Total No. of Questions: 3

Enrollment No: EN22CS301175

Faculty of Engineering / Science

Mid Sem-II Examination November -2024

CS3CO40 / BC3CO66 Software Engineering

Programme: B.Tech / B. Sc. **Branch/Specialization: CS**

Duration: 1.5Hrs. **Maximum Marks: 30**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	You are designing a large e-commerce system. To make future updates easier, you want to apply the concept of modularity. How would you best implement this? A) By ensuring that user interface elements are standardized across the system. B) By dividing the system into separate, self-contained modules like payment processing, user management, and inventory. C) By ensuring that data is securely encapsulated within each component. D) By using abstraction to hide the complexity of algorithms within the system.	1	BL_3	CO_3	PO_1 PO_2 PO_3 PO_4 PO_5 PO_{10} PO_{12}	
	ii.	In a software system that requires frequent updates, how would you apply configuration management practices to ensure that changes are controlled and tracked effectively? A) By breaking the system into smaller modules for easier updates. B) By using a version control system like Git to track changes to the code and manage different versions of the software. C) By designing reusable components that can be easily modified. D) By separating user interface design from business logic.	1	BL_3	CO_3	PO_1 PO_2 PO_4 PO_5 PO_{10} PO_{12}	
	iii.	You are developing a banking application where transaction processing needs to be secure and isolated. How would you apply the principle of separation of concerns to this scenario? A) By ensuring that different parts of the application, such as transaction processing and account management, are developed as independent modules. B) By applying abstraction to hide the complexity of transaction processing algorithms. C) By ensuring that all components of the banking system are version-controlled. D) By reusing transaction processing logic across different parts of the system.	1	BL_3	CO_3	PO_1 PO_2 PO_3 PO_5 PO_{10} PO_{12}	
	iv.	During a defect analysis session, a team identifies that a high number of defects originate from a specific module. What should be the team's next step to address this issue? A) Increase the number of test cases for that module B) Conduct a root cause analysis to understand why defects are concentrated in that module C) Reduce the scope of the module to minimize defects D)Implement automated tests exclusively for that module	1	BL_4	CO_3	PO_1 PO_2 PO_3 PO_5	
	v.	a software project consistently meets its deadlines but has a high number of post-release defects, what conclusion can be drawn about the quality assurance process? A) The QA process is effective since deadlines are met. B) There may be insufficient testing or quality control measures in place despite timely delivery. C) The project should prioritize speeding up the testing phase. D) The development team is producing high-quality code.	1	BL_4	CO_3	PO_1 PO_2 PO_3 PO_5	

	vi.	During the testing phase, a team discovers that a new feature introduced in the software causes existing functionalities to fail. What type of testing should have been performed earlier to detect this issue? A) Unit Testing B) Integration Testing C) System Testing D) Regression Testing	1	BL_4	CO_4	PO_1 PO_2 PO_4 PO_6
Q.2	i.	How would you apply the principle of modularity in the design of a software application? Describe how breaking the application into smaller modules can improve maintainability and collaboration among team members.	2	BL_3	CO_3	PO_1 PO_2 PO_4 PO_6 PO_{10} PO_{12}
	ii.	How would you apply the principles of user interface design to develop a navigation system for a mobile app, while considering the diverse needs of users? Discuss how usability, accessibility, and user diversity would guide your design choices.	4	BL_3	CO_3	PO_1 PO_2 PO_3 PO_6 PO_{10} PO_{12}
	iii.	Analyze the design of a complex software application to assess the balance between cohesion and coupling. Identify specific areas where high coupling may lead to maintenance challenges and discuss the potential impacts on the software lifecycle. Additionally, outline a detailed approach for analyzing these areas, including tools and techniques that can aid in this assessment.	6	BL_4	CO_4	PO_1 PO_2 PO_4 PO_6
OR	iv.	Analyze the role of version control systems in Software Configuration Management (SCM). Identify key features of version control systems that facilitate collaborative development and discuss how these features help in managing code changes over time. Provide examples of common version control practices that can enhance team productivity and reduce the risk of conflicts.	6	BL_4	CO_4	PO_1 PO_2 PO_4 PO_6
Q.3	i.	Explain the difference between verification and validation in software development. Provide an example of each to illustrate your answer.	2	BL_3	CO_3	PO_1 PO_2 PO_4 PO_6 PO_{10} PO_{12}
	ii.	Discuss the differences between unit testing and integration testing. How do each of these testing types contribute to overall software quality? Provide examples of when you would use each.	4	BL_3	CO_3	PO_1 PO_2 PO_4 PO_6 PO_{10} PO_{12}
	iii.	Analyze a case study of a software project that faced significant risks. Discuss how the risk management strategies employed (or not employed) affected the project's quality and success. What lessons can be learned from this case?	6	BL_4	CO_4	PO_1 PO_2 PO_4 PO_6
OR	iv.	Evaluate the importance of establishing a Software Quality Assurance (SQA) process in a software development lifecycle. How do SQA practices influence the overall success of software projects? Provide examples to support your evaluation.	6	BL_4	CO_4	PO_1 PO_2 PO_4 PO_6

No. of Questions: 3

Enrollment No....EN22CS301175

Faculty of Engineering

Mid Sem II Examination November-2024

OE00018 Python essentials

Programme: B.Tech. (CS/RA/EC/BSc/DS/AI) **Branch/Specialization:**

Duration: 1.5 Hrs. **Maximum Marks: 30**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	Which function would you use to read all lines of a file into a list in Python? a) read() b) readline() c) readlines() d) write()	1	BL01	CL01		
	ii.	In Python, what is the effect of using the seek() function on a file object? a) It writes data to the file at a specified location. b) It moves the file pointer to a specified position. c) It reads the entire contents of the file. d) It closes the file after reading.	1	BL01	CL01		
	iii.	Which of the following statements about OOP in Python is correct? a) Inheritance allows a class to access the private variables of another class directly. b) Composition implies a "has-a" relationship between classes. c) Encapsulation only applies to methods, not attributes. d) Polymorphism restricts objects to one specific behavior.	1	BL01	CL01		
	iv.	Which special method in Python acts as a constructor and is called automatically when a new instance of a class is created? a) __del__ b) __new__ c) __init__ d) __str__	1	BL01	CL01		
	v.	What is the primary purpose of encapsulation in object-oriented programming? a) To create multiple instances of a class b) To restrict direct access to some of a class's components c) To combine multiple classes into one d) To overload operators	1	BL14	CL01		
	vi.	Which of the following terms best describes the ability of different classes to provide a specific implementation of the same method in Python? a) Inheritance b) Encapsulation c) Polymorphism d) Instantiation	1	BL01	CL01		
Q.2	i.	Describe how Python's seek() function is used to manipulate the file pointer.	2	BL04	CL02		
	ii.	Write a Python function that logs error messages into a log file each time it encounters an exception in the code.	3	BL04	CL01		
	iii.	Analyze the impact of opening files in different modes, such as read, write, append, and binary. Provide an example for each scenario.	7	BL05	CL02		
OR	iv.	Write two classes, Circle and Square, that inherit from a Shape class, each with an overridden area() method that calculates the area specific to each shape. Demonstrate polymorphism by creating instances of both Circle and Square and calling their area() methods within a loop	7	BL01	CL02		
Q.3	i.	What is multiple inheritance in Python? Give a simple example of a class that inherits from two parent classes, and explain why this can be useful..	2	BL01	CL01		
	ii.	Explain why encapsulation is important in a class with sensitive data, like a BankAccount class. How does using private or protected attributes help protect data?	2	BL01	CL01		

iii. Given the following code, analyze how Python's Method Resolution Order (MRO) resolves method conflicts in multiple inheritance. Explain the order in which the display() method will be executed. **8** BL01 CL01

```
class Parent1:
        def display(self):
        print("Parent1")

class Parent2:
        def display(self):
        print("Parent2")

class Child(Parent1, Parent2):
        pass

obj = Child()
obj.display()
```

OR iv. Examine how polymorphism is demonstrated in the following classes. Explain how the *speak()* method's behavior varies between instances of Dog and Cat **8** BL01 CL01

```
class Animal:
        def speak(self):
        pass
class Dog(Animal):
        def speak(self):
        return "Woof!"
class Cat(Animal):
        def speak(self):
        return "Meow!"
```

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Total No. of Questions: 3

Enrollment No. EN22CS301175

Faculty of Engineering / Science

Mid Sem II Examination November-2024

CS3CO43 / BC3CO67 Computer Networks

Programme: B.Tech./B.Sc. **Branch/Specialization: CSE**

Duration: 1.5 Hrs. **Maximum Marks: 30**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	*Which QoS mechanism allows differentiation of network traffic based on service classes rather than individual flows?* (a) IntServ (b) DiffServ (c) RSVP (d) ECN	1	BL_{01}	CO_{01}	PO_{01}-PO_{05}, PO_{10}	PSO_{01}, PSO_{03}, PSO_{04}
	ii.	In a hierarchical routing system, what key advantage is provided over a flat routing system? (a) Less memory required for routing tables (b) Better performance under congestion (c) Guaranteed shortest paths (d) Easier integration of link-state and distance-vector methods	1	BL_{01}	CO_{01}	PO_{01}-PO_{05}, PO_{10}	PSO_{01}, PSO_{03}, PSO_{04}
	iii.	*Which traffic shaping technique allows bursty traffic by accumulating tokens when the network is idle?* (a) Leaky Bucket (b) Random Early Detection (c) Token Bucket (d) Priority Queuing	1	BL_{01}	CO_{01}	PO_{01}-PO_{05}, PO_{10}	PSO_{01}, PSO_{03}, PSO_{04}
	iv.	Which TCP mechanism ensures that the sender does not overwhelm the receiver's buffer capacity? (a) Congestion control (b) Flow control (c) Error correction (d) Retransmission timeout	1	BL_{01}	CO_{01}	PO_{01}-PO_{05}, PO_{10}	PSO_{01}, PSO_{03}, PSO_{04}
	v.	In UDP communication, which aspect is sacrificed to achieve faster data transmission? (a) Error checking (b) Flow control (c) Connection setup (d) Reliable delivery	1	BL_{02}	CO_{02}	PO_{01}-PO_{08}, PO_{10}	PSO_{01}, PSO_{02}, PSO_{03}, PSO_{04}
	vi.	Which TCP timer is used to retransmit data when an acknowledgment is not received within the expected time? (a) Keep-alive timer (b) Round-trip timer (c) Retransmission timer (d) Persistence timer	1	BL_{02}	CO_{02}	PO_{01}-PO_{08}, PO_{10}	PSO_{01}, PSO_{02}, PSO_{03}, PSO_{04}
Q.2	i.	How do Integrated Services (IntServ) and RSVP work together to ensure guaranteed Quality of Service in a network?	2	BL_{02}	CO_{02}	PO_{01}-PO_{08}, PO_{10}	PSO_{01}, PSO_{02}, PSO_{03}, PSO_{04}
	ii.	A Computer on a 10-Mbps network is regulated by token bucket. Token bucket filled at a rate of 2 Mbps. It is initially filled to a capacity with 16 Megabits. How long can computer transmit at the full 10 Mbps?	3	BL_{03}	CO_{03}	PO_{01}-PO_{07}, PO_{10}-PO_{12}	PSO_{01}, PSO_{02}, PSO_{03}
	iii.	Design an example network and explain how Dijkstra's algorithm can be applied to compute the shortest path between two nodes. Discuss the impact of link failure on the routing and how the network could recover using link-state information.	7	BL_{03}	CO_{03}	PO_{01}-PO_{07}, PO_{10}-PO_{12}	PSO_{01}, PSO_{02}, PSO_{03}
OR	iv.	Given the following network topology with routers A, B, C, D, and E, each connected by the specified link costs:	7	BL_{03}	CO_{03}	PO_{01}-PO_{07}, PO_{10}-PO_{12}	PSO_{01}, PSO_{02}, PSO_{03}

Link	Cost
A - B	4
A - C	2
B - C	1
B - D	5
C - D	8
C - E	10
D - E	2

Assume that each router knows the complete topology of the network, including all the link costs.
Using Dijkstra's Algorithm (part of the link-state routing algorithm), calculate the shortest path from router A to all other routers (B, C, D, and E).

Q.3	i.	Explain how TCP's three-way handshake ensures reliable connection setup between two hosts.	2	BL_{02}	CO_{02}	PO_{01}, PO_{08}, PO_{10}	PSO_{01}, PSO_{02}, PSO_{03}, PSO_{04}
	ii.	In a client-server communication using sockets, describe the steps involved in establishing a connection using TCP.	4	BL_{02}	CO_{02}	PO_{01}, PO_{08}, PO_{10}	PSO_{01}, PSO_{02}, PSO_{03}, PSO_{04}
	iii.	Design a scenario where TCP's congestion control mechanisms (slow start, congestion avoidance, fast retransmit, fast recovery) would be triggered and explain how TCP adjusts its transmission rate to avoid network congestion.	6	BL_{03}	CO_{03}	PO_{01}, PO_{07}, PO_{10}, PO_{12}	PSO_{01}, PSO_{02}, PSO_{03}
OR	iv.	How would you apply your understanding of the TCP segment structure to troubleshoot network communication issues or analyze data traffic in a packet capture?	6	BL_{03}	CO_{03}	PO_{01}, PO_{07}, PO_{10}, PO_{12}	PSO_{01}, PSO_{02}, PSO_{03}

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al No. of Questions: 3

Enrollment No.. EN22CS301175

Faculty of Engineering

Mid Sem II Examination November-2024

EN3HS04 / BC3HS05

Fundamentals of Management Economics and Accountancy

Programme: B.Tech **Branch/Specialization: CSE**

Duration: 1.5 Hrs. **Maximum Marks: 30**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	Which of the following is one of the major causes of economic problems? a) unlimited human wants b) alternative usage of resources c) scarcity of economic resources d) All of the above	1	2	3	11	
	ii.	Which of the following is the relation that the law of demand defines? a) Income and price of a commodity b) Price and quantity of a commodity c) Income and quantity demanded d) Quantity demanded and quantity supplied	1	2	3	11	
	iii.	What do you mean by the supply of goods? a) Stock available for sale b) Total stock in the warehouse c) The actual production of the goods d) Quantity of the goods offered for sale at a particular price per unit of time	1	2	3	11	
	iv.	Which of the following is the correct sequence of the accounting cycle: a) Journal > Trial balance > Ledger > Transaction Analysis b) Transaction Analysis > Journal > Ledger > Trial Balance c) Purchases > Journal > Ledger > Trial Balance d) None of the above	1	2	4	11	

	v.	Ledger is a principal book that contains. a) Real accounts only b) Personal accounts only c) All accounts d) Nominal accounts only	**1**	2	4	11
	vi.	The matching concept matches which of the following? a) Asset with liabilities b) Capital with income c) Revenues with expenses d) Expenses with capital	**1**	2	4	11
Q.2	i.	Differentiate between micro and macro economics.	**3**	2	3	11
	ii.	Differentiate between monopoly and monopolistic competition.	**3**	2	3	11
	iii.	Explain the law of diminishing marginal utility	**6**	2	3	11
OR	iv.	Explain the concept of price elasticity of demand.	**6**	2	3	11
Q.3	i.	What do you mean by Journal? Give a specimen of its format.	**3**	2	4	11
	ii.	Differentiate between trial balance and balance sheet.	**3**	2	4	11
	iii.	Explain any three principles of accounting.	**6**	2	4	11
OR	iv.	Explain the Break-even point Analysis with the help of diagram.	**6**	2	4	11

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al No. of Questions: 3

Enrollment No... EN22CS301175

Faculty of Engineering / Science

Mid Sem II Examination November-2024

CS3EL13 / BC3EL07 Data Science

Programme: B.Tech / B. Sc. **Branch/Specialization: CS**

Duration: 1.5 Hrs. **Maximum Marks: 30**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	What is the term for a data point that falls far from the rest of the data in a dataset? a) Median b) Mean c) Outlier d) Variance	1	BL1	CO3	PO1	BL1
	ii.	What is the purpose of a correlation matrix in EDA? a) To visualize the distribution of data b) To display relationships between variables c) To identify missing values d) To calculate summary statistics	1	BL1	CO3	PO1	BL1
	iii.	What type of data visualization is commonly used in EDA to represent the distribution of a categorical variable? a) Scatter plot b) Box plot c) Histogram d) Bar chart	1	BL1	CO3	PO1	BL1
	iv.	What is the primary purpose of data visualization in data science? a) Summarizing data b) Communicating insights c) Cleaning data d) Storing data	1	BL1	CO4	PO2	BL1

v. What is the term for a data visualization that shows the relationship between 2 continuous variables? 1 BL1 CO4
   a) Heatmap
   b) Scatter plot
   c) Bar chart
   d) Pie chart

vi. What is the purpose of a legend in data visualization? 1 BL1 CO4 PO2 BL1
   a) Explains the meaning of colours or symbols in a chart
   b) Provides data context
   c) Represents the main data
   d) Adds decorative elements

Q.2 i. What is Exploratory Data Analysis? 2 BL2 CO3 PO2 BL2
ii. Write a note on multivariate analysis of dataset. 3 BL2 CO3 PO2 BL2
iii. Write a note on univariate analysis of dataset using graphical and non-graphical approaches. Justify how this will help the EDA. 7 BL3 CO3 PO2 BL3

OR iv. Write a note on finding and handling missing values in the dataset with the help of necessary examples. 7 BL3 CO3 PO3 BL3

Q.3 i. What are the benefits of data visualization? 2 BL2 CO4 PO2 BL2
ii. Explain relationship chart and word cloud with example. 3 BL2 CO4 P03 BL2
iii. Explain with an example, how the one-way ANOVA works? 7 BL3 CO4 P03 BL3

OR iv. Explain boxplot with the help of below parameters: BL3 CO4 P03 BL3
   a) Outlier 7
   b) Spread
   c) Inter Quartile Range
   d) Mean

Mark each of them in the boxplot.

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al No of Questions: 3

Enrollment No.. ENRCS301175

Faculty of Engineering

Mid Sem II Examination November-2024

CS3EL17 NoSQL Database

Programme: B.Tech. **Branch/Specialization:** CSE

Duration: 1.5 Hrs. **Maximum Marks: 30**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	In a microservices architecture, why would a team choose a key-value database for service communication? a) To ensure ACID compliance across services. b) To reduce latency in data retrieval. c) To facilitate complex transactions. d) To maintain strong data consistency across all services.	1	BL_1	CO_3	PO_3	
	ii.	When considering a key-value database for an IoT application, which of the following factors is most critical? a) Relational integrity constraints. b) Full-text search capabilities. c) Support for complex queries. d) High write throughput and low latency.	1	BL_1	CO_3	PO_3	
	iii.	In a social media application, document databases can be effectively used for which of the following? a) User authentication management. b) Storing user profiles and posts with varied attributes. c) Generating complex analytical reports. d) Enforcing strict relational integrity.	1	BL_1	CO_3	PO_3	
	iv.	Which of the following industries would most benefit from using a columnar database for performance optimization? a) Telecommunications for analysing call data records. b) Social media for storing user profiles. c) Healthcare for patient record management. d) E-commerce for managing customer orders	1	BL_1	CO_4	PO_4	

	v.	For which type of analysis is a graph database particularly well-suited? a) Time-series analysis of financial data. b) Aggregation of large datasets. c) Pathfinding and network traversal analysis. d) Full-text search across data.	1	BL_1		PO_4
	vi.	In which application would a graph database excel in representing data? a) A customer relationship management (CRM) system. b) A financial system for managing ledgers. c) A data warehouse for historical analytics. d) A content management system for articles.	1	BL_1	CO_4	O_4
Q.2	i.	How hash functions work and why they are important in key-value databases.	3	BL_2	CO_3	PO_3
	ii.	Applying the concepts to real-world scenarios, such as choosing which database type to use for a specific application or data model in between Document database and Key-Value database.	4	BL_3	CO_3	PO_3
	iii.	Discussing specific implementations or examples of transaction management in popular key-value databases (like Redis or Amazon DynamoDB).	5	BL_3	CO_3	PO_3
OR	iv.	Analyzing the implications of these operations on data integrity, performance, and scalability within document databases.	5	BL_4	CO_3	PO_3
Q.3	i.	Give a brief introduction of the graph type of database and its types.	3	BL_3	CO_4	PO_4
	ii.	Explain the fundamental differences between columnar databases and other types (like row-based relational databases or document databases).	4	BL_2	CO_4	PO_4
	iii.	Discuss the advantages of using graph databases for social network analysis. How do graph structures facilitate the understanding of user interactions, relationships, and community detection? Provide specific examples.	5	BL_4	CO_4	PO_4
OR	iv.	Illustrate how a columnar database can support advanced analytics for social media platforms. Discuss the types of data it would handle and the analytics it would enable.	5	BL_4	CO_4	PO_4

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