Anjuman-I-Islam's

AKBAR PEERBHOY COLLEGE OF COMMERCE AND ECONOMICS

PROFESSIONAL SECTION

31/10/2023

(REVISED)

Time Table - S. Y. B. Sc. (I.T.) Semester-III (Regular) Oct-2023

Sr. No.	Date	Day	Name of the Subjects	Time	Duration
1	02-11-2023	Thursday	Data Structures	11:30 am to 02:00 pm	2 ½ Hrs
2	03-11-2023	Friday	Computer Networks	**02:00 pm to 04:30 pm**	2 ½ Hrs
3	06-11-2023	Monday	Applied Mathematics	11:30 am to 02:00 pm	2 ½ Hrs
4	07-11-2023	Tuesday	Python Programming	11:30 am to 02:00 pm	2 ½ Hrs
5	08-11-2023	Wed	Operating System	11:30 am to 02:00 pm	2 ½ Hrs

Time Table - S. Y. B. Sc. (Data Sc) Semester-III (Regular) Oct-2023

Sr. No.	Date	Day	Name of the Subjects	Time	Duration
1	02-11-2023	Thursday	Data Structures & Algorithm using Python	11:30 am to 02:00 pm	2 ½ Hrs
2	03-11-2023	Friday	Economics	**02:00 pm to 04:30 pm**	2 ½ Hrs
3	06-11-2023	Monday	Liner Algebra & Discrete Mathematics	11:30 am to 02:00 pm	2 ½ Hrs
4	07-11-2023	Tuesday	Research Methods & Ethics	11:30 am to 02:00 pm	2 ½ Hrs
5	08-11-2023	Wed	Data Warehousing & Mining	11:30 am to 02:00 pm	2 ½ Hrs

Note:
1) Students without valid I-Card are not allowed to sit for the Semester End Examination.
2) Seating arrangement will be displayed later on notice board.
3) Mobile phones are not allowed in the examination hall.

Prof. Shahid Pervez
Chairman, Exam Comm.
Professional Courses

Prof. (Dr.) Hanif Lakdawala
Asst. Director
Professional Courses

Prof. (Dr.) Shaukat Ali
Principal

Akbar Peerbhoy College of Commerce & Eco.

S. Y. B. Sc. IT SEM I CBGS **75 Marks** **Subject: Data Structures**

Date: _____ **Duration: 02 ½ Hours** **Roll Number: _____**

Note: All questions are compulsory.

Q. 1) Attempt the following. (Any Three) **(15M)**

a) What is data structure? Explain different categories of data structure.

b) List and explain different operations that can be performed on a data structure.

c) Discuss memory representation of one dimensional array.

d) What are the advantages and limitations of an array?

e) Differentiate between linear search and binary search.

f) What is sparse matrix? Explain different ways of representing sparse matrix into memory.

Q. 2) Attempt the following. (Any Three) **(15M)**

a) Explain how memory is allocated and deallocated for linked list.

b) Write and explain an algorithm to insert a new element into sorted linked list.

c) What is the need of two way linked lists? Explain the structure of a node in a two way linked list.

d) Write a short note on header linked list.

e) Explain how to represent a sparse array, using an array and a linked list with an example.

f) What is circular linked list? How to traverse a circular linked list

Q. 3) Attempt the following. (Any Three) **(15M)**

a) Write a short notes on Stack.

b) Convert following infix expression into prefix and postfix expressions

i) a × b × (c - d) – (e ^ 3 × f) + g/h

ii) (a × b × c ^ 2) + d – (c/d + e)

c) What is recursion? What are disadvantages of recursion?

d) Evaluate 5 9 3 + 4 2 * * 7 + *.

e) Define queue. How queue is represented in memory using linked list?

f) Write a short note on double ended priority queue.

Q. 4) Attempt the following. (Any Three) **(15M)**

a) Explain with example the following terms:

i) Degree of a node.

ii) Path.

iii) Internal node.

iv) Similar binary trees.

v) Complete binary tree.

b) Draw the binary tree for the given In-order and Pre-order traversals are:
In-order: g d b h e I a f c
Pre-order: a b d g e h I c f

c) Explain Huffman Algorithms.

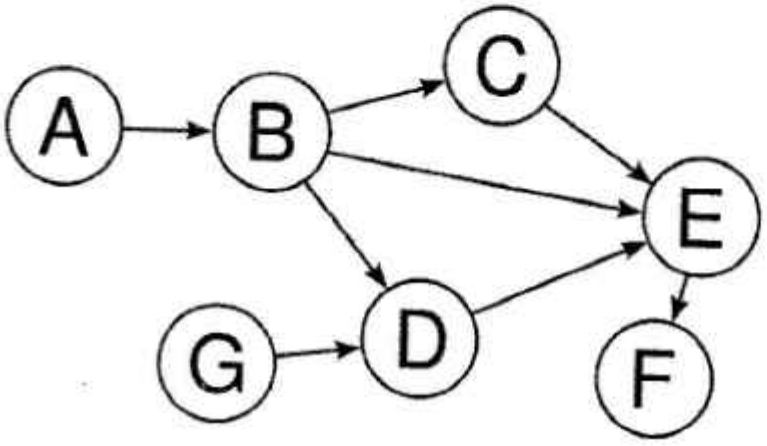
d) Explain Binary Search Tree

e) Write a short note on Heap.

f) Make a binary search tree by inserting the following numbers in sequence
52 36 98 29 123 39 15 56 31 365 278 45 72

Q. 5) Attempt the following. (Any Three) **(15M)**

a) Find the adjacency matrix and list representation of the following graph



b) List graph traversal technique. Write and explain algorithm for any one. Give suitable example.

c) Explain Warshall's algorithm of finding path matrix of graph.

d) Explain the following Terminology
   i. Directed Graph.
   ii. Undirected Graph.
   iii. Weighted Graph
   iv. Multiple Edge Graph.
   v. Complete Graph.

e) List the various application of Graph.

f) Explain the Sequential representation of Graph.

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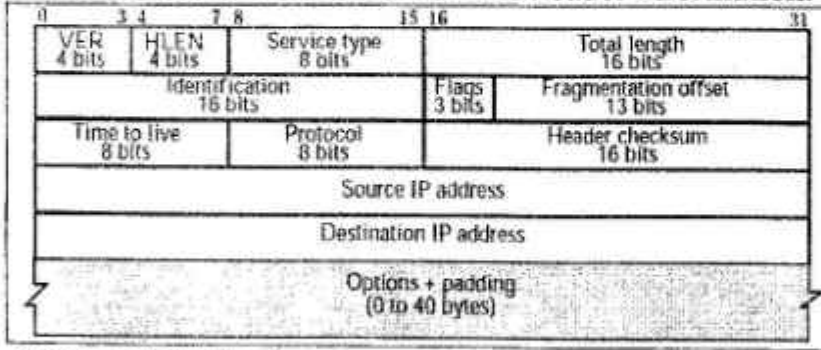
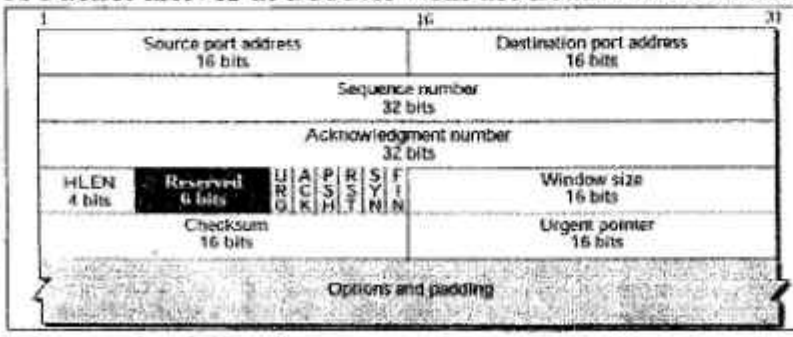
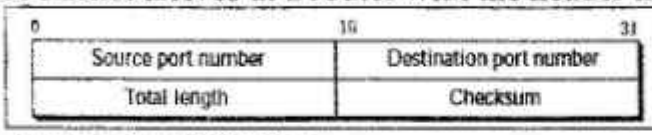
S. Y. B. Sc. IT SEM I CBGS **75 Marks** **Subject: Computer Network**

Date: 03-11-2023 **Duration: 02 ½ Hours** **Roll Number: _____**

Note: All questions are compulsory.

1.	**Attempt *any three* of the following:**	**15**
a.	Write a short note on Evolution of Computer Network.	
b.	Explain the concept of LAN, MAN, WAN w. r. t. Computer Network:	
c.	What is the use of Ethernet card and RJ45 in networking? Explain.	
d.	List the different Network Topologies? Explain any-one.	
e.	Write a short note on OSI model.	
f.	Distinguish between OSI model and TCP/IP Reference Model.	
2.	**Attempt *any three* of the following:**	**15**
a.	Define the following terms: **i.** Composite Signal **ii.** Bandwidth **iii.** Aperiodic Signal **iv.** Frequency **v.** Wavelength	
b.	Signals travel through transmission media, which are not perfect. The imperfection causes signal impairment. List and explain three transmission impairments with its solutions.	
c.	Write a short note on Noisy Channel: Shannon Capacity.	
d.	Write a short note on Multiplexing using suitable example.	
e.	Explain the various unguided media in networks.	
f.	What is the network performance measurement criteria in network? Explain.	
3.	**Attempt *any three* of the following:**	**15**
a.	Solve the following: **i.** Identify the error in the given IP Addresses:156.263.112.225 **ii.** Identify the error 101010101.10011001.11110000.11001100 **iii.** Identify the class of IP address: 223.191.127.239 **iv.** Identify the class of IP address: 00100100.10101010.00001111.10101010 **v.** Find the subnet mask for the following: 10.20.30.40/14	
b.	A Packet arrives at a router with the header information:  4500 0123 506A 0000 4011 8D0F c0A8 0D01 c0A8 0DFF Answer the following **i.** What is the Header Length? **ii.** Are there any options used? **iii.** What is the size of Data?	

	iv. How many more routes the packet can travel? v. Name the protocol to which the data belongs?	
c.	Write a short note on defining subnetwork and address distribution. Support your answer using suitable example.	
d.	List and explain the services provided by network layer.	
e.	What are the three strategies used in transition from IPv4 to IPv6	
f.	Name the two types of ICMP error messages.	
g.	Explain the single byte and multibyte options available in IPv4 protocol.	
4.	**Attempt *any three* of the following:**	**15**
a.	List and explain the services provided by Transport Layer.	
b.	Explain the process of connection establishment using three-way handshaking in TCP.	
c.	A Packet arrives at a router with the header information:  0532 0017 0000 0001 0000 0000 5002 07FF 0000 0000 Answer the following i. What is the destination port number? ii. What is sequence number? iii. Is the packet traveling from Client to server or Server to Client. iv. What is the length of the header? v. What is the type of the segment?	
d.	Write a short note on UDP Services.	
e.	What are the different types of times available in TCP? Explain.	
f.	A Packet arrives at a router with the header information:  0043 2023 000F 07FF Answer the following i. What is the Source port number? ii. What is Name of application layer service using the packet? iii. Is the packet traveling from Client to server or Server to Client. iv. What is the length of the header? v. What is the length of data?	
5.	**Attempt *any three* of the following:**	**15**
a.	Write a short note on Client-Server Paradigm.	
b.	Explain DHCP Operation on same network.	
c.	What is the process of name resolution in DNS. Explain Iterative resolution.	
d.	Write a short note on Generic Domain and Country domain in DNS.	
e.	Write a short note on TELNET.	
f.	Explain the working of FTP.	

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SYB.Sc(IT) 03 Sem Oct/2023

Applied Mathematics

ıpt any three of the following: (5 marks each) **(15)**

ind A^{-1} by adjoint method $A=\begin{bmatrix}2 & -1 & 3\\ 4 & 6 & -2\\ 5 & 1 & 8\end{bmatrix}$

.b) Find Eigen values for the given matrix $A=\begin{bmatrix}8 & -6 & 2\\ -6 & 7 & -4\\ 2 & -4 & 3\end{bmatrix}$

Q.c) Verify Caley Hamilton Theorem for $B=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$

Q.d) Find the modulus and argument of $\frac{(2-3i)(5+3i)}{3-2i}$

Q.e) Find $\sqrt{-5+12i}$

Q.f) Solve the following equation for real values of x , 17 cosh x + 18 sinh x = 1.

Q.2) Attempt any three of the following: (5 marks each) **(15)**

Q.a) Solve $D^5 - 15D^3 + 10D^2 + 60D - 72 = 0$ where $D=\frac{d}{dx}$

Q.b) Solve $x^2\frac{dy}{dx} + x\frac{dy}{dx} = 12 \log x$

Q.c) Solve $\frac{dy}{dx} = e^{x-3y}$

Q.d) Solve $x \cos x \cos y + \sin y \frac{dy}{dx} = 0$

Q.e) Solve $(x - 4xy - 2y^2)dx + (y^2 - 4xy - 2x^2)dy = 0$

Q.f) Solve $\frac{dy}{dx} + x^2y = x^5$

Q.3) Attempt any three of the following: (5 marks each) **(15)**

Q.a) Find the Laplace transform of the function : $L[6t^3 - 3\cos(2t) + 7e^{-2t}]$

Q.b) Find the Laplace transform of the function : $f(t) = te^{2t}\cos 3t$

Q.c) Find the Laplace transform of the function : $f(t) = t, 0 < t < 2$

$= 5 . t > 2$

Q.d) Find the Inverse Laplace transform of the following function :i) $\frac{1}{(s-6)3}$ ii) $\frac{1}{(s2-8s+25)}$

Q.e) Find the Inverse Laplace transform of following function using partial fraction :

$$F(s) = \frac{s+1}{s^2-4}$$

Q.f)Find theInverse Laplace transform of the function :$F(s) = \frac{1}{s^2-s-2}$

Q.4) Attempt any three of the following: (5 marks each) **(15,**

Q.a)Find the area of triangle whose vertices are (0,0) (0,10) (10,0).

Q.b)Evaluate : $\int_0^1 \int_0^2 (e^{x+y}) dx\, dy$

Q.c)Evaluate: $\int_0^1 \int_0^2 \int_0^3 1\, dz\, dy\, dz$

Q.d)Show that : $\int_1^a \int_1^b \frac{1}{xy}\, dy\, dx = (log\ a)(log\ b)$

Q.e)Evaluate : $\int_0^2 \int_0^{x/4} (xy) dx\, dy$

Q.f)Find: $\int_0^1 \int_0^2 \int_0^1 xyz\, dz\, dy\, dx$

Q.5) Attempt any three of the following: (5 marks each) **(15)**

Q.a)Evaluate :β (5.5, 3.5)

Q.b)Evaluate $\sqrt{\frac{9}{2}}$using duplication formula

Q.c)Evaluate :i) $erf_c(x) + erf_x(-x)$ ii) $erf_c(x) + erf(x)$

Q.d)By the means of error function properties :i) erf (0)= ? ii) erf(∞) = ?

iii) erf (x) + erf_c(x) = ? iv) erf(-x) = ?

Q.e)Evaluate $\sqrt{9.5}$

Q.f)Evaluate : $\int_0^1 \frac{1-x^\infty}{\log x}\, dx, \infty \geq 0$

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S. Y. B. Sc. IT SEM III CBGS **75 Marks** **Subject: Python Prog.**

Date: 01-11-2023 **Duration: 02 ½Hours** **Roll Number: _____**

Note: All questions are compulsory.

1.	**Attempt *any three* of the following:**	**15**
a.	Explain the features of Python Programming.	
b.	What is variable? What are the rules & conventions for declaring a variable?	
c.	Explain if-else statement with an example.	
d.	List and explain various data types in Python.	
e.	Write a Python program to calculate area of triangle & circle and print the result. Take input from user.	
f.	Write a Python program to print factorial of a number. Take input from user	
2.	**Attempt *any three* of the following:**	**15**
a.	Define function. Write syntax to define function. Give example of function definition.	
b.	Explain any five basic operations performed on string.	
c.	What is a fruitful function? Explain with the help of an example.	
d.	Discuss the distance between local and global variable.	
e.	Write a python program to check whether a string is palindrome.	
f.	Write a Python program to calculate the factorial of given number using recursive function.	
3.	**Attempt *any three* of the following:**	**15**
a.	What are lists? How to define and access the elements of lists?	
b.	How to create dictionary in Python? Give example.	
c.	Write a program to input any two tuples and interchange the tuple values.	
d.	Explain the directory method in python.	
e.	Explain different modes of opening file.	
f.	Write a Python program to accept an integer number and use try/except to catch the exception if a floating point number is entered.	
4.	**Attempt *any three* of the following:**	**15**
a.	What is regular expression? What are the different types of regular expression?	
b.	Explain the math module with its any five functions.	
c.	List and explain built-in class attributes with example.	
d.	How to import a module? Explain time module.	
e.	Design a class that store the information of student and display the same.	
f.	Create a module "Area.py" with functions area_circle(), area_triangle() and area_rect(). Create a new file. Use area_circle(), area_triangle() and area_rect() from the Area module to calculate the areas.	
5.	**Attempt *any three* of the following:**	**15**
a.	Explain the layout manager in detail.	
b.	What is the use of Entry Widget? Explain any five properties of Entry Widget.	
c.	Explain the standard attribute "Font" along with its options.	
d.	What are the different functions to retrieve rows from a table? Explain with a suitable example.	
e.	Explain Checkbutton widget with example.	
f.	Write short note tkMessageBox module.	

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S. Y. B. Sc. IT SEM III CBGS **75 Marks**

Subject: Operating System

Date: _____ **Duration: 02 ½ Hours** **Roll Number:** _____

Note: All questions are compulsory.

1.	**Attempt *any three* of the following:**	**15**
a.	Define Operating System? Explain functions of Operating System?	
b.	Explain Time Sharing Operating System?	
c.	Difference between hardware and software?	
d.	Explain Attributes of Process?	
e.	Explain types of schedulers?	
f.	Explain Process states in detail?	
2.	**Attempt *any three* of the following:**	**15**
a.	Write short notes on user level threads?	
b.	Difference between Process and Threads	
c.	Write short notes on microkernel operating system?	
d.	Define System call? Why do you need system call in os?	
e.	Write functions of kernel?	
f.	Write short notes on priority scheduling?	
3.	**Attempt *any three* of the following:**	**15**
a.	Write short notes on multiple partitioning?	
b.	Explain paging in detail?	
c.	Define deadlock? Explain deadlock prevention in detail?	
d.	Write short notes on contiguous memory management?	
e.	Explain segmentation in detail?	
f.	Explain Fragmentation in detail?	
4.	**Attempt *any three* of the following:**	**15**
a.	Define scheduling? Explain longterm scheduling in detail?	
b.	Write short notes on Direct memory access?	
c.	Explain Round Robin Scheduling in detail?	
d.	Write short notes on medium term scheduler?	
e.	Explain Process scheduling?	
f.	Write short notes on short term scheduler	
5.	**Attempt *any three* of the following:**	**15**
a.	Explain the layers of I/O management?	
b.	Write short notes on Device Controller	
c.	Explain kernel I/O Subsystem	
d.	Write short notes on RAID	
e.	Explain single level directory	
f.	Explain Indexed Allocation in detail	