of Gaussian and Rayleigh noise models.  Discuss human perception of colour and discuss various colour models.	07 07
Q.4	(a)	Explain in brief Heisenberg Uncertainty Principle. Explain conceptual evolution of Wavelet Transform from Fourier transform and Short Time Fourier Transform.	07
	(b)	In relation to image compression explain following  i) Spatial redundancy  ii) Temporal redundancy  iii) Coding redundancy  iv) Psychovisual redundancy  OR	07
Q.4	(a)	Explain Harr Transform for multi-resolution analysis.	07
	<b>(b)</b>	Explain basics of JPEG image compression standard.	07
Q.5	(a) (b)	Explain morphological image processing operations for thinning and thickening. Give two reasons for the popularity of DCT in transform-based image compression. What is blocking artifacts in DCT based image compression scheme?	07 07
Q.5	(a)	<b>OR</b> Explain use of boundary extraction. Explain one algorithm related to boundary	07
	<b>(b)</b>	extraction.  What is image segmentation? List various techniques used in image segmentation.	07

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