04/10/2022

SKM's J. M. PATEL COLLEGE of COMMERCE, GOREGAON WEST
S.Y.B.Sc.I.T SEM-3 EXTERNAL ASSESSMENT OCT-2022

SUB: Python Programing   Total Marks : 75M   Duration:150 Mins

Note : 1. Attempt All Questions and Elaborate your answer with demonstration using Python

   2. Each Question carry 15 Marks

15M

Q-1   Attempt any three.
a.   Explain *The* Difference Between Brackets, Braces, and Parentheses in python programing.
b.   Explain how method can be created and executed in Python Programing.
c.   Explain how while loop can be executed in Python Programing.
d.   Write a short note on Order of Operations in python programing.
e.   Write a python program to accept a number from the user and print whether it is armstrong number or not.
f.   Write a program to print the output of following series:
      (1/2) + (1/4) + (1/6)+ (1/8)+(1/10)

15M

Q-2   Attempt any three.
a.   Explain any five function of Math module with example
b.   How user defined function can be created with parameters. Give demonstration
c.   Explain which technique is used for recursive statements execution
d.   Explain following function/keyword of python:
      Find(), Floor(), count(), find(),isspace()
e.   Write a program in python to check whether entered string is as required or not?
f.   Explain how "in" operator can be used in python with example.

15M

Q-3   Attempt any three.
a.   Write Short note on tuple with example.
b.   Explain time module with at least five function of it.
c.   Explain how Slice operator is used with example
d.   Short note on list functions (any five)
e.   Differentiate between Set vs. Dictionaries
f.   Explain how file handling can be done in python with example.

15M

Q-4   Attempt any three.
a.   What is meant by constructor? Explain how constructor can be created.
b.   Explain importance of re.error in python with example.
c.   Explain how method Overloading and overriding can be implemented in Python.
d.   What is meant by Data hiding. How it can be implemented in Python.
e.   What is meant by Thread & Multithreading? Explain how it can be implemented in Python.
f.   Write a short note on Synchronizing of threads and multithreaded priority queue

15M

Q-5   Attempt any three.
a.   Explain importance of Tkinter Module in Python with example.
b.   What is meant by Layout manager? Explain its different types in python.
c.   Write a short note on Pack Layout manager.
d.   Explain the difference between Grid and Place manager in python
e.   Explain how textbox and label with colorful foreground can be created in python.
f.   Explain how checkbox and radio button can be created and placed on interface in python

SKM's J. M. Patel College of Commerce, Goregaon, Mumbai
Semester -End & ATKT Examination – October 2022

Program: SYB.Sc.IT   Marks:75
Course: Data Structure   Duration:2$^{1/2}$ Hrs
Semester: III

Note: (1) All questions are compulsory.
(2) Make suitable assumptions wherever necessary and state the assumptions made.
(3) Answers to the same question must be written together.
(4) Numbers to the right indicate marks.
(5) Draw neat labelled diagrams wherever necessary.

Q 1. Attempt _any three_ of the following.   **15 M**

a) What is data structure? Explain the categories in which data structure can be divided.
b) Differentiate between Array and Linked list.
c) Explain multidimensional Array. How to declare 2 D array? Give example.
d) List and explain different operations that can be performed on data structure.
e) Write an algorithm to insert an element into the array and to delete an element from the array.
f) Consider a two-dimensional array D[3:7,-2:6]. If the base address of D is 5002 and each element takes 4 memory cells then find the address of D 4,5 element assuming that:
   i.   Array D is sorted in column major order. ii. Array D is sorted in row major order.

Q 2. Attempt _any three_ of the following.   **15 M**

a) Write and explain an algorithm for deleting a first and last node in two-way linked list.
b) Write an algorithm for traversing and searching in circular linked list.
c) What is the need of two way linked lists? Explain the structure of a node in a two-way linked list also explain traversing in two-way linked list.
d) What is linked list? Write and explain an algorithm to insert an element at the beginning of the singly linked list.
e) Write an algorithm for inserting a node after particular value in singly linked list.
f) Explain how the memory is allocated and deallocated for linked list.

Q 3. Attempt _any three_ of the following.   **15 M**
a) Define stack. Discuss the basic operations performed on the stack. Also explain overflow and underflow conditions of the stack.
b) Convert the following expressions in postfix and prefix notations.
   i. (a * b * c / d) + e − (f / g + h)
c) Evaluate the following expression using Stack
   i. (3^2*5)/(4*5-3)+8
d) Differentiate between Stack and Queue.
e) What is recursion? What are advantages and disadvantage of recursion?
f) Define Queue. Explain different types of queue.

**Q 4. Attempt _any three_ of the following.**   **15 M**

a) Sort the following data elements using bubble sort algorithm:
   29, 32, 18, 8, 43, 64, 6
b) What is AVL trees? Explain rotations performed on AVL tree.
c) Write an algorithm for Binary Search and explain with example.
d) Reconstruct the binary tree whose in-order and pre-order traversals are:
   a. In-order Traversal: g d b h e i a f c
   b. Pre-order Traversal: a b d g e h i c f

e) Draw max heap with the following elements:
80 9 25 30 100 45 62 89 51 23 11 27 323
f) Explain different operations performed on Binary Search Tree.

Q 5. Attempt *any three* of the following.   15 M

a) Write and explain the algorithm for Breadth First Search in a graph.
b) Write a short note on Double Hashing.
c) Perform quadratic probing on following numbers and find their positions. Consider the table size as 7.   "50, 700, 76, 85, 92, 73, 101"
d) Find the minimum spanning tree for the following graph using Prim's algorithm and the source vertex '0'.
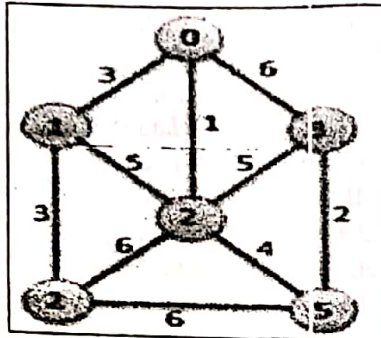
e) What are the different ways to represent graphs in memory?
f) Explain Warshall's algorithm of finding path matrix of a graph.

********** All the Best **********

SKM's J. M. Patel College of Commerce, Goregaon, Mumbai

Semester -End & ATKT Examination – October 2022

Program: SYB.Sc.IT   **Marks: 75**

Course: Computer Network   **Duration: 2¹/² Hrs.**

Semester: III

Note: 1. All questions are compulsory.
2. Figures to the right indicates full marks.
3. Answer to the same question must be written together.
4. Make suitable assumption wherever necessary and state the assumption mode.

1. Attempt any three of the following   (5*3=15M)
1. What is the relationship between Period and Frequency?
2. Write a short note on TCP/IP Model.
3. What is the internet standard? Explain the maturity levels of RFC.
4. Write a short note on Block Coding.
5. Define Data communication. Explain its various components.
6. Write a short note on Transmission Impairments.

2. Attempt any three of the following   (5*3=15M)
1. Write a short note on types of detection methods.
2. What is virtual circuit network? What are its characteristics?
3. Differentiate between Synchronous and Asynchronous TDM
4. Explain Fiber optic cable in detail.
5. Write a short note on Crossbar switch and Multistage switch.
6. Explain the types of Multiplexing.

3. Attempt any three of the following   (5*3=15M)
1. Explain Thick Ethernet and Thin Ethernet.
2. Discuss the addressing mechanisms of IEEE 802.11 project.
3. Explain ALOHA system with its two versions.
4. Write a short note on Point-to-Point Protocol.
5. Write a short note on Cellular Telephony.
6. What is Controlled access? Explain in detail.

4. Attempt any three of the following   (5*3=15M)
1. write a short note on NAT.
2. Explain ICMPv4 protocol.
3. Explain the terms 1. Connection Oriented Network Services. 2. Connectionless Network Services.
4. Explain Dijkstra's algorithm with an example.
5. Explain Packet switching in detail.
6. Differentiate between IPv4 and IPv6.

5. Attempt any three of the following   (5*3=15M)
1. Explain the following: a) WWW b) FTP
2. Write a short note on UDP.
3. With the help of a diagram. explain the Go-Back-N protocol.
4. Write a short note on HTTP.
5. Explain Congestion control in TCP.
6. What is a secure shell? Explain the components of a secure shell.

SKM's J. M. Patel College of Commerce, Goregaon, Mumbai

Semester -End & ATKT Examination – October 2022

Program: S.Y.B.Sc.IT
Course: Database Management System
Semester: IV

Marks: 75
Duration: 2$^{1/2}$ Hrs

Note:1. All questions are compulsory.
2. Figures to right indicate full marks.
3. Answer to same questions must be written together.
4. Make suitable assumption wherever necessary and state the assumptions made.

Q.1. Attempt any 3 among the following. [15 M]

1. What is the difference between DBMS and RDBMS.
2. Define the following terms:
   (a)Tuple (b)Multivalued attribute (c)Entity (d) Primary key (e)Weak entity
3. What is data Abstraction in DBMS?
4. Explain Relational database design process.
5. Explain the term specialization and generalization along with example.
6. Design an E - R schema for Alumni Database System to store information about Alumni: their basic details and Institution details where they are currently working. System keeps Admin Staff details which can post messages to alumni in order to inform about upcoming events. A system also maintains a track of messages which are posted to Alumni.

Q.2. Attempt any 3 among the following. [15 M]

1. Explain the need for normalization and why it is important?
2. Given a relation R(A, B, C, D) and Functional Dependency set FD = { AB → CD, B → C }, determine whether the given R is in 2NF? Give explanation to your answer.
3. Explain lossless join decomposition and dependency preserving decomposition.
4. Define a functional dependency. List and explain the six inference rules for functional dependencies.
5. Difference between Relational Algebra and Relational Calculus.
6. Explain Union and Intersection operation with respect to Relation algebra.

Q.3. Attempt any 3 among the following. [15 M]

1. Short note on Constraints along with its types.
2. Explain the term Views along with its advantages and disadvantages of views.
3. Explain aggregate functions with example..
4. Explain Null value concept?
5. Explain Group by clause with help of example.

6. Consider a relation emp(empid,ename,job,commission,salary,department). Write the queries for the following statements.
   a) Write a query to fetch the Ename from the Emp table in upper case and use the ALIAS name as EmpName
   b) Display name, salary and department of the employee.
   c) Display name of employee whose name ends with A.
   d) Write a query to fetch the number of employees.
   e) Display name of employee in descending order.

Q.4.Attempt any 3 among the following.   [15 M]

1. Discuss ACID properties.
2. Why is concurrency control needed? Explain lost update and dirty read problem.
3. What is two-phase locking protocol and how does it guarantee serializability.
4. What is deadlock? Explain deadlock prevention.
5. Explain the concept of serializability and explain in detail view serializability.
6. Explain the timestamp-ordering protocol.

Q.5.Attempt any 3 among the following.   [15 M]

1. Explain various features of PL/SQL.
2. What is cursor? What are different types of cursors? List and explain different cursor attribute.
3. Explain for loop with help of example in PL/SQL?
4. Short note on exception handling in PL/SQL.
5. Demonstrate the use of Relational operator in PL/SQL.
6. Write a PL/SQL block to calculate simple interest.

Skm's Jashbhai Maganbhai Patel College of Commerce

Regular Semester End Examination October 2022-23

Program: S.Y.B.Sc.I.T. (Sem-III)

Max. Marks : 75

Course: Applied Mathematics

Duration: 2 ½ hours

Instructions: 1. All questions are compulsory

2. Figures to the right indicates full marks

3. Non-Programmable calculator is allowed

4. Answer to the same question must be written together.

5. Make suitable assumption wherever necessary and state the assumption made

(5 x 3 =15)

Q.1   **Attempt any three from the following.**

a)   Reduce to normal form $\begin{bmatrix} 2 & 3 & 4 & 5 \\ 3 & 4 & 5 & 6 \\ 4 & 5 & 6 & 7 \\ 9 & 10 & 11 & 12 \end{bmatrix}$.

b)   Find Eigen value and Eigen vector : $\begin{pmatrix} 1 & -1 \\ 0 & 2 \end{pmatrix}$

c)   Define   i. Non-singular matrix   ii. Scalar matrix   iii. let $A = \begin{pmatrix} 2 & 0 \\ 1 & -3 \end{pmatrix}$ then find A^2+2A

d)   Find the cube root of (1+ i)

e)   Solve : Sinh(x) +7Cosh(x)=8

f)   Find   i. Log(-1+i)(2+i)   ii. Log(1/2 +i /2)

(5 x 3 =15)

Q.2   **Attempt any three from the following.**

a)   Solve: $\frac{dy}{dx} = \frac{xy^2}{x^3+y^3}$

b)   Solve : $\frac{dy}{dx} = \frac{1-y-x}{y+x+2}$

c)   Which of the following is exact differential equation:

i. $2xtan(y)dx + sec^2(y)dy = 0$

ii. $3(x^2 + 4y)dx + (2x^2 + 2y)dy = 0$

d)   Find the solution : $\frac{dy}{dx} = \frac{1}{(x-1)}y + x(x-1)$

e)   Find complementary function: i. (D^2-4D+4) y = 0   ii. (D^4-1) y=0

f)   Solve: $(D^4-1)y= 1+x^4$

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Q.3 Attempt any three from the following. (5 x 3 =15)

a) Prove that $L[e^{at}] = \frac{1}{s-a}$

b) Find Laplace transform of i. $[\sinh(3t) + e^t\cos(3t)]$ ii. $[t^2 + \cos(t)]$

c) Define Heaviside Unit step function and find $L^{-1}[\frac{s}{s^2-4s-21}]$

d) Find Laplace transform of $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} = x$ where $y(0) = y'(0) = 0$

e) Find $L^{-1}[\frac{s}{(s-1)(s+2)}]$

f) By using convolution theorem find $L^{-1}[\frac{1}{s(s-1)}]$

Q.4 Attempt any three from the following. (5 x 3 =15)

a) Evaluate: $\int_1^2 \int_0^y (x^2 + y)dxdy$

b) Evaluate by changing the order of integration: $\int_0^1 \int_0^{x+5}(e^x)dxdy$

c) Evaluate: $\int_0^1 \int_0^1 \int_0^1 e^{x+y} \, dxdydz$

d) Find the area of region bounded by $y = x^2$ and $x = y^2$

e) Find the volume bounded by $y^2 = x$ and $x^2 = y$ and the plane $z = 0$, $x + y + z = 1$

f) Evaluate by using polar form : $\int_0^1 \int_0^x \int_0^{xy} dxdydz$

Q.5 Attempt any three from the following. (5 x 3 =15)

a) Evaluate: $\int_0^\infty \frac{x^3}{3^x}dx$

b) Evaluate: i. β (2,5) ii. $\int_0^1 \frac{x^4+x^3}{(1+x)^7} \, dx$

c) Show that i. erf(x) + erfc (x)=1 ii. erf(0)=0

d) Evaluate: $\int_0^1 \frac{x^5}{(1+x^6)^7} \, dx$

e) Find i. erf(∞) b[$\int_0^t$ erf(ax)dx + $\int_t^\infty$ erfc (ax)dx]

f) Show that $\int_0^\infty \frac{\sin x}{x}dx = \frac{\pi}{2}$

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SKM's J. M. PATEL COLLEGE of COMMERCE, GOREGAON WEST
S.Y.B.Sc.I.T SEM-3 EXTERNAL ASSESSMENT OCT-2022

SUB: Python Programing   Total Marks : 75M   Duration:150 Mins

Note : 1. Attempt All Questions and Elaborate your answer with demonstration using Python

2. Each Question carry 15 Marks

Q-1   Attempt any three.   15M
a.   Explain how conversion from one data type to another in python.
b.   Write a python program to accept a number from the user and print whether it is prime number or not.
c.   Write a program to print the output of following series:
1!+2!+3!+….+10!
d.   Explain how method can be created and executed in Python Programing.
e.   Explain how while loop can be executed in Python Programing.
f.   Write a short note on PEDMAS in python programing.

Q-2   Attempt any three.   15M
a.   Explain how each and every character of accepted string from user can be displayed using for loop
b.   Explain different ways to create a function.
c.   Explain any five string function used in python.
d.   Explain following function/keyword of python:
Abs(), Ceil(), max(),min()
e.   Write a program in python to check whether entered number is prime or not?
f.   Explain how "in" operator can be used in python with example.

Q-3   Attempt any three.   15M
a.   What is meant by Data hiding. How it can be implemented in Python.
b.   What is meant by Thread & Multithreading? Explain how it can be implemented in Python.
c.   Write a short note on Synchronizing of threads and multithreaded priority queue
d.   Explain five functions of tuple.
e.   What is meant by Set ? Explain with example.
f.   Explain how file handling can be done in python with example.

Q-4   Attempt any three.   15M
a.   What is meant by Data Exposure. How it can be implemented in Python.
b.   What is meant by Multithreading? Explain how it can be implemented in Python.
c.   Write a short note on Synchronizing of threads and multithreaded priority queue
d.   Explain built in functionality available in python for error handling with example.
e.   Explain how method Overloading and overriding can be implemented in Python.
f.   Explain how Inheritance takes place in python with demonstration.

Q-5   Attempt any three.   15M
a.   Explain the difference between Grid and Place manager in python
b.   Explain how module of Panda is more beneficial than array in python.
c.   Explain how checkbox and radio button can be created and placed on interface in python
d.   Write a program in python to demonstrate use of TextBox
e.   Write a program in python to demonstrate use of Label control
f.   Explain importance of Pack method in python.

Program: SYB.Sc.IT   **Marks:75**
Course: Data Structure   **Duration:2¹ᐟ² Hrs**
Semester: III

Note: (1) All questions are compulsory.
(2) Make suitable assumptions wherever necessary and state the assumptions made.
(3) Answers to the same question must be written together.
(4) Numbers to the right indicate marks.
(5) Draw neat labelled diagrams wherever necessary.

Q 1. Attempt **_any three_** of the following.   **15 M**

   a) What is an algorithm? What are the characteristics of an algorithm?
   b) What are the advantages and limitations of an array?
   c) What is Sparse matrix? Explain different ways of representing Sparse matrix into memory.
   d) Write an algorithm to insert an element into the array and to delete an element from the array.
   e) Consider a two-dimensional array D[7:11,-3:6]. If the base address of D is 1536 and each element takes 2 memory cells then find the address of D 5,4 element assuming that:
      i) Array D is sorted in column major order.
      ii) Array D is sorted in row major order.
   f) What is data structure? Explain the classification of data structure.

Q 2. Attempt **_any three_** of the following.   **15 M**

   a) Write an algorithm for inserting a node at first and last position in circular linked list.
   b) Explain how the memory is allocated and deallocated for linked list.
   c) Write an algorithm for traversing and inserting a node after particular value in doubly linked list.
   d) What is linked list? Write and explain an algorithm to deleting an element from the beginning and end of the singly linked list.
   e) Write a short note on header linked list.
   f) Write an algorithm for merging two linked list.

Q 3. Attempt **_any three_** of the following.   **15 M**

   a) Differentiate between Stack and Queue.
   b) Convert the following expressions in postfix notations using stack:
      $(x * y) + (z + ((a + b - c) * d))$

   c) Define Queue. Explain different types of queues.
   d) Evaluate the following expression using Stack
      $(3^2 * 5)/(4 * 5 - 3) + 8$
   e) Define Stack. Explain how stack is represented in memory?
   f) What is Queue? Explain different operations performed on queue.

Q 4. Attempt **_any three_** of the following.   **15 M**

   a) What are the algorithmic steps of insertion sort method? Sort the following data elements using insertion sort method: 12,23,5,10,35,20,40,18.
   b) Make a Max Heap by inserting the following number in sequence:
      52, 36, 98, 29, 123, 39, 15, 56, 31, 365, 278, 45, 72.
   c) Reconstruct the binary tree who's in-order and pre-order traversals are:
      In-order Traversal: d c k e a h b q j i
   Post-order Traversal: d k e c h q j i b a

d) Define the following and explain with example:
   1) Height of tree   2) Parent & Child   3) External node   4) degree of a node   5) External node
e) Write difference between Binary Search and Linear Search.
f) What is AVL tree? Explain rotations performed on AVL tree for balancing of the tree.

Q 5. Attempt **_any three_** of the following.   **15 M**

a) Define the following terms. 1. Graph   2. Outdegree and Indegree   3. Weighted Graph
         4. Path   5. Directed Graph
b) Find the adjacency matrix and list representation of the following graph.
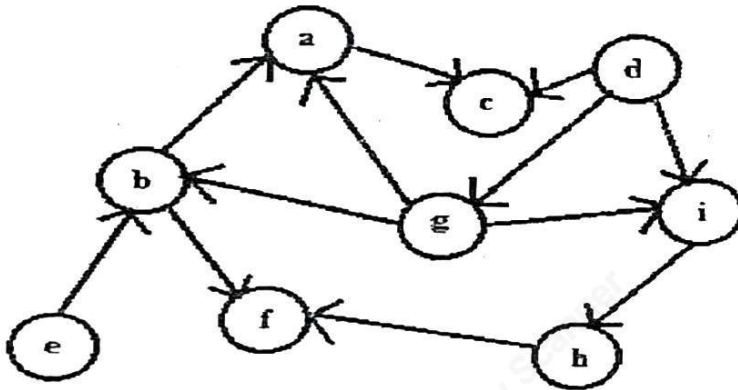
c) Explain with example Kruskal's Algorithm to find Minimum Spanning Tree (MST).
d) Find the minimum spanning tree using Prim's Algorithm. Start traversing using vertex 'A'.
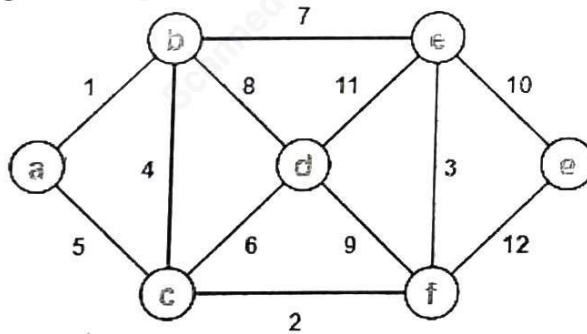
e) Perform linear probing on following numbers and find their positions. Consider the table size as 7.
         "50, 700, 76, 85, 92, 73, 101"
f) What is hashing? List different collision resolution techniques. Explain any one in detail.

********** **All the Best** **********

SKM's J. M. Patel College of Commerce, Goregaon, Mumbai

Semester -End & ATKT Examination – October 2022

Program: SYB.Sc.IT   Marks: 75

Course: Computer Network   Duration: 2¹ᐟ² Hrs.

Semester: III

Note: 1. All questions are compulsory.
2. Figures to the right indicates full marks.
3. Answer to the same question must be written together.
4. Make suitable assumption wherever necessary and state the assumption mode.

1. **Attempt any three of the following**   (5*3=15M)
    1. Write a short note on Analog to Digital Conversion.
    2. Define Modulation. Explain along with its types.
    3. Explain Time and Frequency Domain representation of signals.
    4. What is the OSI model? List its layers and explain their responsibilities.
    5. Discuss the advantages and disadvantages of any two-network topology.
    6. Differentiate between Data rate and Signal rate.

2. **Attempt any three of the following**   (5*3=15M)
    1. Explain the types of Propagation modes.
    2. Write a short note on Crossbar switch and Multistage switch.
    3. What is Hamming Distance? Explain in detail.
    4. Differentiate between Synchronous and Asynchronous TDM
    5. How does single bit error differ from a burst error.
    6. Explain types of unguided media.

3. **Attempt any three of the following**   (5*3=15M)
    1. Explain frame format of Standard Ethernet.
    2. Explain the working of Stop-N-Wait ARQ with the help of flow diagram.
    3. write a short note on Bluetooth Architecture
    4. Explain router in detail.
    5. Differentiate between Satellite Communication and Optical Communication.
    6. Explain HDLC Frame format.

4. **Attempt any three of the following**   (5*3=15M)
    1. List and explain the services provided by the network layer.
    2. Explain the two ways of forwarding of IP packets.
    3. What is routing information protocol? Explain the RIP algorithm.
    4. Draw and Explain IPv6 header structure.
    5. Explain Fragmentation in detail.
    6. What are the types of links in OSPF? Explain each in detail.

5. **Attempt any three of the following**   (5*3=15M)
    1. Explain the persistent and non-persistent connection.
    2. What do you mean by Domain Name System? What is the use of the same?
    3. Write a short note on TCP services
    4. Explain Types of segments to handle error in TCP.
    5. Explain the architecture of WWW.
    6. Explain the different timers in TCP.

SKM's J. M. Patel College of Commerce, Goregaon, Mumbai

Semester -End & ATKT Examination – October 2022

Program: S.Y.B.Sc.IT   Marks: 75
Course: Database Management System   Duration: 2^1/2 Hrs
Semester: IV

Note:1. All questions are compulsory.
    2.Figures to right indicate full marks.
    3.Answer to same questions must be written together.
    4.Make suitable assumption wherever necessary and state the assumptions made.

Q.1.Attempt any 3 among the following.   **[15 M]**

1. What are the Disadvantages of File Processing System? Explain Advantages of DBMS over File System.
2. What is structured query language? How the DDL and DML are different? Explain.
3. Explain the term relationship with respect to ER model and Give example of following relationships:
    a. Many-to-One b. One-to-One c. One-to-Many d. Many-to-Many
4. Explain in detail about view of data and levels of Abstraction.
5. List and explain basic building blocks of ER diagram.
6. Write a short note on network model?

Q.2Attempt any 3 among the following.   **[15 M]**

1. Explain 1 NF, 2 NF,3 NF and BCNF with examples.
2. What is lossless decomposition in DBMS? Explain the necessary conditions to check for lossless join decomposition.
3. List and explain the six inference rules for functional dependencies.
4. Explain SELECT and PROJECT operation in Relational algebra?
5. Difference between Relational algebra and relational calculus.
6. Explain rename and division operator with help of example

Q.3.Attempt any 3 among the following.   **[15 M]**

1. Explain the term constraints? Explain any two constraints.
2. Explain order by and group by clause.
3. What are aggregate functions? And list the aggregate functions supported by SQL?
4. Explain outer join along with its types.
5. Explain ANY and ALL operators with example.

6. Consider a relation emp(empid,ename,job,commission,salary,department).Write the queries for the following statement.
   a. Display name of employee whose name starts with A and ends with C.
   b. Display name of the employee whose salary ranges between 10000 and 50000.
   c. Display name of employee in ascending order.
   d. Display the details of employees whose commission is NULL.
   e. Display empid when name of employee starts with k and is working as manager with salary less than 30000.

Q.4.Attempt any 3 among the following.   [15 M]

1. Why is concurrency control needed? Explain lost update and Unrepeatable Read Problem.
2. Short note on Log-based recovery.
3. Explain the term transaction? Explain Atomicity and Consistency with help of example.
4. Explain in detail view serializability.
5. Explain timestamp ordering protocol.
6. Explain Optimistic concurrency control protocol.

Q5. Attempt any 3 among the following.   [15 M]

1. What is PL/SQL? Explain various advantages of PL/SQL.
2. What are sequences in PL/SQL? Explain it with help of suitable example.
3. What do you understand by PL/SQL packages?
4. Write a Pl/SQL function that returns factorial of a number.
5. What are triggers? Explain the syntax for creating a trigger? List the advantages of using triggers.
6. Write a PL/SQL script to display the following series of numbers: 99,96,93......9,6,3?

Skm's Jashbhai Maganbhai Patel College of Commerce

Regular Semester End Examination October 2022-23

Program: S.Y.B.Sc.I.T. (Sem-III)

Course: Applied Mathematics

Max. Marks : 75

Duration: 2 ½ hours

Instructions:
1. All questions are compulsory
2. Figures to the right indicates full marks
3. Non-Programmable calculator is allowed
4. Answer to the same question must be written together.
5. Make suitable assumption wherever necessary and state the assumption made

Q.1   Attempt any three from the following. (5 x 3 =15)

a) Find inverse of a matrix $\begin{bmatrix} 2 & 3 & 4 \\ 3 & 4 & 5 \\ 4 & 5 & 6 \end{bmatrix}$

b) Find Eigen value and Eigen vector $\begin{pmatrix} 1 & 1 \\ 0 & 4 \end{pmatrix}$

c) Define: **i.** Singular matrix **ii.** Null matrix **iii.** let $A = \begin{bmatrix} 3 & 0 \\ 2 & -3 \end{bmatrix}$ then find A^2+A

d) Find the cube root of $(-1-i)$

e) Solve : $\sinh x + 10\cosh x = 20$

f) Find **i.** $\text{Log}(-1-i)(1+i)$ **ii.** $\text{Log}(-1/2 -i/2)$

Q.2   Attempt any three from the following. (5 x 3 =15)

a) Solve: $\dfrac{dy}{dx} = \dfrac{xy}{x^2+y^2}$

b) Solve: $\dfrac{dy}{dx} = \dfrac{x}{\sqrt{x^2+1}} y + x^2\sqrt{x^2 + 1}$

c) Find complementary function: **i.** $(D^2+10D+25) y = 0$ **ii.** $(D^3-9D^2 +27D-27) y=0$

d) Solve: $(D^2-1)y=e^x$

e) Solve : $\dfrac{dy}{dx} = \dfrac{1-y-x}{2y+2x-1}$

f) Which of the following is exact differential equation:

i. $(xy)dx+ (y^2+x+1)dy=0$

ii. $(xy)dx- (y^2+x^2)dy=0$

Q.3 Attempt any three from the following. (5 x 3 =15)

a) Prove that $L[\sinh(pt)] = \frac{p}{s^2-p^2}$

b) Find Laplace transform of i. $[\sin(3t) + e^{-t}\cosh(3t)]$ ii. $[t^3 - 2\cos(t)]$

c) Define periodic function and find $L^{-1}[\frac{s}{s^2+6s+13}]$

d) Find Laplace transform of $\frac{d^2y}{dt^2} + 4\frac{dy}{dt} = t$ where $y(0) = y'(0) = 0$

e) Find $L^{-1}[\frac{s}{(s-1)(s+3)}]$

f) By using convolution theorem find $L^{-1}[\frac{1}{s(s-4)}]$

Q.4 Attempt any three from the following. (5 x 3 =15)

a) Evaluate: $\int_1^2 \int_0^{2y}(x^2 - y)dxdy$

b) Evaluate by changing the order of integration: $\int_0^1 \int_0^{y+5}(e^y)dydx$

c) Evaluate: $\int_0^1 \int_0^1 \int_0^1 e^{x+2y} \, dxdydz$

d) Find the area of region bounded by $y = x^2$ and $y = 2x$

e) Find the volume bounded by $x^2 + y^2 = 1$ and the $z = 0, z = 1$

f) Evaluate by using polar form : $\int_0^1 \int_0^x \int_0^{xy} 4 \, dxdydz$

Q.5 Attempt any three from the following. (5 x 3 =15)

a) Evaluate: $\int_0^\infty \frac{x^5}{5^x}dx$

b) Evaluate: i. $\beta(4,5)$ ii. $\int_0^1 \frac{x^6+x^{10}}{(1+x)^5} \, dx$

c) Show that i. erf (-x)=-erf(x)   ii. erfc (x) + erfc (-x)=2

d) Evaluate: $\int_0^1 \frac{x^5}{(1+x^6)^7} \, dx$

e) Show that : $\int_a^b e^{-t^2} \, dt = \frac{\sqrt{\pi}}{2}(erf(b) - erf(a))$

f) Show that : $\int_0^\infty \frac{1-e^{-ax}}{x} \, dx = \log(a + 1)$