B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E.   **Semester: V**

Branch: Artificial Intelligence and Machine Learning   **Duration: 3 hrs.**

Course Code: 23AM5PCSED   **Max Marks: 100**

Course: Software Engineering and Design Patterns

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

<table>
<tr><td colspan="3" align="center">UNIT - I</td><td><i>CO</i></td><td><i>PO</i></td><td>Marks</td></tr>
<tr><td>1</td><td>a)</td><td>Demonstrate working principle of the following Software engineering models:
i. Water fall Model
ii. Spiral Model</td><td><i>CO 1</i></td><td><i>PO 1</i></td><td>10</td></tr>
<tr><td></td><td>b)</td><td>Justify the need for Requirement Engineering. Differentiate between Functional and Non-Functional Requirements in software engineering.</td><td><i>CO 1</i></td><td><i>PO 1</i></td><td>10</td></tr>
<tr><td colspan="6" align="center">OR</td></tr>
<tr><td>2</td><td>a)</td><td>Differentiate V-Model and Agile Model</td><td><i>CO 1</i></td><td><i>PO 1</i></td><td>10</td></tr>
<tr><td></td><td>b)</td><td>Determine functional and non-functional requirements for storing employee data in a database through web-based interface</td><td><i>CO1</i></td><td><i>PO1</i></td><td>10</td></tr>
<tr><td colspan="6" align="center">UNIT - II</td></tr>
<tr><td>3</td><td>a)</td><td>Illustrate Unified Modeling Language with a key diagram.</td><td><i>CO 2</i></td><td><i>PO 1</i></td><td>10</td></tr>
<tr><td></td><td>b)</td><td>Analyze the source code by applying Halsted software metrics and Calculate the following terms:
i. Volume
ii. Vocabulary
iii. Length
iv. Difficulty
v. Effort
int sort (int x[ ], int n)
{ int i, j, save, im1;
  /*This function sorts array x in ascending order */
  If (n< 2) return 1;
  for (i=2; i< =n; i++)
  {
    im1=i-1;
    for (j=1; j< =im1; j++)
      if (x[i] < x[j])
        {</td><td><i>CO 2</i></td><td><i>PO 1</i></td><td>10</td></tr>
</table>

```
                Save = x[i];
                x[i] = x[j];
                x[j] = save;
            }
        }
    return 0; }
```

			OR			

4	a)	Analyse the following code and, calculate the cyclomatic complexity using all three methods.
		A = 10
		  IF B > C THEN
		    A = B
		  ELSE
		    A = C
		  ENDIF
		Print A
		Print B
		Print C
			CO 2	*PO 1*	**6**

	b)	Illustrate the application of a use case diagram in managing any system within an organization, showcasing its effectiveness in depicting user interactions, system functionalities, and business processes.	*CO 2*	*PO 1*	**6**
	c)	Summarize the following with appropriate examples: i. Software Quality Guidelines ii. Software Design principles	*CO 2*	*PO 1*	**8**
			UNIT - III			
5	a)	With a neat diagram elaborate on Integration Testing.	*CO 2*	*PO 1*	**5**
	b)	Explain Testing Strategies for Web Applications.	*CO 2*	*PO 1*	**5**
	c)	Differentiate between White box and Black box testing and explain Boundary Value Analysis method.	*CO 2*	*PO 1*	**10**
			OR			
6	a)	What is unit testing? How is it different from integration testing	*CO 2*	*PO 1*	**5**
	b)	Perform boundary value analysis on mobile number filed that must be entered on a webpage	*CO 2*	*PO 1*	**5**
	c)	Differentiate White box testing and black box Testing	*CO 2*	*PO 1*	**10**
			UNIT - IV			
7	a)	Outline the significance of patterns and Relationships between Patterns.	*CO 3*	*PO 1*	**10**
	b)	Describe how interactive systems contribute to the creation and implementation of design patterns in software development.	*CO 3*	*PO 1*	**10**
			OR			

	8	a)	John is developing a web application for a financial institution. This application needs to handle sensitive customer data securely while accommodating a large number of concurrent users. Outline the significance of Layer pattern in fulfilling the stringent requirements of the financial institution while safeguarding the confidentiality and integrity of customer data.	CO 3	PO 1	**10**
		b)	Illustrate the working of Model View Controller (MVC) and provide Class Responsibility Collaboration (CRC) for the same.	CO 3	PO 1	**10**
			UNIT - V			
	9	a)	Describe the mechanism by which Adapter and Bridge patterns provide elegant solutions to address the challenges of integrating disparate systems, managing platform dependencies, and enabling flexible extensibility in software design.	CO 3	PO 1	**10**
		b)	Demonstrate functionality of Façade design structure and explain advantages of using this design over the others.	CO 3	PO 1	**10**
			OR			
	10	a)	How is Façade design pattern different from master-slave pattern	CO 3	PO 1	**10**
		b)	Compare publish-subscribe and Bridge Pattern	CO 3	PO 1	**10**

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