Reg. No: | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech / B. Arch (Full Time) – END SEMESTER EXAMINATIONS, NOV/DEC 2024

INFORMATION TECHNOLOGY

Third Semester

IT3201 - INFORMATION TECHNOLOGY ESSENTIALS

(Regulation 2023)

Time: 3 hrs | Max. Marks: 100

Course Outcomes

[CO1]. Understand the basic concepts of hardware, data communications and networking.
[CO2]. Create dynamic website/web-based applications using HTML5, CSS3 and understand the syntax, semantics, and dialects of JavaScript.
[CO3]. Get familiar with the use of Python and ReactJS for GUI Development.
[CO4]. Develop application Backend using Node.js, and Express.
[CO5]. Identify the fundamental concepts of mobile communications and key issues in the design of commonly used applications.
[CO6]. Design and build robust and scalable web applications.

BL – Bloom's Taxonomy Levels:
(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

Part - A (10 x 2 = 20 marks)
(Answer all Questions)

Q.No.	Question	CO	BL	Marks
1.	What is the primary purpose of a graphics card?	CO1	L1	2
2.	Explain the difference between LAN and WAN.	CO1	L2	2
3.	What is the purpose of the action attribute in an HTML <form> tag?	CO2	L1	2
4.	What is the difference between a class selector and an id selector?	CO2	L2	2
5.	Define a variable in Python. Provide an example.	CO3	L1	2
6.	Describe the role of props in React components.	CO3	L2	2
7.	What is the Node Package Manager (NPM) used for?	CO4	L1	2
8.	Describe the role of the require function in Node.js.	CO4	L2	2
9.	What does GSM stand for, and what is its significance in mobile communication?	CO5	L1	2
10.	Explain the role of social networking applications in modern communication.	CO6	L2	2

Part - B (5 x 13 = 65 marks)

(Restrict to a maximum of 2 subdivisions)

Q.No.	Question	CO	BL	Marks
11. (a) (i)	You have just built a new computer system for a client and need to configure the hardware components for optimal performance. The system includes a motherboard, networking cards, graphics card, processor, and hard drive. Describe the steps you would follow to configure each of these components for efficient performance and explain the role each one plays in the overall functionality of the system.	CO1	L3	7
(ii)	Given the following network components: switches, routers, firewalls, and network cards, analyse how they work together to ensure smooth data transmission in a large organization's network. Explain the specific role of each component and how they contribute to security, data flow, and network efficiency.	CO1	L4	6
	(or)			
11. (b) (i)	Design a computer network for a small organization. The network must connect 5 departments with at least 25 computers each. You must decide on the network topology, the type of network (LAN, MAN, or WAN), and the communication medium. Provide detailed justifications for your choices, and discuss how network components like switches, routers, and network cards will facilitate communication within the organization.	CO1	L3	7
(ii)	You are analysing two different network topologies: star and bus. Compare and contrast these topologies in terms of scalability, fault tolerance, cost, and performance. Which topology would be more suitable for a growing business with multiple branches, and why?	CO1	L4	6
12. (a) (i)	Write the HTML code (only what goes in the <body></body> tags) that will define the following lists. You cannot type any numbers in your HTML. Notice that "**Favorite Movies**" is in italics and "**Favorite Songs**" is in bold.	CO2	L3	7
(ii)	Create an HTML5 form that includes the following fields: Name, Email, Date of Birth, and Gender. Use JavaScript to validate the form: • Ensure the Name field is not empty. • Ensure the Email field contains a valid email address. • Ensure the Date of Birth is a valid date and the user is above 18 years old. (Provide the code for the form and JavaScript validation logic. Explain how the validation works.)	CO2	L3	6
	(or)			
12. (b) (i)	Identify and describe four properties that are used in the CSS box model. Give a pictorial representation.	CO2	L3	7
(ii)	Write a JavaScript program that assigns a ticket type to a customer based on their spending. The program will read the amount spent and display the ticket type based on the following criteria:	CO2	L3	6

Q.No.	Question	CO	BL	Marks
	• If the spending is less than 100, the ticket type will be "**Standard**". • If the spending is between 100 and 499, the ticket type will be "**VIP**". • If the spending is between 500 and 999, the ticket type will be "**Premium**". • If the spending is 1000 or above, the ticket type will be "**Elite**". Use the alert function to display the result. Use the message "**Enter your spending amount**" to read the spending.			
13. (a) (i)	Write a Python program that defines a function to calculate the factorial of a number using both an iterative approach and a recursive approach. Create a module for the recursive factorial and import it into the main program. Demonstrate its usage with an example.	CO3	L3	7

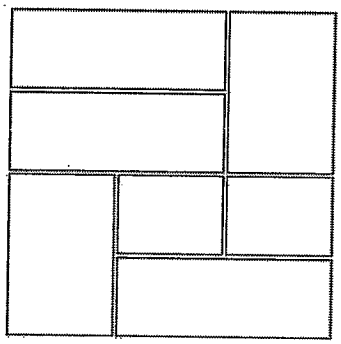
(ii)	Given the following code snippet, identify and explain any logical errors or potential improvements:
	`def check_vowel(char):`
	`  if char == 'a' or 'e' or 'i' or 'o' or 'u':`
	`  return True`
	`  else:`
	`  return False`
		CO3	L4	6

	(or)			
13. (b) (i)	Write a React component called **`UserProfile`** that accepts name, age, and location as props and renders an HTML structure displaying the user's name, age, and location in a styled div. Ensure the component is functional and properly renders when the data is passed to it.	CO3	L3	7
(ii)	Given a simple React component that displays a counter, explain how React manages the state for that counter and the implications of using **`setState`**. What would happen if you directly modified the state without using **`setState`**?	CO3	L4	6
14. (a) (i)	Discuss the various core modules of Node.js in detail with necessary example.	CO4	L3	7
(ii)	Analyse the difference between the HTTP methods GET, POST, and PUT in the context of RESTful APIs.	CO4	L3	6
	(or)			
14. (b) (i)	Why Node.js is non-blocking? Briefly explain about an event-loop in Node.js with necessary illustrations.	CO4	L3	7
(ii)	Compare and contrast Express.js with any other Node.js framework. What are the advantages and limitations of Express.js over the chosen framework?	CO4	L3	6
15. (a) (i)	Develop a step-by-step procedure to register a mobile device to a GSM network, explaining the roles of the BTS, MSC, and HLR.	CO5	L3	7
(ii)	When are Handover procedures initiated in a GSM network? What are the various types of Handovers in GSM?	CO5	L3	6
	(or)			
15. (b) (i)	Explain in detail about the functionalities of the various components	CO5	L3	7

Q.No.	Question	CO	BL	Marks
	involved in the design of an information system.			
(ii)	Explain in detail about the Software Architecture of the IR System along with Retrieval and Ranking Process with neat sketch.	CO5	L3	6

Part - C (1 x 15 = 15 marks)

(Q.No.16 is compulsory)

Q. No.	Question	CO	BL	Marks
16. (i)	Write the HTML code (only what goes in the <body></body> tags) that will define the following table. The border value to use is 2. 	CO2	L5	7
(ii)	Consider the process of sending a file from a user's computer to another user over the internet. Explain the functionality of each layer in the OSI model during this process. Use a real-time example, such as sending a document via email or using a file transfer application, to illustrate how each layer works from the user's device to the recipient's device.	CO4	L5	8