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**

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 analyzing 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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SLOT – B1+TB1

School of Information Technology and Engineering

Fall Semester 2022-2023

Continuous Assessment Test – I

Programme Name & Branch : MCA (CA)

Course Name & code: Database Technologies (ITA5008)

Class Number (s): VL2022230106221 & VL2022230105096

Faculty Name: Dr. Bimal Kumar Ray & Dr. Tapan Kumar Das

Exam Duration: 90 Minutes **Maximum Marks: 50**

Answer ALL Questions

1. Consider a CONFERENCE_REVIEW database in which researchers submit their research papers for consideration. Reviews by reviewers are recorded for use in the paper selection process. The database system caters primarily to reviewers who record answers to evaluation questions for each paper they review and make recommendations regarding whether to accept or reject the paper. The data requirements are summarized as follows.

Authors of papers are uniquely identified by e-mail id. First and last names are also recorded. Each paper is assigned a unique identifier by the system and is described by a title, abstract, and the name of the electronic file containing the paper. A paper may have multiple authors, but one of the authors is designated as the contact author. Reviewers of papers are uniquely identified by e-mail address. Each reviewer's first name, last name, phone number, affiliation, and topics of interest are also recorded. Each paper is assigned between two to four reviewers. A reviewer rates each paper assigned to him or her on a scale of 1 to 10 in four categories: technical merit, readability, originality, and relevance to the conference. Finally, each reviewer provides an overall recommendation regarding each paper. Each review contains two types of written comments: one to be seen by the review committee only and the other as feedback to the author(s).

Draw an entity-relationship diagram for the above data requirements. Indicate key constraints, cardinality constraints and participation constraints on the diagram. (10 Marks)

2. (a) Every key is a super key but every super key is not a key – justify. (2 Marks)

(b) What is meant by entity integrity constraint and referential integrity constraint? (3 Marks)

(c) Consider the following six relations for an order-processing database application in a company.

CUSTOMER(Cust_id, Cname, City)

ORDER(Order_no, Odate, Cust_id, Ord_amt)

ORDER_ITEM(Order_no, Item_no, Qty)

ITEM(Item_no, Unit_price)

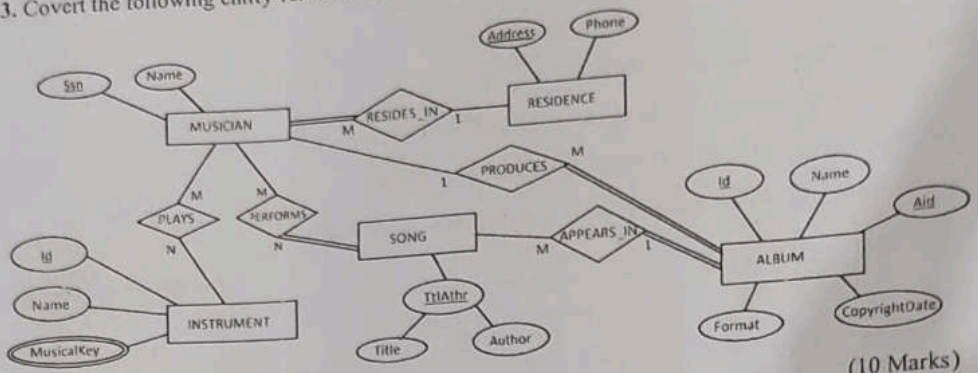
SHIPMENT(Order_no., Warehouse_id, Ship_date)

WAREHOUSE(Warehouse_id, City)

(5 Marks)

Specify the foreign keys for this schema.

3. Covert the following entity-relationship diagram into a relational database schema diagram.



(10 Marks)

4. (a) Identify three functional dependencies from the following relation.

X	Y	Z
x_1	y_1	z_1
x_1	y_1	z_2
x_2	y_1	z_1
x_2	y_1	z_3

(3 Marks)

(b) Consider a relation schema R(A, B, C, D, E, G, H) and the following set of functional dependency.

$$\mathcal{F} = \{A \rightarrow BC, B \rightarrow CE, A \rightarrow EG, AC \rightarrow H, D \rightarrow B\}.$$

Find out a key of the schema and decompose it into the highest possible normal form. (7 Marks)

5. Consider the following relational database schema to record access of social networks. The primary keys are underlined. The foreign keys are self-explanatory.

USER(User_id, Name, Location, DoB, Profession),

ACCESSES(User_id, Web_site_address, Date_of_membership),

SOCIAL_NETWORK(Popular_name, Web_site_address, Rank_in_popularity, Date_of_inception),

Popular_name is a secondary key.

(a) Write down the necessary SQL statements for creating the above tables with the necessary primary key, secondary key and foreign key. (6 Marks)

(b) Write down a SQL statement to list the name and profession of all users from Canada. (2 Marks)

(c) Write down a SQL statement to list the popular name of the social network and its web site address in decreasing order of its rank in popularity. (2 Marks)

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School of Information Technology and Engineering

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

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

*** ALL THE BEST ***

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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.

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

Mode =

median =

Standard

$\sigma = \sqrt{\frac{\sum fd}{}}$

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 – I

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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Fall Semester 2022-2023 - Fresher

Continuous Assessment Test – I

Programme Name & Branch: MCA

Course Name & code: Object Oriented Software Engineering

Class Number (s): VL2022230106231, VL2022230105113

Slot: F1+TF1

Faculty Name (s): Prof. Sweta Bhattacharya, Ms. Nagalakshmi Vallabhaneni.

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

General instruction(s):

Q.No.	Question	Max Marks
1.	a) Analyze the stakeholders for the Air Traffic control scenario (4) b) Applying the same scenario, consider that the requirement uncertainties are really high and schedule is extremely tight, what SDLC will you adopt? Identify the advantages or disadvantages of the model. (6)	10
2.	Create a class diagram for an Inventory management system (or) online E-commerce ports	10
3.	Write a Java/ C++ program for a banking system which has savings and checking account. Explain the conceptual use of inheritance and polymorphism.	10
4.	Evaluate the functional and nonfunctional requirements for Movie Ticket Booking system.	10
5.	For the Movie Ticket Booking system in Question 4, identify the use cases and actors. Draw a use-case diagram wherein the diagram should have "include" and "extend" relationships	10