VIT

Vellore Institute of Technology

School of Information Technology and Engineering

Fall Semester 2022-2023- Fresher

Continuous Assessment Test – I

Programme Name &Branch : MCA, Computer Applications

Course Name & code: Software Project Management, ITA5001

Class Number (s): 5090/5083 **Slot: A1**

Faculty Name (s): Brijendra Singh and Neelu Khare

Exam Duration: 90 Min. **Maximum Marks: 50**

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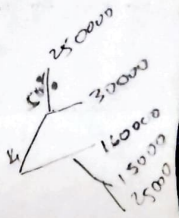
1. Petroleum college is a higher education institution which is used to manage by the local government authority but has become now autonomous. Its payroll system is still administrated by the local authority and pay slips and other output is produced in the local authority's computer center. The authority now charges the college for this service. The college management is of the opinion that it would be cheaper to obtain an "off-the --shelf" payroll application and do the payroll processing by them.

(a) Based on the above scenario identify the stakeholders involved in the project. [5]

(b) Illustrate in detail about various project stages is to be carried out. [10]



2. Consider the scenario given in question-1 and identify the following:

(a) Project Infrastructure [5]

(b) Activity Risks [5]

3. (a) Sports International limited is planning to expand its business, and for that, it will require four new employees in the organization. For analysing whether the expansion is beneficial or not, the management of the company decides to use the cost-benefit analysis. The following are the information available related to benefits and costs related to expansion:

Within the time frame of one year, it is expected that if the company hires four employees for the expansion, then the revenue of the company will increase by 50 %, i.e., the revenue benefit will be around $ 250,000.

Also, due to the new hiring, the company value of the business will increase, which would result in additional revenue of $ 30,000.

The salary of the new employees is estimated to be $ 160,000.

The additional cost of hiring is estimated to be $ 15,000.

The cost of additional hardware and software required will come at around $ 25,000

i. Analyze the expansion using Cost-benefit analysis. [5]

ii. Benefit –cost ratio. [5]

(b) The present value of the future benefits of a project is $6,00,000. The present value of the costs is $4,00,000. Calculate the Net Present Value (NPV) of the project and determine whether the project should be executed. [5]

4. Enumerate the reasons to create PBS in any software project. Design PBS for developing a software application for car. [10]

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Continuous Assessment Test – I

Programme Name & Branch: MCA

Course Name & code: ITA5005 - Object Oriented Software Engineering

Class Number (s): VL2022230106225

Slot: B1 Slot

Faculty Name (s) (Mention all the faculty names handling this subject for common course):

Prof. Sweta Bhattacharya

Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s):

Q.No.	Question	Max Marks
1.	You are the project manager in a software firm and you have been assigned to develop a software project. You intend to develop a modularized system and design based project. The project requires automated code generating functionality. There is a pressing need to launch the product at the earliest to the market. What software process model will you choose and Justify your answer? Discuss the strengths and weaknesses of the chosen model.(2+4+4)	10
2.	Consider the scenario of a University accounting system that generates payment for all employees and also conducts all financial transactions. Enlist the possible use cases and actors involved and Draw a use case diagram for the same. (3+7)	10
3.	Write a Java/ C++ program for the following scenario and explain concepts of inheritance and polymorphism for the same. The component is passed an exam mark (out of 75) and a course work mark out of 25, for which it generates a grade for the course in the range of "A" to "D". The grade is calculated from the overall marks which includes sum of exam and course work marks. The grade is decided as per the following criteria: Greater than or equal to 90 – "A" Greater than or equal to 50, but less than 70 – "B" Greater than or equal to 30, but less than 50 – "C" Less than 30 – "D"	10
4.	Discuss the stages involved in ethnographic analysis. Also, consider the online Travel & Tourism Management System. Enlist the functional requirements for the same. (4+6)	10
5.	Draw a Class Diagram for a Hotel Management System. The system includes New, Star and Premium Customers depending on their frequency of booking. The hotel Single, Double, Double Luxury and Family Rooms. The hotel also provides food to the customers as per their order. Food Items are delivered in the hotel dining room or in the room as part of room service. The hotel is managed by a receptionist. The receptionist is headed by a Manager.	10

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Fall Semester 2022-2023

Continuous Assessment Test – 1

Programme Name & Branch : MCA

Course Name & code : Problem Solving with Data Structures and Algorithms (ITA5002)

Class Number (s): VL2022230105103 & VL2022230105095

Slot: C1+TC1 Faculty Name: Dr.Prabukumar.M & Dr. DHARMENDRA SINGH RAJPUT

Exam Duration: 90 Min. Maximum Marks: 50

PART A (5 *10 = 50 Marks)

Q.No.	Question	Max Marks
1.	We are given a recursive algorithm which, given an input of size n, splits it into 2 problems of size n/2, solves each recursively, and then combines the two parts in time O(n). Thus, if T(n) denotes the runtime for the algorithm on an input of size n, then we have T(n) = 2T(n/2) + O(n) Prove that T(n) = O(n log n)	10
2.	(i) Develop an algorithm to convert the following infix expression into postfix using suitable data structure. Trace the algorithm and show the chosen data structure contents. M ^ N * O– P + Q /R / (S + T) (ii) Develop an algorithm to evaluate the following postfix expression using suitable data structure. Trace the algorithm and show the chosen data structure contents. A B C – D * + E * F + and assume A=6, B=3, C=2, D=5, E=1, and F=7.	5 5

FCFS

3.	Design an algorithm for an online movie ticket reservation system using suitable data structure. Allot the tickets based on first come first serve basis and also provide the option of cancellation. In case of cancellation allot the seats for new costumer. Justify the data structure used to solve this problem.	10
4.	Select and apply an appropriate data structures to store data in each of the following cases. (i) A list of employee records with (emp_Number, emp_Name, emp_Designation and Emp_Sallary) needs to be arranged based on the employee salary. (ii) A library needs to maintain books by their ISBN number. Only thing important is finding them as soon as possible.	5 5
5.	Create a Binary Search Tree for the following data and do in-order, Preorder and Post-order traversal of the tree. 50, 60, 25, 40, 30, 70, 35, 10, 55, 65, 5	10

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

SCHOOL OF ADVANCED SCIENCES
DEPARTMENT OF MATHEMATICS
Continuous Assessment Test – I – November 2022

FALL SEMESTER 2022-23

D1

Programme Name & Branch: MCA

Course Code: MAT 5007

Course Name: Applied Statistical Methods

Time Duration: 90 Minutes

Max. Marks: 50

Answer All the Questions (10 × 5 = 50)

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1. Find mean and median for the following frequency distribution:

Age group (in years)	No of Members
20 – 25	30
25 – 30	160
30 – 35	210
35 – 40	180
40 – 45	145
45 – 50	105
50 – 55	70
55 – 60	60
60 – 65	40

2. Scores of two cricket players for 10 matches are as follows. Find which cricketer can be considered as more consistent player.

$L + \frac{\frac{N}{2} - cb}{b} \times h$

Player A	74	75	78	72	77	79	78	81	76	72
Player B	86	84	80	88	89	85	86	82	82	79

3. Calculate the Pearson's Coefficient of Skewness (from Mode and Median) for the following data:

Class size	Frequency
$0 - 20$	8
$20 - 40$	12
$40 - 60$	30
$60 - 80$	14
$80 - 100$	6

4. Calculate Karl Pearson's Correlation Coefficient for the following data and interpret your result:

X	60	34	40	50	45	41	22	43
Y	75	32	34	40	45	33	12	30

5. Find the regression lines of Sales on Advertising Expenditure and Advertising Expenditure on Sales for the following data:

$Sales\ (X)$ $(Rs.Crores)$	14	16	18	20	24	30	32
$Adv.Expendiure\ (Y)$ $(Rs.Lakhs)$	52	62	65	70	76	80	78

(i) Estimate the sales for the advertising expenditure of Rs.100 Lakhs

(ii) Estimate the advertising expenditure for the sales of Rs.47 Crores.

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Fall Semester 2022-2023

Continuous Assessment Test – 1

Programme Name & Branch: MCA
Course Name & code: Data Communication and Networking & ITA5003
Class Number (s): VL2022230105115, VL2022230105119, VL2022230105114
Slot: E1+TE1
Faculty Name: Prof K.Santhi, Prof Felicita S A M, Prof Shobana D

Exam Duration: 90 Min. **Maximum Marks:** 50

Answer all the questions

Q.No.	Question
1.	With neat sketch show the encapsulation and decapsulation process of OSI model when you browse a web page on your laptop.
2.	a) Distinguish between port address, logical address and a physical address. Identify which layer functionality for the following services. **(6 marks)** i) Provides independence from differences in data representation. ii) Error correction and retransmission iii) Ensures reliable transmission of data b) Let us assume that source node sends a message to destination node via LAN1, router R1, and LAN2. Depict this scenario as diagram. Show the contents of the packet and frames at the network and data link layer for each hop interfaces. **(4 marks)**
3.	i) Given the following information, find the minimum bandwidth required for the path: FDM multiplexing five devices, each requiring **4000 Hz. 200 Hz** guard band for each device. **(5 Marks)** ii) Four channels, two with a bit rate of **200 Kbps** and two with a bit rate of **150 kbps**, are to be multiplexed using multiple-slot TDM with no synchronization bits. Answer the following questions: **(5 Marks)** i. What is the size of a frame in bits? ii. What is the frame rate? iii. What is the duration of a frame iv. What is the data rate?

4.	a) Show the contents of the five output frames for a synchronous TDM multiplexer that combines four sources sending the following characters. Note that the characters are sent in the same order that they are typed. The third source is silent. **(5 Marks)** I. Source 1 message: HELLO II. Source 2 message: HI III. Source 3 message: IV. Source 4 message: BYE b) A signal that can be decomposed into five sine waves with frequencies at **0, 20, 50, 100** and **200 Hz**? All peak amplitudes are the same i) what is the bandwidth for this signal? ii) Draw the frequency spectrum, assuming the maximum amplitude for all components is 5V. **(5 Marks)**
5.	a) What is the total delay(latency) for a frame of size **5 Million bits** that is being sent on a link with **10** routers each having a queuing time of **2μs** and a processing time of **1μs**. The length of the link is **2000Km**. The speed of light inside the link is **2*10^8 m/s.** The link has a bandwidth of **5 Mbps**. Which component of the total delay is dominant? Which one is negligible? **(7 Marks)** b) Given a channel with an intended capacity of **20 Mbps**. The bandwidth of the channel is **3MHz**. Assuming white thermal noise, what signal-to-noise ratio is required in order to achieve this capacity? **(3 Marks)**

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Continuous Assessment Test – I

Programme Name & Branch: MCA

Course Name & code: Database Technologies & ITA5008 **Class Number (s):VL2022230105091**

Slot: F1 + TF1 **Exam Duration: 90 Min.**

Faculty Name: Yuvarani S **Maximum Marks: 50**

Answer ALL the Questions (5 X 10 = 50)

1. Online application is widely used in current scenario. It's like client server web application. Admin has full control over each and every section of website. The shopping site has huge number of products, which divided under different product category. There are many suppliers who list their products on the shopping portal. Customer can visit shopping site and explore different products and order them online. After customer registration they can login to the shopping site and add product in cart and place order. After placing the order, they can either pay online or can choose COD option. Customer can track their order by a unique tracking id provided by the shopping site. Customer can view his previous order history. Customer can also pay online via credit/debit card. The entire system is secured. Customer can login through their password and shop online. Admin can view all daily use report such product report, daily order report and payment report.

   Design an entity-relationship diagram for the above scenario. Mention the key constraints, cardinality constraints and participation constraints on the diagram. (10M)

2. Consider College admission database and express the following queries in SQL.

   College(cName,state,enrollment)

   Student(sID,sName,GPA)

   Apply(sID,cName,major,decision)

   1. Find the details of the students whose GPA is greater than 3.6 (2M)
   2. Display the names of students and their major using natural join and remove the duplicates from the result. (2M)

3. Display the sID of student and average GPA scored by student. (2M)
4. Display the college names without duplication where enrollment is more than 20000 and major is CS. (2M)
5. Display sID, sName, GPA, cName and enrollment with descending order of GPA. (2M)

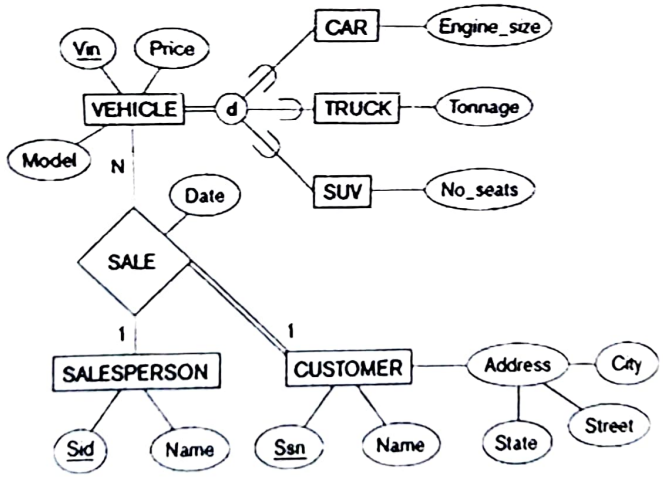
3. Explain the three-level schema architecture in DBMS? (10M)

4. a) Consider the relation scheme R = {E, F, G, H, I, J, K, L, M, N} and the set of functional dependencies {{E, F} -> {G}, {F} -> {I, J}, {E, H} -> {K, L}, K -> {M}, L -> {N} on R. What is the key for R? (3M)

b) Discuss in detail about 1NF,2NF and 3NF with suitable example. (7M)

5. a) Convert the following enhanced entity-relationship diagram into a relational database schema and indicate primary key and foreign key. (5M)

Figure EER diagram for a car dealer.



b) Explain the concept of attribute defined specialization, predicate defined specialization and user defined specialization. (5M)