K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)
Semester: **January – May 2021**
In-Semester Examination

Class: TY B. Tech
Branch: Computer Engineering
Semester: VI
Full name of the course: Digital Signal and Image Processing
Course Code: 2UCC601
Duration: 1hr.15 min (attempting questions) +15 min (uploading) Max. Marks: 30

Q. No	Questions	Marks		
Q1	1.1 Right shifted in time by 4 units signal x(n) is a. x(n-1) b. x(n-4) c. x(n+4) d. none of these 1.2 A system is said to be _____if the output does not depend on future inputs and outputs 1.3 A discrete time system is named as _____ if it obeys the principle of superposition and named as _____if its input-output relationship does not change with time. 1.4 128X128 image with 32 gray levels requires _____bits of storage a. 4096 b. 81920 c. 12288 d. 65536 1.5 In bit-plane slicing if an image is represented by 8 bits and is composed of eight, 1-bit planes, with plane 0 showing least significant bit and plane 7 showing most significant bit. Then, combination of which planes as given below contains most significant data. a) Planes 4, 5, 6, 7 b) Planes 0, 1 c) Planes 0,1,2 d) Planes 2, 6, 4, 5	10 marks (2 MARKS EACH)		

Q2	2 a) Find whether the signal given below is periodic or aperiodic. $$y(n) = \sin\left(\frac{\pi}{3}n^2\right)$$ **OR** 2a) Explain causal and anti-causal system with an example. 2b) Find even and odd components of the given discrete time signal. x(n) = {1, -2, 3, 4, -1, 2, 2,3, -2) ↑	5 marks 5 marks		
Q3	For 3 BPP, 4x 4 image perform following operations. a) Thresholding T=4 b) Bit plane slicing with MSB and LSB planes c) Negation d) Intensity level slicing with background for r1=2, r2=5 **OR** Perform spatial enhancement technique, Histogram Equalization on the following digital image data of 3 BPP. Plot the original histogram as well as equalized histogram of the image.	10 marks		

4	2	3	0					
1	3	5	7					
5	3	2	1					
2	4	6	7					

Intensity	0	1	2	3	4	5	6	7
No. of pixels	70	100	40	60	0	80	10	40