

SAKET GYANPEETH'S

**SAKET COLLEGE OF ARTS, SCIENCE & COMMERCE
KALYAN (EAST)**

UNIVERSITY & MODEL PRACTICE QUESTION PAPER SET

CLASS-S.Y.B.Sc.[INFORMATION TECHNOLOGY]

SEMESTER-III

| SR.NO. | COURSE TITLE | COURSE CODE |
|--------|-----------------------------|-------------|
| 1 | Python Programming | USIT301 |
| 2 | Data Structures | USIT302 |
| 3 | Computer Networks | USIT303 |
| 4 | Database Management Systems | USIT304 |
| 5 | Applied Mathematics | USIT305 |

- Q-1 Answer the following.(Any 3) [15]**
- a) What are two modes of working in IDLE?
 - b) How to assign a value to a variable in python? Explain with example.
 - c) Explain While loop with suitable example.
 - d) Explain skipping specification conditions with pass statement.
 - e) State the difference between Brackets, Braces and Parentheses.
 - f) What are the advantages of python programming Language?
- Q-2 Answer the following.(Any 3) [15]**
- a) What are fruitful function and void function in python?
 - b) Explain recursion function in python with example.
 - c) Define String. What are different operations of string?
 - d) What is composition in python? Explain
 - e) Explain function with parameters and arguments.
 - f) Explain some built in function of string in detail.
- Q-3 Answer the following.(Any 3) [15]**
- a) Write a python program to sum all the items in a given list.
[3,6,8,12,15]
 - b) Explain Basic tuples operations.
 - c) How to update Dictionary? Explain
 - d) What is different between write() and append() function?
 - e) Which are built in dictionary function? Explain.
 - f) Explain advantages of Exception Handling
- Q-4 Answer the following.(Any 3) [15]**
- a) Write a short note on regular expression.
 - b) Explain classes and class objects.
 - c) What is multithreading? How to create a thread?
 - d) Explain Math module.
 - e) What are different types of regular expression?
 - f) What is method overriding?
- Q-5 Answer the following.(Any 3) [15]**
- a) State and explain DBM module in detail.
 - b) Explain UPDATE command with example.
 - c) Write a short note on Tkinter module.
 - d) What are the advantages of GUI?
 - e) List the Tkinter widgets with its purpose.
 - f) How to store and retrieve data from MySQL database in python?

SAKET GYANPEETH'S
SAKET COLLEGE OF ARTS, SCIENCE AND COMMERCE, KALYAN (EAST)
S.Y.B.Sc. (IT) SEM-III PRACTICE QUESTION PAPER
SUB:-PYTHON PROGRAMMING

- Q-1 Answer the following.(Any 3) [15]**
- Explain python features in detail.
 - What is debugging? Explain different types of errors.
 - What is operator? Define different types of operators in python in detail,
 - Explain type conversion in python with example.
 - Which different conditional statements used in python? Explain
 - Explain for loop with else with suitable example.
- Q-2 Answer the following.(Any 3) [15]**
- Write a short note on stack diagram.
 - Explain User Defined Function with example.
 - What is String? How to work with string in python?
 - Explain Boolean function with suitable example.
 - Write a short note on incremental development.
 - Explain math functions with example.
- Q-3 Answer the following.(Any 3) [15]**
- Explain built in list functions and methods of list in python.
 - Write a python program to create a new file in text mode & then read contents of that file in binary mode.
 - Explain mkdir(), chdir(), getcwd() and rmdir() directory.
 - What is text file? Write syntax of open() function and its arguments.
 - Explain what do you mean by exception.
 - Define Tuple Assignment with suitable example.
- Q-4 Answer the following.(Any 3) [15]**
- What are different methods of regular expression?
 - Define thread. Explain the thread module.
 - Explain inheritance with example.
 - Explain random module.
 - Write a short note on data hiding.
 - Define class, a class variable and data member.
- Q-5 Answer the following.(Any 3) [15]**
- Explain database connectivity in python.
 - Explain the layout management features.
 - How to create database in python?
 - Explain the widget attributes and properties.
 - Explain INSERT command with example.
 - How to draw line using canvas in python?

Q.4 Answer the following : (Any Three)

[15M]

- a. How will you sort an array using merge sort? TI
- b. Explain the 3 traversal methods used in a binary tree.
- c. What are the different rotations performed in an AVL tree.
- d. Write a short note on B-tree
- e. How will you delete a node in binary linked list/
- f. What are the operations performed on a heap..

Q.5 Answer the following : (Any Three)

[15M]

- a. Explain the linear probing collision resolution technique with the help of an example.
- b. How will you represent a graph ?
- c. Write a program to traverse a graph using BFS
- d. Write a short note on spanning tree.
- e. Resolve the following collision from the following set using double hashing:
0 1 4 9 16 25 36 49 64 81
- f. Write a short note on hash function

SAKET GYANPEETH'S
SAKET COLLEGE OF ARTS, SCIENCE AND COMMERCE, KALYAN (EAST)
S.Y.B.Sc. (CS) SEM-III PRACTICE QUESTION PAPER
SUB:- DATA STRUCTURES

Q.1 Answer the following : (Any Three) [15M]

- a. State and explain the asymptotic notations used in analysis of algorithms.
- b. Write a program to search an element in an array.
- c. Write a short note on sparse arrays.
- d. Write a program to multiply 2 matrices.
- e. What are the different types of data types ?
- f. Explain the advantages and disadvantages of arrays.

Q.2 Answer the following : (Any Three) [15M]

- a. How will you insert an element in a linked list ?
- b. Explain memory allocation and deallocation
- c. Explain the applications of linked list.
- d. How will you delete a node from a doubly linked list?
- e. How will you traverse a circular linked list?
- f. Write short note on header linked list.

Q.3 Answer the following : (Any Three) [15M]

- a. What are the operations performed in a stack?
- b. Convert the following infix expression to postfix and prefix expression
 $a+b*(c^d-e)^{(f+g*h)}-i$
- c. How will you represent a circular queue using array?
- d. Write a program to check whether the parentheses are correctly ordered or not.
- e. Write short note on priority Queue.
- f. Write a short note on recursion.

Q.4 Answer the following : (Any Three)

[15 M]

a. Sort the following array using heap sort.

72

15, 19, 10, 7, 17, 16

b. Explain Huffman algorithm with an example.

c. Construct the binary tree using following traversal.

Inorder sequence : D B E A F C

Preorder sequence : A B D E C F

d. Write a program to construct a binary search tree.

e. Write a short note on red black tree.

f. Write short note on index sequential search".

Q.5 Answer the following : (Any Three)

[15 M]

a. Explain BFS traversal in graph.

b. Write short note on Adjacency matrix.

c. Write short on prim's algorithm

d. Resolve the following collision from the following set using quadratic hashing:

0 1 4 9 16 25 36 49 64 81

e. Write short note on deletion and rehashing.

f. What are the applications of graph ?

SAKET GYANPEETH'S
SAKET COLLEGE OF ARTS, SCIENCE AND COMMERCE, KALYAN (EAST)
S.Y.B.Sc.(IT) SEM-III PRACTICE QUESTION PAPER
SUB:-COMPUTER NETWORKS

Q1. Answer any THREE Questions

[15M]

1. Explain various types of address in TCP/IP Protocol suite in detail.
2. Define Transmission Impairment and explain how it is caused.
3. State the different types of Transmission modes. Explain serial Transmission.
4. Explain Analog to Digital Conversion.
5. Explain periodic and non-periodic signal.
6. Explain the techniques used in Digital to Digital Conversion.

Q2. Answer any THREE Questions

[15M]

1. Write a short note on Spread Spectrum.
2. Explain Coaxial cable in detail with diagram.
3. Explain Circuit Switching in detail.
4. Define Error. Explain its Types
5. What is checksum? Explain with example.
6. Explain MAC addressing.

Q3. Answer any THREE Questions

[15M]

1. Explain Stop wait protocol(noiseless channel).
2. Explain CSMA protocol with type.
3. Which technique is used for controlled access?
4. Explain working of Frequency Division Multiple Access.
5. Explain working of wired LAN.
6. Explain Cellular telephony.

Q4. Answer any THREE Questions

[15M]

1. Explain IPv4 addressing with detail.
2. Explain IPv4 packet format with help of neat diagram.
3. Explain Border gateway protocol with diagram.
4. Which techniques are used in forwarding of IP packets?
5. Explain service provide by network layer to upper layer.
6. Explain ICMPv6 in detail.

Q5. Answer any THREE Questions

[15M]

1. Explain TCP connection termination by 3 way handshaking concept.
2. Explain header format of UDP datagram.
3. Explain architecture of WWW.
4. Short note on FTP
5. Write a short note on IMAP4.
6. Write a short note on MIME.

SAKET GYANPEETH'S
SAKET COLLEGE OF ARTS, SCIENCE AND COMMERCE, KALYAN (EAST)
S.Y.B.Sc.(IT) SEM-III PRACTICE QUESTION PAPER
SUB:-COMPUTER NETWORKS

Q1. Answer any THREE Questions

[15M]

1. What is data communication? Explain its various characteristics.
2. What is network? List & explain different types of network.
3. What is OSI model? Explain its different layers and their functions.
4. State the different types of transmission modes. Explain Parallel Transmission.
5. Explain the factors on which the performance of the network depends.
6. Explain Analog to Analog Conversion.
7. Explain periodic and non-periodic signals.

Q2. Answer any THREE Questions

[15M]

1. What is multiplexing? List and explain any one type.
2. Explain Transmission Media and its types.
3. Explain Packet Switching in detail.
4. Explain the structure of packet switches.
5. List the various types of error detection techniques and explain any one.
6. Explain forward error correction.

Q3. Answer any THREE Questions

[15M]

1. Explain Simple protocol in detail.
2. Explain Stop and Wait ARQ for a noisy channel.
3. Explain High Level Data Link Control.
4. Explain ALOHA protocol in detail.
5. Explain connecting devices in detail.
6. Explain wireless LAN.

Q4. Answer any THREE Questions

[15M]

1. Explain different notations in IPv6 addressing.
2. Explain different types of transition strategies from IPv4 to IPv6.
3. Explain the need of ICMP at the network layer with its types.
4. Short note on Mobile IP.
5. Explain Area and Metric in OSPF with a diagram.
6. Find out the first address and last address from the given address 172.168.0.2.

Q5. Answer any THREE Questions

[15M]

1. What are the services of TCP?
2. Write a note on: HTTP.
3. Explain various types of commands in FTP.
4. Explain various components of email.
5. Explain various phases used in mail transfer.
6. Write a short note on POP3.

SAKET GHYANPEETH'S
SAKET COLLEGE OF ARTS, SCIENCE & COMMERCE, KLAYAN (EAST)
S.Y.B.Sc. IT SEMESTER III - PRACTICE QUESTION PAPER
SUBJECT: DATABASE MANAGEMENT SYSTEM

Q1. Attempt any 3:-

[15 M]

- a. What is DBMS? Explain its advantages and disadvantages.
- b. Explain three level architecture with proper diagram.
- c. Explain different types of users.
- d. Explain data Independence in detail
- e. Explain hierarchal model with proper diagram.
- f. Explain characteristics of DBMS.

Q2. Attempt any 3:-

[15 M]

- a. What is ERD? Explain different notation of ERD.
- b. What is attributes? Explain different types of attributes.
- c. Explain Activity diagram with example
- d. Explain Generalization and Specialization with suitable example
- e. Explain different types of Mapping cardinalities
- f. Explain hierarchical model in DBMS.

Q3. Attempt any 3:-

[15 M]

- a) What is SQL? Explain different DataTypes in SQL.
- b) What is Views? How to create view with example.
- c) What is Nested subqueries? Explain with example.
- d) Explain different types of DML statements with example
- e) Explain 1st Level of Normalization with suitable example.
- f) Explain E-R Model in detail.

Q4. Attempt any 3:-

[15 M]

- a) What is transaction ? Explain ACID properties of transaction
- b) What is Deadlock? Explain different types of locking mechanism.
- c) What is concurrency control? Explain different types of concurrency control.
- d) Explain concurrent execution of transaction with suitable example
- e) Explain Commit and RollBack commands with suitable example.
- f) Explain trigger with example.

Q5. Attempt any 3:-

[15 M]

- a) What is PL/SQL? Explain the difference between sub programs and anonymous blocks
- b) Explain packages with suitable example
- c) Explain case statement with suitable example.
- d) What is Exception handling? Explain different types of SYSTEM Exception handling
- e) What is cursor? Explain different types of Cursors
- f) Draw ER diagram for hospital management system.

SAKET GHYANPEETH'S
SAKET COLLEGE OF ARTS, SCIENCE & COMMERCE, KLAYAN (EAST)
S.Y.B.Sc. IT SEMESTER III - PRACTICE QUESTION PAPER
SUBJECT: DATABASE MANAGEMENT SYSTEM

Q1. Attempt any 3:-

[15 M]

- a. Explain the Architecture of DBMS.
- b. Explain Network Model with suitable example.
- c. Explain Record Based Model with suitable example
- d. Explain Benefits of DBMS.
- e. Explain 3 level architecture of DBMS.
- f. Explain characteristics of DBMS.

Q2. Attempt any 3:-

[15 M]

- a. Explain Sequence Diagram with suitable example.
- b. What is UML? Explain Use Case Diagram with suitable example.
- c. Explain different types of relationships with suitable example.
- d. Explain State transition diagram with suitable example
- e. What is Key attribute? Explain different types of Keys attributes.
- f. Explain hierarchical model in DBMS.

Q3. Attempt any 3:-

[15 M]

- a. Explain 3rd level of normalization with suitable example.
- b. Explain different types of Cods rules.
- c. Explain Select and Project operator with suitable example
- d. Explain different types of set operators with suitable example
- e. What is joins? Explain different types of Joins in SQL.
- f. Explain E-R Model in detail.

Q4. Attempt any 3:-

[15 M]

- a. What is Transaction Management? Explain different states of Transaction.
- b. What is Schedule? Explain Schedule of transaction with suitable example.
- c. What is transaction? Explain different operations of transaction with suitable example.
- d. What is Deadlock ? Explain different types of locks.
- e. What is Concurrent Execution of transaction? Explain different problems of concurrent execution of transaction.
- f. Define Normalization. Explain types of Normalization.

Q5. Attempt any 3:-

[15 M]

- a. Explain different types of loops in PL/SQL.
- b. What is PL/SQL? Explain different parts of PL/SQL.
- c. What is procedure? Explain different parameters of PL/SQL with suitable example
- d. What is a Function? Explain difference between Functions and Procedures.
- e. Explain different types of decision statements with suitable example .
- f. Draw ER diagram for College management system.

SAKET GYANPEETH'S
SAKET COLLEGE OF ARTS, SCIENCE AND COMMERCE, KALYAN (EAST)
S.Y.B.Sc. (IT) SEM-III PRACTICE QUESTION PAPER
SUB:-APPLIED MATHEMATICS

- Note: (1) All questions are compulsory.
 (2) All questions carry equal marks.
 (3) Figures to right indicate full marks.

Q.1 Attempt any three of the following:

(a) Find the Eigen values of the matrix: $A =$

$$\begin{matrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{matrix}$$

(b) Examine for consistency the system of equations $x-y-z=2$; $x+2y+z$; $4x-7y-5z=2$ and solve them if found consistence.

(c) Examine the linear dependence or independence of vector $(1, 2, -1, 0)$, $(1, 3, 1, 3)$, $(4, 2, 1, -1)$ and $(6, 1, 0, -5)$.

(d) If Z_1 and Z_2 be two complex numbers show that -

$$|Z_1 + Z_2|^2 + |Z_1 - Z_2|^2 = 2|Z_1|^2 + 2|Z_2|^2$$

(e) If $\tanh x = 2/3$, find the value of $\cosh 2x$.

(f) Find principle value of $\log e (2+3i)$.

Q.2 Attempt any three of the following:

(a) Solve: $(D^2 + 9)y = \sec 3x$

(b) Solve: $(D^4 - 3D^2 - 4)y = 5 \sin 2x - e^{-2x}$

(c) Solve: $(3y + 2x^3) dx + (3x + y - 1) dy = 0$

(d) If

$$\cos x \frac{dy}{dx} + y \sin x = \sec^2 x$$

(e) Solve: $(px-y)(px+y) = 2p$

(f) Solve: $p^2 + 2py \cot x = y^2$ if an integral curve. Passes through the point $(\pi/2, 1)$. Find the equation to the curve.

Where $P = \frac{dy}{dx}$.

Q.3 Attempt any three of the following:

(a) Find Laplace transform of $f(t) = e^{-4t} \frac{\sin 3t}{3}$

(b) Prove that: $L[\cos at] = 1/s^2 - a^2$

(c) Evaluate by using Laplace transforms:

$$\int_0^{\infty} t^2 e^{-t} \sin t dt$$

(d) Find Laplace transform of -

$$F(t) = (t-1)^2 v(t-1)$$

(e) Solve the following differential equation by Laplace transform method:

$$\frac{d^2 y}{dt^2} + \frac{dy}{dx} + 5y = e^{-t} \sin t$$

Given $y(0) = 0$, $y'(0) = 1$

(f) Find inverse Laplace transform of $1/s^3(s^2 + 1)$

- (f) Find Laplace transform of –
 $F(t) = (t-1)^2 v(t-1)$

Q.4 Attempt any three of the following:

- (a) Change the order of integration and evaluation $\int_0^2 \int_{x^2}^x xy \, dx \, dy$.

- (b) Evaluate $\int_0^2 \int_0^{\sqrt{2x-x^2}} \frac{x \, dx \, dy}{\sqrt{x^2+y^2}}$ by changing polar coordinates.

- (c) Evaluate $1 = \int_0^2 \int_0^x \int_0^{2x+2y} e^{x+y+z} \, dx \, dy \, dz$.

- (d) Evaluate $\iint xy(x+y) \, dx \, dy$ over the area between curve $y = x^2$ and the line $y = x$.

- (e) Find area of a circle $x^2 + y^2 = 25$.

- (f) Calculate the volume of the solid bounded by the following surface:
 $z=0, x^2 + y^2 = 1, x+y+z=3$.

Q.5 Attempt any three of the following:

- (a) Evaluate $\int_0^\infty \frac{x^7 (1-x)^{12}}{(1+x)^{28}} \, dx$

- (b) Define gamma function and show that

$$\sqrt{n} = \int_0^1 \left(\log \frac{1}{y}\right)^{n-1} \, dy$$

- (c) Show that: $\int_0^1 \frac{x^a - x^b}{\log x} = \log \left(\frac{a+1}{b+1}\right)$ using quis.

- (d) Evaluate $\int_0^{\frac{\pi}{2}} \frac{dx}{1+a \cos^2 x}$ where $|a| < 1$ and hence prove that $\int_0^{\frac{\pi}{2}} \frac{\cos^2 x}{(3+\cos^2 x)^2} = \frac{\sqrt{3}}{96}$

- (e) Find $\frac{d}{dx} (\operatorname{erf}(ax))$

- (f) Prove that $\int_0^\infty e^{-x^2} - 2ax \cdot dx = \frac{\sqrt{x}}{2} e^{a^2} [1 - \operatorname{erf}(a)]$