

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
 Test III EXAMINATION- December 2021  
 B.Tech. Fifth Semester

COURSE CODE: 20B1WEC533

MAX. MARKS: 35

COURSE NAME: FUNDAMENTALS OF DIGITAL IMAGE PROCESSING AND APPLICATIONS

COURSE CREDITS: 03

MAX. TIME: 2 Hrs

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

**Q1)** Calculate the arithmetic code for the following pixel data-set : { 16, 20, 16, 30}. [5]

**Q2)** Using Lempel-Ziv-Welch (LZW) coding for image compression encode the following 4 x 4 image. [5]

41	41	160	160
41	41	160	160
41	41	160	160
41	41	160	160

**Q3)** Calculate the Huffman code for the following pixels in an image. The pixels along with their probability of occurrence in the image are as given below. [5]

Pixel	12	24	35	120	170	215
Probability	0.20	0.30	0.06	0.15	0.04	0.25

**Q4)** For the image A and structuring element B. Compute [5]

(i) A dilated by B

(ii) A' eroded by B

A =	0	0	0	0	0	0
	0	0	1	1	0	0
	0	1	1	1	1	0
	0	0	1	1	0	0
	0	0	0	0	0	0
B =	1					
	1					
	1					

**Q5)** For the one dimensional function A and structuring element B, compute  $A \circ B$ . (A opening by B).  $A=\{5,7,11,8,2,6,8,9,7,4,3\}$ .  $B=\{1,2,1\}$  [5]

**Q6)** Find the 2 dimensional IDFT of  $F=[32 \ -8 \ 0 \ -8; \ -8 \ 0 \ 0 \ 0; \ 0 \ 0 \ 0 \ 0; \ -8 \ 0 \ 0 \ 0]$  [5]

**Q7)** A polygon with vertices  $A(0,0)$ ;  $B(1,0)$ ;  $C(1,1)$ ;  $D(0,1)$ . Perform x shearing with  $a=2$  followed by y shearing with  $b=3$ . [5]