GES/SBVC/BVL | Sem End/EXAM/ OCT 2024

DATE: 16/10/2023 | TIME: 11.00 am TO 1.30pm

CLASS: S.Y.B.Sc. (IT) –SEM III | MARKS: 75

SUBJECT: Applied Mathematics

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

Q.1 Attempt <u>any three</u> from the following. **[15 Marks]**

a) Define the following terms with one example.

(i) Square Matrix (ii) Upper Triangular Matrix

(b) Find the inverse of the following matrix A ,using the adjoint method.

$$A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$$

(c) Examine the consistency of the following system of equations.

$x - y - z = 2$; $x + 2y + z = 2$; $4x - 7y - 5z = 2$

(d) Find the eigen values of the matrix,

$$A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$$

(e) Express in polar form, $z = -1 + i$

(f) Find the principal and general value of $log(2 + 3i)$.

Q.2 Attempt <u>any three</u> from the following. **[15 Marks]**

(a) Solve, $\frac{dy}{dx} = xy + x + y + 1$

(b) Solve, $(x^2 - y^2)dx + 2xy\,dy = 0$

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

(d) Solve $p^2 + p(x + y) + xy = 0$

(e) Find complementary solution of $(D^4 - 4D^3 + 6D^2 - 4D + 1)y = e^x$

(f) Find the complete solution of differential equation, $(D^3 - 3D^2 + 3D^2 - 1)y = \frac{1}{3}$

Q.3 Attempt <u>any three</u> from the following. **[15 Marks]**

(a) Prove that, $L[1] = \frac{1}{s}$

(b) Find Laplace transform of the following functions.

(i) $f(t) = e^{at}$ (ii) $f(t) = sin3t + cos2t$

(c) Prove that, if $L[f(t)] = f(s)$ then $L\left[e^{-at}f(t)\right] = f(s + a)$

(d) Find the Laplace transform of the following differential equation.

$\frac{d^2y}{dx^2} - 3\frac{dy}{dx} = 9$, When $x = 0$, $y = 0$ and $\frac{dy}{dx} = 0$

(e) Find inverse Laplace transform $F(s) = \frac{2s-5}{s^2+s-6}$

(f) Find $L^{-1}[\frac{2(S+1)}{S^2+2S+10}]$

Q.4 Attempt <u>any three</u> from the following. **[15 Marks]**

(a) Evaluate $\int_0^a \int_0^{\sqrt{a^2-x^2}} x^2 y \, dydx$

(b) Change the order of integration and evaluate $\int_0^1 \int_0^x xy \, dxdy$

(c) Evaluate $\int_0^1 \int_0^y xy \, e^{-x^2} \, dx \, dy$

(d) Evaluate $\int_{-1}^{1} dz \int_0^z dz \int_{x-z}^{x+z} (x + y + z) \, dy$

(e) Evaluate $\int_0^1 \int_0^x x(x^2 + y^2) \, dx$

(f) Evaluate $\int_0^{4a} \int_{\frac{y^2}{4a}}^{y} dy \, dx$

Q.5 Attempt <u>any three</u> from the following. **[15 Marks]**

(a) Prove that, $\Gamma(n + 1) = n\Gamma(n)$

(b) Evaluate $\int_0^\infty \sqrt{x} e^{-x^3} \, dx$

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

(d) Find $erf(\infty)$

(e) Prove that, $erf(x) + erf_c(x) = 1$

(f) Find the value of $\Gamma(5)$, $\Gamma(10)$, $\beta(4, 5)$

GES/SBVC/BVL | SEMESTER END/EXAM/ Oct2024

DATE: 15/10/2024 | TIME: 11.00 am TO 1.30 pm

PROGRAM: S.Y.B.Sc. (IT) –SEM III | MARKS: 75

COURSE: Operating Systems

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Q.1 Attempt Any THREE from following: **15 M**

a) What is an Operating System? Explain its objectives and functions?
b) Write a note on Batch Multiprogramming systems.
c) List and describe briefly four of the characteristics of Modern operating system.
d) What are the advantages and Disadvantages of Multicore systems.
e) Write a short note on Process.
f) What is a Fault Tolerance? Explain in detail.

Q.2 Attempt Any THREE from following: **15 M**

a) What is Thread? Explain mapping of threads at the user level and threads at the kernel level.
b) Describe Linux Namespaces.
c) Explain Message Passing.
d) Describe the Principles of Concurrency.
e) Write a note on Semaphores.
f) Describe Synchronization.

Q.3 Attempt Any THREE from following: **15 M**

a) What are the Principles of Deadlock?
b) Explain Dinning Philosopher's Problem.
c) Explain Preemptable and Nonpreemptable Resources.
d) Write a note on Deadlock Detection.
e) Write the requirement for memory virtualization.
f) Write a note on Paging.

Q.4 Attempt Any THREE from following: **15 M**

a) Explain Process Scheduling.
b) Write characteristics of Real Time Operating System.
c) What is Scheduling and explain the types of schedulers.
d) Write a note on Thread Scheduling.
e) Briefly define Round-Robin scheduling.
f) Write a note on Windows Scheduling.

P.T.O.

Q.5 Attempt Any THREE from following: **15 M**

a) Write a note on RAID.
b) Write a note on Operating System Design Issues.
c) What is a File? Give its Characteristics.
d) Write a note on File Management System.
e) Explain types of buffer overflow attacks with examples.
f) Write a note on Windows Security.

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GES/SBVC/BVL

Sem End/EXAM/ OCT 2024

DATE: 11/10/2024

TIME: 11.00 am TO 1.30pm

CLASS: S.Y.B.Sc. [IT] –SEM III

MARKS: 75

SUBJECT: Data Structures.

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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 labeled diagrams** wherever **necessary.**
(6) Use of **Non-programmable** calculators is **allowed.**

Q.1 Attempt ANY THREE from following **15 Marks**

a. What is data structure? Explain classification of it.
b. Explain asymptotic analysis and its notations.
c. Write a short note o0n Abstract data types.
d. Write a short note on: memory representation for 2-D array.
e. What is Sparse Matrix? Explain types of it.
f. What is an array? Explain various operations performed on it.

Q.2 Attempt ANY THREE from following **15 Marks**

a. Distinguish between array and linked list.
b. Explain the applications of circular linked lists.
c. Explain: How to insert a node in a linked list?
d. What is a header linked list?
e. What are the operations performed on the linked list?
f. Explain the types of linked lists with diagrams.

Q.3 Attempt ANY THREE from following **15 Marks**

a. What is stack? Explain operations performed on it.
b. Explain the types of Queue.
c. Explain the applications of stack.
d. Write a short note on : Recursion.
e. Explain the memory representation techniques for stack.
f. Explain advantages and disadvantages of stack.

P.T.O.

Q.4 **Attempt ANY THREE from following** **15 Marks**

a. Sort following array elements by using Radix Sort:
342, 11, 678,4352, 70, 654, 900, 648

b. Sort following array elements by using selection sort:
39, 45, 67, 22, 56, 34, 99, 23

c. What is sorting? Explain classification of it.

d. Distinguish between Linear search and Binary search.

e. Write an algorithm for Merge Sort.

f. Sort following array elements by using Insertion sort:
55, 44, 11, 66, 88, 22, 99, 33, 77

Q.5 **Attempt ANY THREE from following** **15 Marks**

a. What is a tree? Explain methods for tree traversal.

b. What is Hashing? Explain various types of it.

c. What is a graph? Explain applications of it.

d. Explain memory representation of binary trees.

e. Explain following terms:

1. Directed graph
2. Degree of node
3. Outdegree
4. Sibling
5. Weighted graph

f. Explain graph traversal techniques. Write an algorithm for any ONE technique.

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GES/SBVC/BVL

SEMESTER END/EXAM/ Oct2024

DATE: 10/10/2024

TIME: 11.00 am TO 1.30 pm

PROGRAM: S.Y.B.Sc. (IT) –SEM III

MARKS: 75

COURSE: Python Programming

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Q.1 Attempt Any THREE from following: **15 M**

a) What is Python? List and explain the features of python.
b) What is debugging? What are the different types of errors?
c) Explain type conversion of variable in python? Explain with examples.
d) What is the difference between interactive mode and script mode in python?
e) Write a python code to display the sum of cubes of digits of a number.
f) Explain how to terminate the loop or skip the particular condition in python.

Q.2 Attempt Any THREE from following: **15 M**

a) Define function. Write syntax to define function. Give an example of function definition.
b) Write a function that takes a single character and prints a vowel, if it is a vowel and prints 'character is not a vowel otherwise.
c) Explain recursive function. Write a python program to calculate factorial of number using a recursive function.
d) How can string be traversed with a loop? Give a suitable example.
e) Explain string slicing, concatenation and repetition operators with examples.
f) Explain following strings methods

i)upper() ii)lower () iii)isalpha() iv)isdigit() v)find()

Q.3 Attempt Any THREE from following: **15 M**

a) Explain any 5 built in list functions and methods.
b) What will be the output of following by considering Tuple1=(1,2,3) and Tuple2=(1,2,3)
   i) max(Tup1)
   ii) min(Tup2)
   iii) len(TUp1)
   iv) cmp(Tup1,Tup2)
c) Write a Python code that takes two lists and returns True if they have at least one common member.
d) What is a dictionary? Explain how to access, update and delete an element in dictionary
e) What is an exception? List and explain built in exceptions in python.
f) Explain how to open a file in Python? What are the various file modes to open a file in python?

P.T.O.

Q.4 Attempt Any THREE from following: **15 M**

a) What is a regular expression? Explain any 5 regular expression patterns.
b) List and explain built in class attributes with examples.
c) Design a class that stores the information of students and displays the same.
d) Write a program to demonstrate the concept of single inheritance using python.
e) What is multithreaded Programming? Explain _thread module with suitable example.
f) What is a module? What are the ways to import modules? What's its advantages?

Q.5 Attempt Any THREE from following: **15 M**

a) Write Python code to create GUI which accepts user name and display message to greet him. Make use of suitable widgets.
b) Write python code to show !, ?, i, × message boxes in python.
c) What is layout management? Explain pack() manager.
d) Write a source code to show the database connectivity and create a sample database and a table student in that database.
e) Design a simple database application using Python GUI that stores the details of a bank Customer (Cust_id, Cust_name , address, account Type)
f) Write a source code in python to create a login screen.

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GES/SBVC/BVL

Sem End/EXAM/ OCT 2024

DATE: 14/10/2024

TIME: 11.00 am TO 1.30pm

CLASS: S.Y.B.Sc. [IT] –SEM III

MARKS: 75

SUBJECT: Computer networks.

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Q.1 Attempt Any THREE from following: **15 M**

a) What is data communication ? Explain the types of flow in data communication?
b) Difference between LAN, MAN and WAN.
c) Explain the types of computer networks ?
d) Explain Bus Topology and Star Topology in detail.
e) Explain TCP IP Protocol ?
f) Write a short note on:-
   1. NIC 2. Router 3. Repeater 4. Hub 5. Bridge

Q.2 Attempt Any THREE from following: **15 M**

a) Explain the term analog and digital signal.
b) Explain the types of transmission impairment ?
c) Explain the concept of block coding ?
d) Explain CRC ?
e) Write a short note on Bluetooth Architecture ?
f) Write a short note on 3G/4G.

Q.3 Attempt Any THREE from following: **15 M**

a) Find the Network ID and Host ID of the IP address 253.9.1.201?
b) Write a short note on IPv4 packet format ?
c) What is RIP? Explain the RIP timers in detail.
d) Explain Distance vector routing with an example ?
e) Difference between IPv4 and IPv6.
f) What are the types of links in OSPF ? Explain in detail.

Q.4 Attempt Any THREE from following: **15 M**

a) Write a short note on Transport Layer Service ?
b) Explain the various TCP timers ?
c) Explain the concept of port number with respect to networking.
d) Explain the difference between UDP and TCP ?
e) What is UDP ? Explain the UDP packet format ?
f) Explain sliding window protocol.

P.T.O

Q.5 Attempt Any THREE from following: **15 M**

a) Write a short note on WWW ?
b) Explain FTP?
c) What is HTTP? Explain different HTTP Transactions.
d) Explain the commands and responses used in SMTP to transfer messages from client to server ?
e) What is the domain? Explain the categories of domains in detail.
f) Write a short note on telnet ?

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