GES/SBVC/BVL | Sem End/EXAM/ Nov 2023

DATE: 02 /11/2023 | TIME: 11.00 am TO 1.30 pm

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

COURSE: Python Programming

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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 M

a) What is debugging? What are the different types of errors?
b) What is the difference between interactive mode and script mode in python?
c) Explain type conversion of variable in python? Explain with examples.
d) Write a python program to print factorial of a number. Take input from the user.
e) Write a program that asks the user to enter their name and age. Print a message addressed to them that tells the year when they will turn 100 years old.
f) Explain how to terminate the loop or skip the particular condition in python.

Q.2 Attempt Any THREE from following: 15 M

a) Explain following with respect to string
   i) A string is a sequence
   ii) Strings are immutable
b) What is a fruitful function? Explain with the help of an example.
c) Write a function that takes a single character and prints the character as a vowel, if it is a vowel and prints 'character is not a vowel otherwise.
d) Write a short note on incremental development.
e) Explain string slicing, concatenation and repetition operators with examples.
f) Explain recursive function to calculate sum of first n numbers.

Q.3 Attempt Any THREE from following: 15 M

a) What are lists? How to define and access the elements of a list?
b) Explain any 5 built in list functions and methods.
c) Explain try and except blocks for exception handling in Python.
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 Open() and Close() methods of File handling.

P.T.O.

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

a) What is a regular expression? Explain match () function with suitable examples.
b) Explain constructor and destructor functions in python.
c) Design a class that stores the information of students and displays the same.
d) Write a program to demonstrate use of inheritance in Python.
e) What is multithreaded Programming? Explain _thread module with suitable example.
f) What are modules? What are the ways to import modules? What's its advantages?

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

a) Explain Checkbutton Widget with an example.
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) Write a short note on a Cursor object in Python.
f) Write and explain steps to retrieve data from Mysql database with examples.

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GES/SBVC/BVL | Sem End/EXAM/ Nov 2023

DATE: 03 /11/2023 | TIME: 11.00 am TO 1.30 pm

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 with suitable examples.
b) Explain various asymptotic notations available in data structure
c) What is an algorithm? Explain properties of it.
d) What is an array? Explain types of it.
e) What are the various operations performed on data structure?
f) Write a short note on ADT.

Q.2 Attempt ANY THREE from following 15 Marks

a) What is a Linked list? Explain it with a diagram.
b) What are the disadvantages of an array?
c) Write an algorithm to add a node at the start of the linked list.
d) What is a doubly linked list? Explain it with a diagram.
e) Distinguish between arrays and linked lists.
f) Explain circular linked list with diagram.

Q.3 Attempt ANY THREE from following 15 Marks

a) What is stack ? explain the operation performed on it.
b) Write a short note on recursion.
c) Write a short note on a circular queue.
d) Explain the memory representation of the queue.
e) Explain infix, postfix and prefix notation with the help of examples.
f) What is Deque? Explain it with an example.

P.T.O.

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

a) Explain selection sort with any example.
b) Sort the following array elements by using Radix Sort.
998, 3456, 768, 23, 45, 354, 987, 678, 543, 1
c) Explain the properties of Binary trees.
d) What is Heap? Explain types of it.
e) Sort the following array elements by using merge sort.
66, 33, 40, 22, 55, 88, 60, 180, 20, 50, 44, 77, 30
f) What is Merge sort? Explain it with an example.

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

a) What is hashing? Explain it with an example.
b) What is a graph? Explain applications of it.
c) Explain linear probing with an example.
d) Explain dijkstra algorithm-
e) What is open addressing ? Explain types of it.
f) Explain the various types of graphs.

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GES/SBVC/BVL | Sem End/EXAM/ Nov 2023

DATE: 04 /11/2023 | TIME: 11.00 am TO 1.30 pm

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

SUBJECT: Computer Networks

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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: 15M

a) Define data communication . What are the characteristics of data communication? explain.

b) Write a short note on: Repeater, Modem

c) Explain the concept of Addressing in TCP/IP Protocol.

d) What are the responsibilities of the Data link layer in the TCP/IP Protocol model?

e) Write a short note on the evolution of computer networks.

f) Differentiate between LAN,MAN and WAN.

Q.2 Attempt any three: 15M

a) Explain the term Analog and Digital data, with differentiation of Analog vs Digital signal.

b) What are the measures taken to check the performance of the network?

c) Write a short note on CRC .

d) What is cellular telephony? Explain 3G and 4G in detail.

e) Compare LEO,MEO and GEO satellites.

f) Explain the concept of Bluetooth with their types.

P.T.O.

Q.3 **Attempt any three:** 15M

a) State and explain IPV4 addressing. Explain with various classes in classful addresses.

b) Explain ARP Packet format with suitable diagram.

c) What are the different types of links used in OSPF?

d) Explain different types of transition strategies.

e) Explain the importance of ICMPV4 at the network layer.

f) State and explain different types of timer used in RIP.

Q.4 **Attempt any three:** 15M

a) What is UDP and explain UDP Packet format with suitable diagrams.

b) Explain three ways of handshaking mechanism for TCP connection establishment.

c) Explain stop and wait ARQ mechanism in TCP.

d) What are the different types of timers used in TCP ? Explain.

e) With suitable examples explain the sliding window protocol mechanism used in TCP.

f) Compare TCP and UDP with minimum 5 points.

Q.5 **Attempt any three:** 15M

a) Write a short note on : a)WWW b) URL

b) Write a short note on cookies with different examples.

c) Explain the commands and response used in SMTP to transfer messages from the client to server.

d) Explain the concept of DHCP Packet format.

e) Write a short note on FTP connections.

f) Explain MIME headers with suitable diagrams.

GES/SBVC/BVL | Sem End/EXAM/ Nov 2023

DATE: 06 /11/2023 | TIME: 11.00 am TO 1.30pm

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

SUBJECT: Operating Systems

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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: 15M

a) What is an Operating System? Explain with examples.
b) Explain in detail Time-sharing systems.
c) Explain the Role and Responsibilities of the Operating System.
d) List and describe briefly four of the characteristics of the Modern operating system.
e) What are the advantages and Disadvantages of Multicore systems?
f) Write a note on Process.

Q.2 Attempt any three: 15M

a) What is Thread?
b) Explain User-Level and Kernel-Level Thread.
c) Explain Message Passing.
d) Explain Thread Execution.
e) Write a note on semaphores.
f) Describe Synchronization.

Q.3 Attempt any three: 15M

a) What are the Principles of Deadlock?
b) Explain Preemptable and Non Preemptable Resources.
c) Write a note on Deadlock Detection.
d) Explain Dining Philosophers Problem.
e) Write a note on Paging.
f) Write a note on Segmentation.

P.T.O.

Q.4 **Attempt any three:** 15M

a) Explain Process Scheduling.
b) Define the terms: CPU Utilization and Throughput.
c) Briefly define First-Come First-Served (FCFS) Scheduling.
d) Briefly define Round-Robin scheduling.
e) Write a note on Thread Scheduling.
f) Write a note on Windows Scheduling.

Q.5 **Attempt any three:** 15M

a) Explain Single Buffer and Double Buffer.
b) What are the Disk Performance Parameters?
c) Write a note on File Management Systems.
d) Describe key features of NTFS.
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/ Nov 2023

DATE: 07 /11/2023 — 28 NOV 2023

TIME: 11.00 am TO 1.30 pm

CLASS: S.Y.B.Sc. (IT) –SEM III

MARKS: 75

SUBJECT: Applied Mathematics

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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 the following **[15 Marks]**

A) Find the adjoint of given matrix and hence find its inverse if exists.

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

B) Find the rank of matrix by converting into normal form(Canonical form).

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

C) Check the consistency of the system of equations $2x - y + z = 8;\ 3x - y + z = 6;\ 4x - y + 2z = 7;\ -x + y - z = 4.$

D) Determine the value of a and b such that given $3x - 2y + z = b,\quad 5x - 8y + 9z = 3,\quad 2x + y + az = 1$ has 1) No solution 2) Unique Solution 3) Infinite Solution.

E) Find argument and modulus of following complex number

1. $z = (1 + i\sqrt{3})$ 2. $z = (-1 - i\sqrt{3})$

F) Find principal and general value of $z = log(-3)$

Q.2 Attempt any three from the following **[15 Marks]**

A) Solve differential equation $\frac{dy}{dx} = xy + x + y + 1$

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

C) Solve $(D^2 + 3D + 2)\,y = 0.$

D) Find complete solution of $(D^3 - 4D)y = sinh2x.$

E) $Solve\ (px - y\,)(px + y) = 2p$

F) Solve $p^2 + p(x + y) + xy = 0, where\ p = \frac{dy}{dx}$

P. T. O.

Q.3 Attempt any three from the following **[15 Marks]**

A) If $\mathcal{L}\{f(t)\} = f(s)$, then prove that $\mathcal{L}\{e^{-at}f(t)\} = f(s+a)$

B) Find the Laplace transform of following functions

1. $f(t) = \cosh 4t$ 2. $f(t) = \frac{\sin t}{t}$

C) If $f(t) = e^{-3t}\cos 2t$ then find $\mathcal{L}\{f(t)\}$.

D) Find inverse Laplace transform of $\frac{1}{s(s^2+4)}$

E) Find the inverse Laplace transform of following function $L^{-1}[\frac{2(s+1)}{s^2+2s+10}]$

F) Use transform method to solve differential equation, $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} = 9$, when y(0)=y'(0)=0

Q.4 Attempt any three from the following **[15 Marks]**

A) Evaluate $I = \int_0^a \int_0^{\sqrt{a^2-x^2}} x^2 y\,dy\,dx$

B) Change the order of integration by showing the region of integration and evalulate

$I = \int_0^a \int_{\frac{x}{a}}^{\sqrt{x}} (x^2+y^2)dxdy$ and evaluate the same with reversed order of integration.

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

D) Evaluate $I = \int_0^1 \int_0^x x(x^2+y^2)\,dxdy$

E) Evaluate $\iint y dx\,dy$ over the area bounded by $y = x^2, x+y = 2$.

F) Evaluate $I = \int_{-1}^1 dz \int_0^z dx \int_{x-z}^{x+z} (x+y+z)dy$

Q.5 Attempt any three from the following **[15 Marks]**

A) Define Gamma and Beta function.

B) Show that $\Gamma(1) = 1$ and $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$

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

D) Find the value of $\Gamma(5), \Gamma(3), \Gamma\left(\frac{7}{2}\right), \beta\left(4,\frac{3}{2}\right)$ and $\beta(10,3)$

E) Show that, $\Gamma\frac{1}{4} \cdot \Gamma\frac{3}{4} = \pi\sqrt{2}$

F) Evaluate $I = \int_0^\infty \frac{x^4(1+x^5)}{(1+x)^{15}} dx$

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