ATKT Exam, Sem - III
SYIT - March - 2024

SYIT
ATKT Exam
Sem III
March 2024

[illegible] College Chapter
ATKT Exam March 2024
SY (IT) | Sem III
Sub Python Prog.

SYBSC IT
2/3/24

Duration: $2^{1/2}$hrs Max. Marks: 75

N.B. 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume the necessary data.

Q.1. Attempt any THREE of the following:

a) Which statements are used as loop controlling statements? Explain any one of them. (5)
b) How to declare variables in python? Explain with an example. (5)
c) Define operator. Explain membership operator in detail. (5)
d) Describe the use of range() in python. (5)
e) Write a short note on python indentation. (5)
f) What is debugging? State and explain three basic types of error. (5)

Q.2. Attempt any THREE of the following:

a) What is function? How do you call the function? Explain with an example. (5)
b) Explain incremental development in python. (5)
c) List and explain python string methods. (5)
d) How do you traverse over the string using for loop? (5)
e) Write two approaches to use import statement in python. (5)
f) Write a short note on flow of execution. (5)

Q.3. Attempt any THREE of the following:

a) Is it possible to update a type tuple? Give an example. (5)
b) Which operations are performed with a list? Explain with an example. (5)
c) What is python dictionary? Explain the two properties of dictionary key. (5)
d) Write any one of the following file handling method: (5)
1. f. readline() 2. f. tell()
e) How do you rename and delete the file? Give an example. (5)
f) State standard built in exceptions in python. (5)

Q.4. Attempt any THREE of the following:

a) How do you create a constructor in python class? Explain in detail. (5)
b) Describe the terminology of Object Oriented Programming. (5)
c) Explain the concept of multiple inheritance with an example. (5)
d) What is REgex? Write any two metacharacters with an example. (5)
e) Write a short note on _thread module. (5)
f) How do you create and import module by yourself? Give an example. (5)

Q.5. Attempt any THREE of the following:

a) What is tkinter? How do you create main window using tkinter? (5)
b) Describe any one of the following with python code: (5)
1. spinbox 2. entry
c) Describe cursor as a standard attribute of widget. (5)
d) How the look of GUI can be enhanced by changing default icon of parent window? (5)
e) What is layout management? Explain pack () layout manager. (5)
f) Write a program to configure the widget canvas. (5)

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AKI Exam March 2024
Sem III
SY I.T.

SYOBSC I.T
4/3/24

Sub. Data structures

Duration: 2.30 Hrs. **Max. Marks: 75**

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Instructions: (1) All questions are compulsory.
(2) Numbers to the right indicate marks.

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Q.1) **Attempt any three of the following:** 15

A) List and explain different types of data structure?
B) What is sparse array? Explain it with example.
C) List and explain the different ways for merging of arrays.
D) What is time and space complexity? Explain Big Theta Notation with example.
E) Explain deletion operation for array.
F) List out the advantages and limitations of arrays.

Q.2) **Attempt any three of the following:** 15

A) With a diagram explain Doubly linked list.
B) Explain the deletion of a node at last of Circular linked list.
C) With a diagram explain singly linked list.
D) Write a note on Header linked list.
E) With a diagram explain the searching for a value operation in the linked list.
F) Explain merging operation of two linked list.

Q.3) **Attempt any three of the following:** 15

A) Write a note on memory representation of a Stack.
B) Write a note on a Circular Queue.
C) List out the applications of Queue and Priority Queue.
D) Explain Linked List representation of Queue.
E) With an example explain whether the parentheses are correctly matched or not.
F) List and explain the operations performed on a Stack.

Q.4) **Attempt any three of the following:** 15

A) With an example explain Bubble Sort.
B) Write a note on Huffman Algorithm.
C) What is searching? Explain Binary search method.
D) Explain the Postorder traversal operation performed by a Binary Tree.
E) Explain searching operation perform by binary Search Tree.
F) Write a note on Tree Structure.

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

A) Write a note on Hash Function.
B) List and explain the common hash functions.
C) Explain the separate chaining collision resolution techniques of hashing.
D) Write a note on Bucket Hashing.
E) Consider the sequence 10, 20, 30, 40, 50. Solve it using linear probing for the given table size 10.
F) Explain efficiency analysis for hashing.

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AYPT Exam March 2024 Sem III
SY (IT)
Sub: Comp. Networks

SYBSCIT
5/3/24

Duration: $2^{1/2}$hrs **Max.Marks: 75**

N.B. 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3)Assume the necessary data.

Q.1. Attempt any THREE of the following:

a) Explain services provided by Internet. (5)
b) What are design issues of layers? (5)
c) Write a short note on types of channel. (5)
d) List the standard organizations in the world. (5)
e) Write a short note on signal. (5)
f) Explain hybrid model with diagram. (5)

Q.2. Attempt any THREE of the following:

a) Explain Time Division Multiplexing technique. (5)
b) Describe service primitives in tabular format. (5)
c) 4 channels are to be multiplexed using TDM. The rate of each channel is 160 byte/sec. In TDM 1byte/channel is to be multiplexed calculate:- (5)
   I) Frame size
   II) Frame duration
   III) Frame rate
   IV) Bit rate of TDM signal
d) Write a short note on Twisted pair cable. (5)
e) Explain the concept of radio wave transmission. (5)
f) Differentiate between FDM and TDM. (5)

Q.3. Attempt any THREE of the following:

a) Explain the concept of circuit switching. (5)
b) Write a short note on GEO. (5)
c) Differentiate between message switching, circuit switching and packet switching. (5)
d) Write a short note on wireless LAN. (5)
e) Explain the concept of error control mechanism in layer. (5)
f) Write a short note on types of errors. (5)

Q.4. Attempt any THREE of the following:

a) Explain the concept of virtual circuit subnet. (5)
b) Write a short note on structure of IP frame header. (5)
c) Explain the concept of delivery in network layer. (5)
d) What are the advantages of IPv4? (5)
e) List the duties of network layer. (5)
f) Write a short note on IPv6. (5)

Q.5. Attempt any THREE of the following:

a) Differentiate between UDP and TCP. (5)
b) Write a short note on duties of transport layer. (5)
c) Explain the process of assigning IP address. (5)
d) Draw the FDM system to combine 5 voice channels.each voice channel occupies a bandwidth of 3 KHz. The common voice channel bandwidth has 15 KHz ranging from 301 KHz to 315 KHz. (5)
e) Write a short note on routing algorithm. (5)
f) Explain the forwarding techniques. (5)

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(2½ Hours) Total Marks: 75

N.B.: (1) All questions are compulsory.
(2) Numbers to the right indicate marks.
(3) Draw neat labeled diagrams wherever necessary.

Q.1 **Attempt any three of the following:** (15)

A] With a plot of tasks explain the multiprogramming system.
B] List and explain the three basic measures related to fault tolerance.
C] Write a note on time sharing system.
D] With a diagram explain process state.
E] Define operating system with Its objectives.
F] With a diagram explain microkernel architecture.

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

A] What are the requirements for mutual exclusion?
B] Explain producer/consumer problem for critical section.
C] With an example explain semaphore.
D] What design and management issues are raised by the existence of concurrency?
E] Explain three control problems must be faced by competing processes.
F] With a diagram explain user level and kernel level threads.

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

A] Define deadlock. How can operating system avoid deadlock?
B] Write the steps for page faults trap.
C] Explain protection requirement for memory management.
D] What is virtual memory? State its advantages.
E] Consider below string and calculate the total page faults using least recently used (LRU) algorithm.
7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1
F] List and explain two general categories of resources that can be distinguished.

Q.4 **Attempt any three of the following:** (15)

A] List and explain scheduling criteria.
B] Using First Come First Serve algorithm (FCFS) draw the Gantt chart for below table and calculate,
1) Average turnaround time
2) Average waiting time

Process	Burst Time	Arrival Time
P1	5	0
P2	2	0
P3	3	0

C] With a diagram explain paging memory management.
D] Write a note on Multiprocessor Scheduling.
E] List and explain the characteristics of Real-Time operating system.
F] What is scheduling? Explain different types of processor scheduling.

P.T.O.

Q.5 **Attempt <u>any three</u> of the following:** (15)

A] Write a note on I/O devices.

B] Explain contiguous file allocation method.

C] Write the objectives of file management system.

D] Write a note on directory structure.

E] List and explain the operations on file or file system.

F] Write a note on Redundant Array of Independent Disk (RAID).

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Time: 2.30 Hrs. Full Marks: 75

Instructions:
(1) All questions are compulsory
(2) Numbers to the right indicate full marks.

Q.1) **Attempt any three of the following** (15)

a) Solve the system of linear equations
$x + y + z = 3$; $2x - y + 3z = 1$; $4x + y + 5z = 2$; $3x + 2y + z = 4$

b) Show that $(1+i)^{12} + (1-i)^{12} = -128$

c) Express in polar form $1-\sqrt{3}\,i$

d) Verify cayley - Hamilton Theorem for the matrix $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

e) Using euler's formula prove that : $\sin^2\theta+\cos^2\theta=1$

f) If $z_1=1-2i$ and $z_2=1-i$ find i) $|z_1.z_2|$ ii) $|z_1+z_2|$

Q.2) **Attempt any three of the following** (15)

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

b) Find the value of p in the equation $(p-2x)(p-y)=0$.

c) Find the value of x in the equation $xp^3-12p-8=0$.

d) Solve $(\frac{d^3y}{dx^3}) - 3(\frac{d^2y}{dx^2}) + 3(\frac{dy}{dx}) - y=e^x + x\,e^x$

e) Solve $\frac{d^2y}{dx^2} = \frac{36}{y^2}$ given that when $x=0$ $\frac{dy}{dx} = 0, y=8$

f) Find the value of p in the equation $y= 2px+p^4x^2$.

Q.3) **Attempt any three of the following** (15)

a) Find the Laplace transform of $\int_0^t \frac{(\sin t)}{t}\,dt$

b) Find inverse Laplace transform by using convolution theorem $\frac{1}{s^3(s^2+1)}$

c) Find Laplace transform of $\int_0^\infty \frac{e^{-at}-e^{-bt}}{t}\,dt$

d) Find Laplace transform of following differential equation
$y'' + 4y = \sin 3t$; $y(0)=y'(0)=0$

e) Find L(y(t)) of the differential equation $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = te^{-t}$; $y(0) = 1$ *and* $y'(0) = 2$

f) Find L(y(t)) of the following differential equation

$$\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + 5y = e^{-t}\sin t. \textit{Given } y(0)1 \textit{ and } y'(0) = 1$$

Q.4) **Attempt <u>any three</u> of the following** (15)

a) Change the order of integration and evaluate $\int_0^a \int_{x/a}^{\sqrt{x/a}} (x^2 + y^2)dxdy$

b) Evaluate $\int_0^{\sqrt{2}} \int_0^{3y} \int_{x^2+3y^2}^{8-x^2-y^2} dzdxdy$

c) Evaluate $\int_0^1 \int_0^{\sqrt{1-y^2}} \cos(x^2 + y^2)dxdy$

d) $\iint dA$ where S is the annulus between the circles $x^2+y^2=4$ and $x^2+y^2=16$

e) Evaluate I= $\int_0^2 \int_0^x \int_0^{2x+2y} e^{x+y+z}.dxdydz$

f) Evaluate $\int_{-1}^0 \int_{\sqrt{-1-x^2}}^{\sqrt{1-x^2}} xdydx$

Q.5) **Attempt <u>any three</u> of the following** (15)

a) Evaluate $\int_0^\infty 5^{-4x^2} dx$

b) Find $\int_0^\infty \frac{x^a}{a^x} dx$

c) Simplify $\int_0^\infty e^{-ax} x^{n-1} dx$

d) Solve $\int_0^\infty x^2.e^{-h^2x^2} dx$

e) Evaluate $\int_0^{\frac{1}{2}} x^3\sqrt{1-4x^2}\, dx$

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

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