



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

REG.NO.:

NAME OF THE SCHOOL
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2024-2025

SLOT: B1+TB1

Programme Name & Branch : B.Tech
Course Code and Course Name : BCSE323L - Digital Watermarking and Steganography
Faculty Name(s) : Dr. Jenicka S & Dr. Deepikaa S
Class Number(s) : VL2024250101473, 1470
Date of Examination : 14/10/24
Exam Duration : 90 minutes
Maximum Marks: 50

General instruction(s):

Answer All Questions

CO1. Learn the fundamental concepts, principles, characteristics and performance measures of digital watermarking and steganography.

CO2. Acquire the various concepts of watermarking for digital authentication and authorization schemes related to electronic documents, image and video

Q. No	Question	M	CO	BL
1.	An organization wants to store the compressed images of official documents in the cloud with official watermark embedded in it. Suggest a watermarking technique that combines watermark and compression and list out the difficulties in this process.	10	2	2
2.	Alice maintains online book publishing enterprise, who sells e-versions of books, novels and other digital journals. All the digital resources are watermarked with the official logo. Bob sells the pirated version of the digital resources by removing the watermark. Identify the security breach happened here and list out the suggestions to mitigate the attack.	10	2	3
3.	Indian Army headquarters have received an image from the army headquarters of neighbouring country regarding an attack planned by a terrorist group on children's day. Indian army suspects the message has been tampered by some adversary as they expected the attack on Prime Minister visit to Srinagar a week before children's day. Indian army needs to authenticate the message and verify if it is modified or not. Suggest some authentication techniques that exposes the alterations done and help the army to verify the authenticity and integrity of the message.	10	2	4



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4.	a. Assume an image with size of 8*8 pixels is chosen as a cover to hide a message. Each pixel is represented by 8 bits.																																																																		
	<table><tr><td>58</td><td>45</td><td>29</td><td>27</td><td>24</td><td>19</td><td>17</td><td>20</td></tr><tr><td>62</td><td>52</td><td>42</td><td>41</td><td>38</td><td>30</td><td>22</td><td>18</td></tr><tr><td>48</td><td>47</td><td>49</td><td>44</td><td>40</td><td>36</td><td>31</td><td>25</td></tr><tr><td>59</td><td>78</td><td>49</td><td>32</td><td>28</td><td>31</td><td>31</td><td>31</td></tr><tr><td>98</td><td>138</td><td>116</td><td>78</td><td>39</td><td>24</td><td>25</td><td>27</td></tr><tr><td>115</td><td>160</td><td>143</td><td>97</td><td>48</td><td>27</td><td>24</td><td>21</td></tr><tr><td>99</td><td>137</td><td>127</td><td>84</td><td>42</td><td>25</td><td>24</td><td>20</td></tr><tr><td>74</td><td>95</td><td>82</td><td>67</td><td>40</td><td>25</td><td>25</td><td>19</td></tr></table>	58	45	29	27	24	19	17	20	62	52	42	41	38	30	22	18	48	47	49	44	40	36	31	25	59	78	49	32	28	31	31	31	98	138	116	78	39	24	25	27	115	160	143	97	48	27	24	21	99	137	127	84	42	25	24	20	74	95	82	67	40	25	25	19		
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	i Estimate the maximum embedding capacity of the image if all the LSB bits are chosen for embedding. (1M) ii Estimate the maximum embedding capacity of the image if the LSB bits of diagonal pixels are chosen for embedding. (1M) iii Estimate the Maximum number of bits to be modified to hide the message of length 16 bits. (1M) iv Assume the message 110011 to be embedded in the first row of the matrix. Estimate the number of bits modified to embed the message and write the output of traditional LSB embedded version of the 1st row values (2M)	5	1	3																																																															
	b. Compare and contrast steganography and watermarking in the context of Imperceptibility and security.	5	1	2																																																															
5.	Medical images are considered the most sensitive as any changes in the content would definitely affect the diagnosis. Consider a medical image stored in PNG format. Illustrate a steganography method that embeds the secret message in the colour information of the cover without affects the quality of the image.	10	1	4																																																															

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