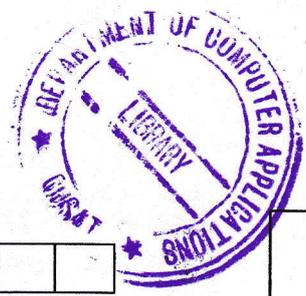


MCA,III/11.23.005

Reg.No.

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A

MCA THIRD SEMESTER EXAMINATION NOVEMBER 2023
22-382-0332 INTERNET OF THINGS
(Regular&Supplementary)

Time: 3 Hours

Write any FIVE questions.
 Each question carries 10 Marks

Maximum Marks :50

No		QUESTIONS	MARKS	CO	BL	PL
1	a.	Explain IoT and its characteristics.	5	CO1	L2	1.6.1
	b.	Explain various link layer protocols of IoT.	5	CO1	L2	1.6.1
OR						
2	a.	Explain MQTT Protocol in detail.	7	CO1	L2	1.6.1
	b.	Differentiate between MQTT and HTTP.	3	CO1	L2	1.6.1
3	a.	Compare M2M & IOT.	5	CO2	L2	1.6.1
	b.	With a neat diagram, explain layered architecture of IoT.	5	CO2	L2	1.6.1
OR						
4	a.	What is Zigbee?	4	CO2	L2	1.6.1
	b.	Explain the role of Zigbee in IoT Communication.	6	CO2	L2	1.6.1
5		Identify the use of the sensors given below:	10	CO3	L3	1.6.1
		(i) LM35 (ii) DHT22 (iii) LDR (iv) MQ Series (v) Gyroscope				
OR						

6		Design an Arduino based vehicle monitoring and tracking system. The system should collect information such as vehicle location, speed, fuel level, acceleration of the vehicle, engine temperature and send this information at regular intervals in real time to a cloud server database. These vehicle statistics stored in the cloud database should be accessible by authorized persons using any web enabled device (1) Identify the sensors required and explain the tasks that should be executed. (2) Draw the high level architecture showing sensors and interface. (3) Write the Pseudo code for implementing the system.	3 3 4	CO3	L2	1.6.1
7	a.	Write aurdino program for traffic control system using three different LEDs.	6	CO4	L2	1.6.1
	b.	Explain the components required to implement traffic control system.	4	CO4	L3	1.6.1
		OR				
8	a.	Design an IoT application for estimating the moisture in the soil using Arduino board and sensor. Draw the circuit diagram and explain the working. Also write the pseudocode.	6	CO4	L3	2.5.2
	b.	Compare Arduino and Rasberry Pi boards.	4	CO3	L3	1.6.1
9.	a.	Explain the role of Big Data Analytics in IoT.	5	CO5	L2	1.6.1
	b.	Consider an IoT based forest fire detection system, and explain the bigdata processing steps in this use case.	5	CO5	L2	1.6.1
		OR				
10	a.	Describe the components and steps to create an IoT-based weather station using Arduino and sensors.	5	CO5	L2	2.5.2
	b.	Explain how the IoT technology used in smart lightening and intrusion detection systems.	5	CO5	L2	1.6.1

M.Sc.(DS).III/11.23.001

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Reg.No.

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**M.SC. COMPUTER SCIENCE WITH SPECIALIZATION IN DATA SCIENCE
THIRD SEMESTER EXAMINATION NOVEMBER 2023**

22-359-0331 INTERNET OF THINGS

(Regular)

Time: 3 Hours

Maximum Marks: 50

Each question carries 10 Marks.

No		QUESTIONS	MARKS	CO	BL	PL
1	a.	Explain IoT and its characteristics.	5	CO1	L2	1.6.1
	b.	Explain various link layer protocols of IoT.	5	CO1	L2	1.6.1
OR						
2	a.	Explain MQTT Protocol in detail.	7	CO1	L2	1.6.1
	b.	State some differences between MQTT and HTTP	3	CO1	L2	1.6.1
3		Describe how the environment can be more protected with the help of IoT technology in the following categories: (i) Air pollution monitoring (ii) Noise pollution monitoring (iii) River flood detection (iv) Structural health monitoring (v) Emergency response	10	CO2	L3	1.6.1
OR						
4		With the help of neat diagrams, explain the M2M system architecture.	10	CO2	L2	1.6.1
5		Identify the functions of the sensors mentioned below: (i) LM35 (ii) DHT22 (iii) LDR (iv) MQ Series (v) Gyroscope	10	CO3	L3	1.6.1
OR						

6	a	Define Actuators? Mention the different types of Actuation systems.	5	CO3	L2	1.6.1
	b	Mention the sensors which are used in industrial applications.	5	CO3	L2	1.6.1
7	a.	What is the use of GPIO pins in IoT device?	4	CO4	L2	1.6.1
	b.	Illustrate how to interface a LED to Arduino and write a program to blink.	6	CO4	L3	1.6.1
OR						
8	a.	Design an IoT application for estimating the moisture in the soil using Arduino board and sensor. Draw the circuit diagram and explain the working. Also write the pseudocode.	5	CO4	L3	2.5.2
	b.	How Aurdino helps to develop IoT applications. Explain with example. Compare How Arduino differs from Raspberry Pi?	5	CO4	L2	1.6.1
9.	a.	Explain the role of Big Data Analytics in IoT.	5	CO5	L2	1.6.1
	b.	Consider an IoT based forest fire detection system, and explain the bigdata processing steps in this use case.	5	CO5	L3	1.6.1
OR						
10	a.	Describe the components and steps to create an IoT-based weather station using Arduino and sensors.	5	CO5	L3	2.5.2
	b.	Define how the IoT technology can be implemented in smart lightening and intrusion detection systems.	5	CO5	L2	1.6.1



MCA THIRD SEMESTER EXAMINATION NOVEMBER 2023
22-382-0301 WEB TECHNOLOGIES AND PROGRAMMING

(Regular)

Time: 3 Hours

Write any FIVE questions.
Each question carries 10 Marks

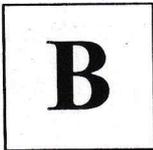
Maximum Marks :50

No	QUESTIONS	MARKS	CO	BL	PL																												
1	a. Write an XHTML code to display the following output. <ul style="list-style-type: none"> ● Department of Physics <ul style="list-style-type: none"> i. Bsc. Physics ii. MSc. Physics <ul style="list-style-type: none"> ■ Nuclear physics ■ Geophysics iii. Ph.D. ● Department of Chemistry <ul style="list-style-type: none"> a. M.Sc. <ul style="list-style-type: none"> ○ Organic Chemistry ○ Analytical Chemistry b. BSc. Chemistry c. Ph.D. 	5	CO1	L3	5.2.2																												
	b. Explain different methods for adding a CSS style into an XHTML web page with examples?	5	CO1	L2	5.2.2																												
OR																																	
2	a. Explain the purpose of the <th>, <tr> and <td> tags in an HTML table. What is the significance of the <i>colspan</i> and <i>rowspan</i> attributes in table cells? Write the HTML code for the below table: <table border="1" style="margin: 10px auto;"> <thead> <tr> <th colspan="4">Time Table</th> </tr> <tr> <th>Day</th> <th>Course</th> <th>Subject</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Day 1</td> <td>BSc. Maths</td> <td>Calculus</td> <td>9 - 11.30 am</td> </tr> <tr> <td>BSc CS.</td> <td>C++</td> <td>12 - 1.30 pm</td> </tr> <tr> <td>BSc. Physics</td> <td>Quantum Mechanics</td> <td>2 - 3.30 pm</td> </tr> <tr> <td rowspan="3">Day 2</td> <td>BSc. Maths</td> <td>Graph Theory</td> <td>9 - 11.30 am</td> </tr> <tr> <td>BSc CS.</td> <td>Operating System</td> <td>12 - 1.30 pm</td> </tr> <tr> <td>BSc. Physics</td> <td>Thermodynamics</td> <td>2 - 3.30 pm</td> </tr> </tbody> </table>	Time Table				Day	Course	Subject	Time	Day 1	BSc. Maths	Calculus	9 - 11.30 am	BSc CS.	C++	12 - 1.30 pm	BSc. Physics	Quantum Mechanics	2 - 3.30 pm	Day 2	BSc. Maths	Graph Theory	9 - 11.30 am	BSc CS.	Operating System	12 - 1.30 pm	BSc. Physics	Thermodynamics	2 - 3.30 pm	5	CO1	L3	5.2.2
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	BSc CS.	Operating System	12 - 1.30 pm																														
	BSc. Physics	Thermodynamics	2 - 3.30 pm																														
b. Create an XHTML web page with CSS style. The webpage should include the following elements: <ul style="list-style-type: none"> ● A heading with the text "Cochin University of Science and Technology" in a color of your choice. ● A paragraph with the class name 'demo' to have a red text color, font size of 16 pixels, and a bold font weight. ● Ensure that all paragraphs have a 1px solid black border. ● Insert an image of the Cochin University of Science and Technology. ● An unordered list of departments. 	5	CO1	L3	5.2.2																													

3	a.	Create a simple HTML form with a text input and a button. Implement an onClick event that triggers an alert with the input value when the button is clicked.	3	CO2	L3	
	b.	Write a JavaScript function that validates a user registration form and gives appropriate alert messages. The form should include fields like username, password, and email, with specific validation requirements. Demonstrate the usage of this function.	5	CO2	L3	5.2.2
	c.	Explain the differences between Alert, Prompt, and Confirm windows in JavaScript. Include examples for each.	2	CO2	L2	5.2.2
OR						
4	a.	Discuss the methods for element access operations in JavaScript. Provide examples for accessing elements by ID and manipulating their values using getElementById(), value, and InnerHTML.	4	CO2	L2	5.2.2
	b.	Discuss the usage of 'onmouseover' and 'onmouseout' events in JavaScript. Provide a practical example of implementing these events on a webpage.	3	CO2	L2	5.2.2
	c.	Write JavaScript code that validates a user's password based on the following requirements: i.) At least 8 characters long ii.) Contains at least one uppercase letter, one lowercase letter, and one digit.	3	CO2	L3	5.2.2
5	a.	Explain the steps involved in connecting a Java application with a MySQL database using JDBC. Include the sample code for the same. Also, provide a brief overview of the class.forName method.	6	CO3	L2	5.2.2
	b.	Describe the lifecycle of a Servlet. Explain the role of the 'init()', 'service()', and 'destroy()' methods in the Servlet lifecycle.	2	CO3	L2	5.2.2
	c.	Write a Java Servlet that reads data from the query parameters of an HTTP GET request and displays it in the response. Include the relevant code snippets.	2	CO3	L3	5.2.2
OR						
6	a.	Write a Java program that demonstrates the use of prepared statements in JDBC (containing all the steps involved in database connectivity). Include examples of executing select and update queries using prepared statements.	8	CO3	L3	5.2.2
	b.	Explain the difference between GET and POST methods in form submissions. Provide an example of when you might prefer one over the other in a Java Servlet application.	2	CO3	L2	5.3.1

7	a.	Why is JSP (JavaServer Pages) a preferred choice for web development, and what are the key advantages it offers over other technologies?	3	CO4	L2	5.2.1
	b.	Develop a jsp based application to facilitate a MCQ based quiz application with a web page named quiz.html containing 10 questions with one correct answer. 4 marks will be awarded if the answer is correct, 1 mark will be deducted if answer is wrong.. Total marks have to be displayed to the user.	7	CO4	L2	5.2.2
OR						
8	a.	Design a java servlet program to get one string value and three integer values via textboxes from a webpage named calculation.html. If the value of first text box is 'odd_prime', find odd prime numbers among those 3 values, if it is 'four_digit', find the four digit numbers among those.	7	CO4	L2	5.2.2
	b.	What are JSP actions? Explain any two commonly used JSP actions and their purposes in JavaServer Pages.	3	CO4	L2	5.2.2
9	a.	Define an XML and Document Type Definition for a simple address book. The address book should capture information about individuals, including their name, phone number, and email address.	5	CO5	L3	5.2.2
	b.	What is XSLT? Explain how XSLT can be used to transform XML data into a HTML format with example.	5	CO5	L2	5.2.2
OR						
10	a.	Explain the basic components of XML. Write a well-formed XML document representing information about a University. The document's root element should be labeled 'university', and include details such as the names of courses, instructors, and the number of enrolled students.	5	CO5	L2	5.2.2
	b.	What is XML Schema, and how does it differ from Document Type Definition (DTD)? Create a simple XML Schema for the University XML data.	5	CO5	L3	5.2.1

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MCA THIRD SEMESTER EXAMINATION NOVEMBER 2023
22-382-0302 CRYPTOGRAPHY AND NETWORK SECURITY

(Regular & Supplementary)

Time: 3 Hours

Write any FIVE questions.
 Each question carries 10 Marks

Maximum Marks :50

Q.No	Questions	Marks	CO	BL	PI																																																																																																																																																																																																																																																																																																																					
1.	a. The following shows a plaintext along with its cipher text. Reason out whether the cipher is monoalphabetic or not. i) Plaintext: HELLO ,Cipher text: KHOOR ii) Plaintext: HELLO ,Cipher text: ABNZF	2	CO1	L2	1.7.1																																																																																																																																																																																																																																																																																																																					
	b. Encrypt the plain text message using Playfair cipher.	5		L3																																																																																																																																																																																																																																																																																																																						
	c. "We are discovered save yourself" with the key monarchy Evaluate i)-18(mod4) ii)GCD(2740,1760) iii)2^16(mod17)	3		L3																																																																																																																																																																																																																																																																																																																						
OR																																																																																																																																																																																																																																																																																																																										
2.	a. Decrypt the plaintext "EWXJEWYTKZ" with Hill cipher algorithm and using the following 2x2 key: 22 13 11 5	5	CO1	L3	1.7.1																																																																																																																																																																																																																																																																																																																					
	b. Find the multiplicative inverse of 49 modulo 970 if exists.	5																																																																																																																																																																																																																																																																																																																								
3	a) Compare Feistel and non feistel ciphers together with examples.	2	CO2	L2	2.6.2																																																																																																																																																																																																																																																																																																																					
	b) Rijndael AES supports the use of 16X16 S-Boxes for byte substitution operation. Consider the given S-Box and state table .																																																																																																																																																																																																																																																																																																																									
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2"></th> <th colspan="16">y</th> </tr> <tr> <th colspan="2"></th> <th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>f</th> </tr> </thead> <tbody> <tr> <th rowspan="16" style="vertical-align: middle;">x</th> <th>0</th><td>63</td><td>7c</td><td>77</td><td>7b</td><td>f2</td><td>6b</td><td>6f</td><td>c5</td><td>30</td><td>01</td><td>67</td><td>2b</td><td>fe</td><td>d7</td><td>ab</td><td>76</td> </tr> <tr> <th>1</th><td>ca</td><td>82</td><td>c9</td><td>7d</td><td>fa</td><td>59</td><td>47</td><td>f0</td><td>ad</td><td>d4</td><td>a2</td><td>af</td><td>9c</td><td>a4</td><td>72</td><td>c0</td> </tr> <tr> <th>2</th><td>b7</td><td>fd</td><td>93</td><td>26</td><td>36</td><td>3f</td><td>f7</td><td>cc</td><td>34</td><td>a5</td><td>e5</td><td>f1</td><td>71</td><td>d8</td><td>31</td><td>15</td> </tr> <tr> <th>3</th><td>04</td><td>c7</td><td>23</td><td>c3</td><td>18</td><td>96</td><td>05</td><td>9a</td><td>07</td><td>12</td><td>80</td><td>e2</td><td>eb</td><td>27</td><td>b2</td><td>75</td> </tr> <tr> <th>4</th><td>09</td><td>83</td><td>2c</td><td>1a</td><td>1b</td><td>6e</td><td>5a</td><td>a0</td><td>52</td><td>3b</td><td>d6</td><td>b3</td><td>29</td><td>e3</td><td>2f</td><td>84</td> </tr> <tr> <th>5</th><td>53</td><td>d1</td><td>00</td><td>ed</td><td>20</td><td>fc</td><td>b1</td><td>5b</td><td>6a</td><td>cb</td><td>be</td><td>39</td><td>4a</td><td>4c</td><td>58</td><td>cf</td> </tr> <tr> <th>6</th><td>d0</td><td>ef</td><td>aa</td><td>fb</td><td>43</td><td>4d</td><td>33</td><td>85</td><td>45</td><td>f9</td><td>02</td><td>7f</td><td>50</td><td>3c</td><td>9f</td><td>a8</td> </tr> <tr> <th>7</th><td>51</td><td>a3</td><td>40</td><td>8f</td><td>92</td><td>9d</td><td>38</td><td>f5</td><td>bc</td><td>b6</td><td>da</td><td>21</td><td>10</td><td>ff</td><td>f3</td><td>d2</td> </tr> <tr> <th>8</th><td>cd</td><td>0c</td><td>13</td><td>ec</td><td>5f</td><td>97</td><td>44</td><td>17</td><td>c4</td><td>a7</td><td>7e</td><td>3d</td><td>64</td><td>5d</td><td>19</td><td>73</td> </tr> <tr> <th>9</th><td>60</td><td>81</td><td>4f</td><td>dc</td><td>22</td><td>2a</td><td>90</td><td>88</td><td>46</td><td>ee</td><td>b8</td><td>14</td><td>de</td><td>5e</td><td>0b</td><td>db</td> </tr> <tr> <th>a</th><td>e0</td><td>32</td><td>3a</td><td>0a</td><td>49</td><td>06</td><td>24</td><td>5c</td><td>c2</td><td>d3</td><td>ac</td><td>62</td><td>91</td><td>95</td><td>e4</td><td>79</td> </tr> <tr> <th>b</th><td>e7</td><td>c8</td><td>37</td><td>6d</td><td>8d</td><td>d5</td><td>4e</td><td>a9</td><td>6c</td><td>56</td><td>f4</td><td>ea</td><td>65</td><td>7a</td><td>ae</td><td>08</td> </tr> <tr> <th>c</th><td>ba</td><td>78</td><td>25</td><td>2e</td><td>1c</td><td>a6</td><td>b4</td><td>c6</td><td>e8</td><td>dd</td><td>74</td><td>1f</td><td>4b</td><td>bd</td><td>8b</td><td>8a</td> </tr> <tr> <th>d</th><td>70</td><td>3e</td><td>b5</td><td>66</td><td>48</td><td>03</td><td>f6</td><td>0e</td><td>61</td><td>35</td><td>57</td><td>b9</td><td>86</td><td>c1</td><td>1d</td><td>9e</td> </tr> <tr> <th>e</th><td>e1</td><td>f8</td><td>98</td><td>11</td><td>69</td><td>d9</td><td>8e</td><td>94</td><td>9b</td><td>1e</td><td>87</td><td>e9</td><td>ce</td><td>55</td><td>28</td><td>df</td> </tr> <tr> <th>f</th><td>8c</td><td>a1</td><td>89</td><td>0d</td><td>bf</td><td>e6</td><td>42</td><td>68</td><td>41</td><td>99</td><td>2d</td><td>0f</td><td>b0</td><td>54</td><td>bb</td><td>16</td> </tr> </tbody> </table>								y																		0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f	x	0	63	7c	77	7b	f2	6b	6f	c5	30	01	67	2b	fe	d7	ab	76	1	ca	82	c9	7d	fa	59	47	f0	ad	d4	a2	af	9c	a4	72	c0	2	b7	fd	93	26	36	3f	f7	cc	34	a5	e5	f1	71	d8	31	15	3	04	c7	23	c3	18	96	05	9a	07	12	80	e2	eb	27	b2	75	4	09	83	2c	1a	1b	6e	5a	a0	52	3b	d6	b3	29	e3	2f	84	5	53	d1	00	ed	20	fc	b1	5b	6a	cb	be	39	4a	4c	58	cf	6	d0	ef	aa	fb	43	4d	33	85	45	f9	02	7f	50	3c	9f	a8	7	51	a3	40	8f	92	9d	38	f5	bc	b6	da	21	10	ff	f3	d2	8	cd	0c	13	ec	5f	97	44	17	c4	a7	7e	3d	64	5d	19	73	9	60	81	4f	dc	22	2a	90	88	46	ee	b8	14	de	5e	0b	db	a	e0	32	3a	0a	49	06	24	5c	c2	d3	ac	62	91	95	e4	79	b	e7	c8	37	6d	8d	d5	4e	a9	6c	56	f4	ea	65	7a	ae	08	c	ba	78	25	2e	1c	a6	b4	c6	e8	dd	74	1f	4b	bd	8b	8a	d	70	3e	b5	66	48	03	f6	0e	61	35	57	b9	86	c1	1d	9e	e	e1	f8	98	11	69	d9	8e	94	9b	1e	87	e9	ce	55	28	df	f	8c	a1	89	0d	bf	e6	42	68	41	99	2d	0f	b0	54	bb	16
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19	a0	9a	e9
3d	f4	c6	f8
e3	e2	8d	48
be	2b	2a	08

- i. What is the value of the matrix after Substitute Byte operation?
- ii. Write the output of shiftrow operation from the result of (i).
- iii. Write the output of matrix multiplication of column 1 from the result of (ii) using below matrix

1	0	1	1
0	1	1	2
1	0	1	0
1	0	1	2

8

L3

2.5.3

OR

- | | | | | | | |
|----|----|--|---|-----|----|-------|
| 4. | a) | List and briefly explain block cipher modes of operation. | 5 | CO2 | L2 | 2.5.3 |
| | b) | Compare AES and DES in terms of block size, key size and operations. | 5 | | | |

- | | | | | | | |
|----|----|--|---|-----|----|-------|
| 5. | a) | Euler's Totient Function is denoted as $\Phi(n)$. Solve <ul style="list-style-type: none"> ● $\Phi(60)$ ● $\Phi(777)$ ● $\Phi(8000)$ ● $\Phi(23491)$ | 5 | CO3 | L3 | 2.5.3 |
| | b) | <ul style="list-style-type: none"> ● Suppose that you are computing an RSA key pair. What are p and q and $\phi(n)$ for an $n = 187$? Find an RSA private key for $e=7$. Using the d computed, decrypt the ciphertext 11. | 5 | | L3 | |

OR

- | | | | | | | |
|----|----|---|---|-----|----|-------|
| 6. | a) | Suppose the Diffie-Hellman public values p and a are 353 and 3, respectively. If one user's secret is 97 Find public key and a session key? Also by selecting 233 as a valid secret for the next user, prove that both session keys are the same. | 8 | CO3 | L3 | 2.5.3 |
| | b) | What is the trapdoor function behind Elgamal public key scheme? Explain the function in terms of Elgamal security. | 2 | | L2 | |

	a)	Consider the curve $Y^2 = X^3 + 2X + 2$ over the prime field Z_7 . Find all the points on the curve. If point $P = (5, 1)$ is a point on the curve find what is $2P$.	6	CO3	L3	2.5.3
	b)	Generate an 8 bit OTP using RSA random number generator, where seed X_0 is 5, for modulus $n = 35$ and $b = 7$	4		L3	
OR						
8	a)	Consider the message with 2400 bits given as input to the SHA160 algorithm, how many bits need to be added to it excluding the length?	3	CO4	L3	1.7.1
	b)	If we have a message M of size 128 bits, whose MD5 hash $H1$ is exactly 128 bits = '844f85c2723bbd39381c7379a6041608'. What will be the size of the hash for the message created by appending M with another copy of the same message if the hashing algorithm remains the same?	2		L3	
	c)	Write steps in the MD5 algorithm.	5		L2	
OR						
9.	a)	List the properties of Message authentication functions.	4	CO6	L2	2.5.3
	b)	Write any 4 uses of Hash function.	3		L2	
	c)	Explain Digital Signature with a schematic diagram.	3		L2	
OR						
10.	a)	List the security services provided by PGP based mailers.	5	CO5	L2	1.2.2
	b)	What is SET? Explain steps involved in SET.	5		L2	

BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 - Creating)

CO – Course Outcomes ; PO – Program Outcomes; PI Code – Performance Indicator Code



MCA, III/11.23.001

Reg.No.

Registration number input box



MCA THIRD SEMESTER EXAMINATION NOVEMBER 2023
22-382-0301 WEB TECHNOLOGIES AND PROGRAMMING

(Regular)

Time: 3 Hours

Write any FIVE questions.
Each question carries 10 Marks

Maximum Marks :50

No		QUESTIONS	MARKS	CO	BL	PL
1	a.	Write an XHTML code to display the following output. <ul style="list-style-type: none"> ● Department of Physics <ul style="list-style-type: none"> i. Bsc. Physics ii. MSc. Physics <ul style="list-style-type: none"> ■ Nuclear physics ■ Geophysics iii. Ph.D. ● Department of Chemistry <ul style="list-style-type: none"> a. M.Sc. <ul style="list-style-type: none"> ○ Organic Chemistry ○ Analytical Chemistry b. BSc. Chemistry c. Ph.D. 	5	CO1	L3	5.2.2
	b.	Explain different methods for adding a CSS style into an XHTML web page with examples?	5	CO1	L2	5.2.2

OR

2	a.	Explain the purpose of the <th>, <tr> and <td> tags in an HTML table. What is the significance of the <i>colspan</i> and <i>rowspan</i> attributes in table cells? Write the HTML code for the below table: <table border="1" style="margin-left: 20px;"> <caption>Time Table</caption> <thead> <tr> <th>Day</th> <th>Course</th> <th>Subject</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Day 1</td> <td>BSc. Maths</td> <td>Calculus</td> <td>9 - 11.30 am</td> </tr> <tr> <td>BSc CS.</td> <td>C++</td> <td>12 - 1.30 pm</td> </tr> <tr> <td>BSc. Physics</td> <td>Quantum Mechanics</td> <td>2 - 3.30 pm</td> </tr> <tr> <td rowspan="3">Day 2</td> <td>BSc. Maths</td> <td>Graph Theory</td> <td>9 - 11.30 am</td> </tr> <tr> <td>BSc CS.</td> <td>Operating System</td> <td>12 - 1.30 pm</td> </tr> <tr> <td>BSc. Physics</td> <td>Thermodynamics</td> <td>2 - 3.30 pm</td> </tr> </tbody> </table>	Day	Course	Subject	Time	Day 1	BSc. Maths	Calculus	9 - 11.30 am	BSc CS.	C++	12 - 1.30 pm	BSc. Physics	Quantum Mechanics	2 - 3.30 pm	Day 2	BSc. Maths	Graph Theory	9 - 11.30 am	BSc CS.	Operating System	12 - 1.30 pm	BSc. Physics	Thermodynamics	2 - 3.30 pm	5	CO1	L3	5.2.2
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	BSc CS.	Operating System	12 - 1.30 pm																											
	BSc. Physics	Thermodynamics	2 - 3.30 pm																											
b.	Create an XHTML web page with CSS style. The webpage should include the following elements: <ul style="list-style-type: none"> ● A heading with the text "Cochin University of Science and Technology" in a color of your choice. ● A paragraph with the class name 'demo' to have a red text color, font size of 16 pixels, and a bold font weight. ● Ensure that all paragraphs have a 1px solid black border. ● Insert an image of the Cochin University of Science and Technology. ● An unordered list of departments. 	5	CO1	L3	5.2.2																									

3	a.	Create a simple HTML form with a text input and a button. Implement an onClick event that triggers an alert with the input value when the button is clicked.	3	CO2	L3	
	b.	Write a JavaScript function that validates a user registration form and gives appropriate alert messages. The form should include fields like username, password, and email, with specific validation requirements. Demonstrate the usage of this function.	5	CO2	L3	5.2.2
	c.	Explain the differences between Alert, Prompt, and Confirm windows in JavaScript. Include examples for each.	2	CO2	L2	5.2.2

OR

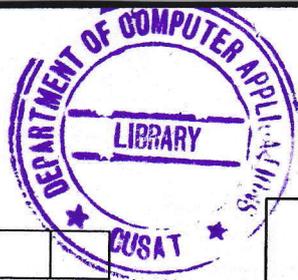
4	a.	Discuss the methods for element access operations in JavaScript. Provide examples for accessing elements by ID and manipulating their values using getElementById(), value, and InnerHTML.	4	CO2	L2	5.2.2
	b.	Discuss the usage of 'onmouseover' and 'onmouseout' events in JavaScript. Provide a practical example of implementing these events on a webpage.	3	CO2	L2	5.2.2
	c.	Write JavaScript code that validates a user's password based on the following requirements: i.) At least 8 characters long ii.) Contains at least one uppercase letter, one lowercase letter, and one digit.	3	CO2	L3	5.2.2

5	a.	Explain the steps involved in connecting a Java application with a MySQL database using JDBC. Include the sample code for the same. Also, provide a brief overview of the class.forName method.	6	CO3	L2	5.2.2
	b.	Describe the lifecycle of a Servlet. Explain the role of the 'init()', 'service()', and 'destroy()' methods in the Servlet lifecycle.	2	CO3	L2	5.2.2
	c.	Write a Java Servlet that reads data from the query parameters of an HTTP GET request and displays it in the response. Include the relevant code snippets.	2	CO3	L3	5.2.2

OR

6	a.	Write a Java program that demonstrates the use of prepared statements in JDBC (containing all the steps involved in database connectivity). Include examples of executing select and update queries using prepared statements.	8	CO3	L3	5.2.2
	b.	Explain the difference between GET and POST methods in form submissions. Provide an example of when you might prefer one over the other in a Java Servlet application.	2	CO3	L2	5.3.1

7	a.	Why is JSP (JavaServer Pages) a preferred choice for web development, and what are the key advantages it offers over other technologies?	3	CO4	L2	5.2.1
	b.	Develop a jsp based application to facilitate a MCQ based quiz application with a web page named quiz.html containing 10 questions with one correct answer. 4 marks will be awarded if the answer is correct, 1 mark will be deducted if answer is wrong.. Total marks have to be displayed to the user.	7	CO4	L2	5.2.2
OR						
8	a.	Design a java servlet program to get one string value and three integer values via textboxes from a webpage named calculation.html. If the value of first text box is 'odd_prime', find odd prime numbers among those 3 values, if it is 'four_digit', find the four digit numbers among those.	7	CO4	L2	5.2.2
	b.	What are JSP actions? Explain any two commonly used JSP actions and their purposes in JavaServer Pages.	3	CO4	L2	5.2.2
9	a.	Define an XML and Document Type Definition for a simple address book. The address book should capture information about individuals, including their name, phone number, and email address.	5	CO5	L3	5.2.2
	b.	What is XSLT? Explain how XSLT can be used to transform XML data into a HTML format with example.	5	CO5	L2	5.2.2
OR						
10	a.	Explain the basic components of XML. Write a well-formed XML document representing information about a University. The document's root element should be labeled 'university', and include details such as the names of courses, instructors, and the number of enrolled students.	5	CO5	L2	5.2.2
	b.	What is XML Schema, and how does it differ from Document Type Definition (DTD)? Create a simple XML Schema for the University XML data.	5	CO5	L3	5.2.1



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MCA THIRD SEMESTER EXAMINATION NOVEMBER 2023
22-382-0323 DEEP LEARNING
 (Regular&Supplementary)

Time: 3 Hours

Write any FIVE questions.
Each question carries 10 Marks

Maximum Marks :50

Q.No	Questions	Marks	CO	BL	PI
1	a. Consider a feedforward neural network with one hidden layer. The input layer has 10 neurons, the hidden layer has 5 neurons, and the output layer has 3 neurons. The activation function used in the hidden layer is the Rectified Linear Unit (ReLU), and the output layer uses the softmax activation function. Define the architecture of the neural network, specifying the number of layers, neurons in each layer, and activation functions.	6	CO1	L2	1.6.1
	b. Write the perceptron learning algorithm to classify positive inputs and negative inputs present in a dataset.	4	CO1	L2	1.7.1
OR					
2	You are given a real-time dataset containing information about housing prices, including features such as square footage, number of bedrooms, and distance to the city center. The goal is to predict the price of a house based on these features. Implement a simple linear regression model using a library like scikit-learn. Train the model on a training subset of the data and evaluate its performance on a separate testing subset. Explain the metrics you would use to evaluate the model's performance.	10	CO1	L3	2.6.4
3	Explain the architecture and key components of Convolutional Neural Networks (CNNs) in detail. Discuss how each component contributes to the network's ability to effectively learn and recognize patterns in images. Provide examples of applications where CNNs have demonstrated significant success and outline any limitations or challenges associated with their use. Support your answer with relevant concepts and real-world examples.	10	CO2	L2	1.6.1

OR

4		Imagine you are a data scientist working in a healthcare research institution. The institution has recently acquired a large dataset of medical images, including X-rays and MRIs, with the goal of developing a deep learning model for automated disease diagnosis. Your team is considering the use of AlexNet for this task.				
	a.	Describe how you would prepare and preprocess the medical image dataset for training AlexNet. Consider aspects such as normalization, and the organization of the dataset.	4	CO2	L3	1.7.1
	b.	Explain the modifications or adaptations you might make to the original AlexNet architecture to better suit the characteristics of medical images. Discuss any additional layers or adjustments that could enhance the model's performance.	6	CO2	L3	1.7.1

5	a.	Explain Generative Adversarial Networks (GAN), outlining the roles of the generator and discriminator in the GAN framework.	5	CO3	L2	1.6.1
	b.	How do Deep Convolutional GANs (DCGANs) differ from standard GANs, and what advantages do they offer in the context of image synthesis?	5	CO3	L2	1.6.1

OR

6.		Discuss the implementation of how autoencoders can be used for generative modelling, such as generating realistic images or data samples.	10	CO3	L2	1.7.1
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7	a.	Define the concept of attention in the context of deep learning. Explain how attention mechanisms differ from traditional models and how they contribute to improving model performance.	6	CO4	L2	1.6.1
	b.	Explain the difference between global attention and local attention mechanisms.	4	CO4	L2	1.6.1

OR

8	a.	Imagine you are working on a project to predict stock prices using historical data. Design and implement an LSTM-based model for this task.	6	CO4	L3	2.6.4
	b.	Briefly explain the concept of Long Short-Term Memory (LSTM) networks and how they address the vanishing gradient problem compared to traditional Recurrent Neural Networks (RNNs).	4	CO4	L3	2.6.4

9.		Consider the following two-dimensional data: x: 2.5 0.5 2.2 1.9 3.1 2.3 2 1 1.5 1.1 y: 2.4 0.7 2.9 2.2 3.0 2.7 1.6 1.1 1.6 0.9 Find the principal compounds using PCA algorithm.	10	CO5	L3	2.6.4
OR						
10	a.	Explain the basic concepts of reinforcement learning, including agents, environments, states, actions, rewards, and policies.	5	CO5	L2	1.6.1
	b.	Describe the motivation behind integrating deep learning with reinforcement learning. Explain the advantages of using deep neural networks in reinforcement learning compared to traditional methods.	5	CO5	L2	1.6.1
