

**JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT**  
**TEST-T3 EXAMINATION-December 2021**  
**B.Tech Vth Semester**

Course Code: 18B1WCI532  
 Course Name: Data Compression  
 Course Credits: 02

Max Marks: 35

Max Time: 02:00 Hours

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

**Section - I**

- Q1. Write the difference between lossless and lossy compression technique and the performance metrics used to evaluate the techniques? (1)
- Q2. Consider a message "abarayaranbarraybranbfarbfaarbfaaarbaway". Find the compression ratio if variable length encoding is used over fixed length encoding? Consider the ASCII character set in sequence? Don't assume Huffman encoding method. (2)
- Q3. Calculate the entropy for message "MISSISSIPPI"? (2)

**Section - II**

- Q1. Find the size of minimum length encoded message using Huffman Coding for any palindrome string of length  $2n$ ? (3)
- Q2. Which Huffman properties is (are) not satisfied for following codes given to the alphabets: (1+2)
- $a = 0, b = 01, c = 10, d = 100, e = 010.$

What necessary changes should be in the codes to satisfy the property, write the codes?

- Q3. Find the average bit rate when  $n = 3, P(aaa) = 0.343, P(b) = 0.2, P(ab) = 0.14, P(ac) = 0.101,$  and code sequence are 000,001,010,101 respectively, using tunstall coding? (4)

**Section - III**

- Q1. What will be the BWT code & index value for Message "KISSAN ANDOLAN"? also find its MFT code (2.5+2.5)
- Q2. What will be the tunstall code for "abb" if  $P(a) = 0.52, P(b) = 0.27, P(c) = 0.15, P(d) = 0.06, n = 4$ ? (5)
- Q3. If  $C(0) = 1, C(1) = 4, D = 300, X[0] = [0, 2], X[1] = [3, 7].$  What will be the new code Words  $C(0)$  &  $C(1)$ ? (5)

Pixel Values	0	1	2	3	4	5	6	7
Frequency	100	100	100	40	30	20	10	0

- Q4. (A) How many bits in the run length encoding using  $k = 3$  bits for the "000000000011000001110000000110101000011"? (1+1+1+2)
- (B) .In vector quantization technique, what will be the compression ratio for the block size is  $5 \times 32,$  & the size of code book is 1024?
- (C) If the training vector is (5,3,9,6) & code word are  $C1(1,3,5,6), C2(1,2,5,2), C3(1,3,1,5) C4(9,1,7,5),$  which is the closest codeword?

(D) What will be the code word for following Pixel values & their frequency?

Pixel Values	15	10	7	11	9	10	8	12
Frequency	10	20	30	10	30	20	15	15