Total No. of Questions : 5]

SEAT No. :

PB1969

[Total No. of Pages : 2

[6242]-301

S.Y.B.Sc. (Cyber and Digital Science)

CDS-231 : BASICS OF ETHICAL HACKING

(2020 Pattern) (Semester - III)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw diagrams wherever necessary.***

Q1) Attempt any Ten of the following : **[10 × 1 = 10]**

a) Define ethical hacking.
b) What is key logger?
c) State any two tools used in hacking.
d) What is CIA triad?
e) Enlist the common ports used in ethical hacking.
f) What is privilege escalation? Explain in brief.
g) What is physical addressing?
h) What is a buffer overflow attack?
i) What is private address and public address?
j) What is evil twining?
k) Explain what is SQL injection?
l) State True or False and Justify - WEP protocol is sure crackable.

Q2) Attempt any Five of the following: **[5 × 2 = 10]**

a) What is reconnaissance?state the types of reconnaissance?
b) Illustrate enumeration in brief.
c) Define network sniffing and enlist its tools
d) Write difference between phishing and vishing.
e) What is OSINT? Explain active vs passive OSINT.
f) Define the terms
    i) Adware
    ii) Backdoor

P.T.O.

Q3) Answer any Four of the following : **[4 × 5 = 20]**

a) What are the types of hacking explain advantages of ethical hacking?

b) Explain intelligence cycle

c) What is web application? Explain flow of web application.

d) Write a short note on nmap tool.

e) Explain OSI Model.

Q4) Answer any Four of the following: **[4 × 5 = 20]**

a) Explain CIA Triad indetail.

b) What is the difference between a white hat hacker and a black hat hacker?

c) Explain manual exploitation in brief.

d) Explain social engineering attack with its types.

e) Write a short note on OWASP.

Q5) Answer any One of the following : **[1 × 10 = 10]**

a) Explain metasploit framework. **[5]**

b) Explain 802.11 protocol. **[3]**

c) Define network sniffing. **[2]**

OR

a) Explain TCP/IP Model. Explain TCP communication with 3-way handshaking. **[5]**

b) Write a short note on social engineering. **[3]**

c) Which are the types of password attacks. **[2]**

Total No. of Questions : 5]

SEAT No. :

PB-1970

[Total No. of Pages : 2

[6242]-302

S.Y.B.Sc.

(Cyber & Digital Science)

CDS - 232 : DATABASE MANAGEMENT SYSTEMS

(2020 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data if necessary.***

Q1) **Attempt any ten of the following :** **[10 × 1 = 10]**

a) Enlist types of independence.
b) What is a file?
c) Enlist users of DBMS.
d) Define a strong entity.
e) Write the term tupic with an example.
f) What is Data Model?
g) What is schedule?
h) Define schema
i) What is an attribute?
j) Draw & write names of any two notations of ER model.
k) Define data mining.
l) Define deadlock.

Q2) **Attempt any five of the following :** **[5 × 2 = 10]**

a) Give any four responsibilities of DBA.
b) Write a short note on an object oriented databases.
c) What is 1NF & 2NF.
d) Write the difference between serial & non serializable schedule.
e) Draw a neat label state transition diagram of transaction.
f) Write any two needs of concurrency control.

P.T.O.

Q3) **Attempt any four of the following :** **[4 × 5 = 20]**

a) Explain the structure of DBMS with a neat label diagram.

b) Explain the concept of decomposition with example.

c) What is transaction? Explain properties of transaction.

d) Consider R (A,B,C,D,G,H,I) and set of FD defined on R as F = {A→ B, A → C, CG → I, B → H} compute closure of F i.e. Ft.

e) What is relationship? Explain its types with examples.

Q4) **Attempt any four of the following :** **[4 × 5 = 20]**

a) Define functional dependency with the help of an example.

b) What is locking? Explain the two - phase locking protocol.

c) Explain the time - stamp protocol with an example.

d) Explain different anomalies related to normalization.

e) Write a short note on Domains, Entity, Tuples, Relations, Select operation.

Q5) **Attempt any one of the following :** **[1 × 10 = 10]**

a) i) In a nursery the plants are sold to customers. These plants are flowering & non flowing nutrients are given to the plants in some quantity. Nutrients include pesticides, watering and manure. Design E-R diagram. **[5]**

ii) Write a short note on XML. **[3]**

iii) Write the advantages and disadvantages of normalization. **[2]**

OR

b) i) Savitribai phule Pune Institute offers a choice - based credit system to all P.G. courses. For P.G. Science courses students have to complete 100 credits to get their certificate. These courses have semester two, three, four etc. Each semester has a set of subjects. The subject may be core (Compulsory) or elective (optional) Design E-R diagram. **[5]**

ii) Discuss the lost update problem. **[3]**

iii) Write any two purposes of distributed databases. **[2]**

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Total No. of Questions : 5]

SEAT No. :

PB1971

[Total No. of Pages : 2

[6242]-303
S.Y.B.Sc. (Cyber & Digital Science)
CDS-233 : DATA STRUCTURES USING PYTHON
(2020 Pattern) (Semester-III)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data if necessary.***

Q1) Attempt any Eight of the following. **[8×2=16]**

a) What is space complexity? How to measure it?

b) What is strict binary tree?

c) What is use of asymptotic notations?

d) What is best, worst case of an algorithm?

e) What are different types of data structure?

f) What are the applications of stack?

g) What is polynomial?

h) What is efficiency of bubble sort technique?

i) What is double ended queue?

j) What is leaf node?

Q2) Attempt any FOUR of the following. **[4×4=16]**

a) Explain linear search method with an example.

b) What is Graph? Explain Adjacency Matrix technique in details.

c) Convert given infix expression to prefix expression:

i) (A + B) * C/D – E

ii) 4 + 6/3 * 1 - 2

d) Sort the following data by using Quick sort technique:

105, 31, 55, 98, 15, 201, 33, 82.

e) Explain recursive tree traversing techniques with an example.

P.T.O.

Q3) Attempt any Four of the following. **[4×4=16]**

a) Write a function to add a node at the end of singly linked list.

b) Write a function to delete a given position's node from circular singly linked list.

c) Write a python program to check whether given string is palindrome or not by using stack.

d) Write a python program for the implementation of insertion sort technique.

e) Write a python program to create and display doubly linked list.

Q4) Attempt any Four of the following. **[4×4=16]**

a) Explain DFS with an example.

b) Construct AVL tree for the following data:

45, 67, 12, 32, 24, 199, 95, 90, 10.

c) Explain the Heap sort with an example.

d) Write a python program to search a given element in the list by using binary search technique.

e) Write a function to delete first node from doubly linked list.

Q5) Attempt any Two of the following. **[2×3=6]**

a) Write a python program for the implementation of priority queue.

b) Write a function to search given node in singly linked list.

c) Explain kruskals algorithm for minimal spanning tree with an example.



Total No. of Questions : 5]

SEAT No. : ____

PB1972

[Total No. of Pages : 3

[6242]-401

S.Y. B.Sc. (Cyber and Digital Science)

CDS-241 : PRINCIPLES OF OPERATING SYSTEMS

(2020 Pattern) (Semester - IV) (24101)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw diagrams wherever necessary.***

Q1) Attempt any Ten of the following : **[10 × 1 = 10]**

a) What is Operating System?

b) What is a Cooperating Process?

c) What do you mean by Deadlock ‘?

d) What is the use of Monitors.

e) Define System Program.

f) Define Process.

g) Define Safe Sequence.

h) What do you mean by contiguous file allocation?

i) List various operations on file.

j) What is fragmentation.

k) What is Belady’s Ana moly’?

l) List the strategies used for deadlock prevention.

Q2) Attempt any Five of the following. **[5 × 2 = 10]**

a) Write a short note on System Calls.

b) Explain Readers /Writers Problem.

c) What are the necessary conditions for occurrence of deadlock.

d) Explain Free Space Management Techniques.

e) Explain the concept of Segmentation.

f) Explain round robin scheduling algorithm with example.

P.T.O.

Q3) Answer any Four of the following : **[4 × 5 = 20]**

a) Consider the system with 5 process = {P0,P1,P2,P3,P4} and four resource type {A,B,C,D}. There are three instances of type A, 14 instances of type C and 12 instances of type D.

The allocation of Maximum demand matrix are as follows

	Allocation			
	A	B	C	D
P0	0	6	3	2
P1	0	0	1	2
P2	1	0	0	0
P3	1	3	5	4
P4	0	0	1	4

	Max			
	A	B	C	D
P0	0	6	5	2
P1	0	0	1	2
P2	1	7	5	0
P3	2	3	5	6
P4	0	6	5	6

Answer the following questions using Bankers Algorithm

i) 1s the system in a safe state '?

ii) If a request from process P4 arrives for (0,0,4,1) can be the request be immediately granted ?

b) What are the criteria's for good CPU Scheduling?

c) Explain various File allocation Methods.

d) What are Semaphores. Explain with example.

e) Differentiate between Starvation & Deadlock

Q4) Answer any Four of the following : **[4 × 5 = 20]**

a) Explain the concept of use Monitors.

b) Explain Time Sharing Operating System.

c) Write a short note on Services of Operating System.

d) Explain Logical Versus Physical Addresses.

e) Explain Demand Paging.

Q5) Answer any One of the following. **[1 × 10 = 10]**

a) Consider the following reference string : 4,3,2,1,4,3,5,4,3,2,1,5

The number of frames are 3 , Show page trace and calculate page faults for the following page replacement schemes. **[5]**

i) FIFO

ii) MFU

b) What do you mean by Virtual Memory/Overlays. **[3]**

c) What do you mean by Pre-emptive and Non-Pre-emptive Process. **[2]**

OR

a) Calculate Average Turn Around Time and average waiting time for all set of processes using FCFS. **[5]**

Process	Burst Time	Arrival Time
P1	5	1
P2	6	0
P3	2	2
P4	4	0

b) Explain Process State Diagram. **[3]**

c) What do you mean by Context Switch? **[2]**



Total No. of Questions : 5]

SEAT No. : ____

PB-1973

[Total No. of Pages : 2

[6242]-402
S.Y. B.Sc.
CYBER AND DIGITAL SCIENCE
CDS - 242 : Web and Mobile Application
(2020 Pattern) (Semester - IV) (24103)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***All questions are compulsary.***
2) ***Figures to the right indicate full marks.***

Q1) **Attempt any EIGHT of the following (out of TEN)** **[8 × 2 = 16]**

a) What is Web Server? Write any two advantages of Web Server.

b) Define Image tag with an example.

c) What is CSS? List different types of CSS.

d) Describe <font> tag with Attribute.

e) Define data types in JavaScript.

f) List any four events of JavaScript.

g) What is regular expression.

h) List different types of String in PHP.

i) List different Popup boxes in JavaScript?

j) What is Cryptography?

Q2) **Attempt any FOUR of the following (out of FIVE)** **[4 × 4 = 16]**

a) What are the common lists that can be used when designing a page? Explain.

b) How does a hyperlink apply to text? Explain with example.

c) Write a syntax of CSS? List the properties of CSS backgrounds.

d) What is Operator? List the various operators in JavaScript.

e) Explain any four String functions of JavaScript.

P.T.O

Q3) **Attempt any FOUR of the following (out of FIVE)** **[4 × 4 = 16]**

a) What is PHP? Explain its advantages.

b) What is the different printing function in PHP? Explain.

c) Explain any 5 properties of Button class of Android.

d) What is Encryption of the text? Explain with example.

e) Write a PHP program to find the factorial of any number.

Q4) **Attempt any FOUR of the following (out of FIVE)** **[4 × 4 = 16]**

a) What is Layout? Explain and list different types of Layout in Android.

b) Explain Activity Life Cycle of Kotlin.

c) Explain different steps to create new Project in Android.

d) List and explain the Control structures used in PHP.

e) Explain Mobile Architecture.

Q5) **Write a short notes on any TWO of the following (out of THREE).** **[2 × 3 = 6]**

a) Dialog.

b) ToggleButton with any 2 Properties.

c) Security with HTTPS.



Total No. of Questions : 5]

SEAT No. :

PB1974

[Total No. of Pages : 2

[6242]-403

S.Y.B.Sc. (Cyber and Digital Science)

CDS-243 : NETWORK SECURITY AND CRYPTOGRAPHY

(2020 Pattern) (Semester-IV) (24105)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw diagrams whrever necessary.***

Q1) Attempt any Ten of the following. **[10×1=10]**

a) What is steganography?

b) What is WAP?

c) How many types of security Attacks?

d) Define cipher text.

e) Explain any two application of IP Security.

f) What is the size of key used in DES?

g) What is Cryptanalysis?

h) List Asymmetric key algorithms.

i) What is hash function?

j) What is Rotor Machines?

k) Define Digital Signature.

1) Justify True/False: Passive attacks are difficult to detect.

Q2) Attempt any Five of the following. **[5×2=10]**

a) What is a use of initialization vector (IV) in CBC mode?

b) What is authentication? List the different types of authentication.

c) What is Brute-Force Attack?

d) What would be the transformation of a message using Rail Fence technique “Cyber and Digital Science”.

e) What is the use of digital certificate?

f) Which are the applications of Internet Protocol Security?

P.T.O.

Q3) Attempt any Four of the following. **[4×5=20]**

a) Explain detail Network Security Model.

b) Explain working of time stamping protocol (TSP).

c) Write a short note on private key management.

d) Explain Knapsack Encryption with suitable example.

e) Convert "CAT" using Hill Cipher with the key matrix. Convert the cipher text back to plaintext.

$$\begin{bmatrix} 2 \\ 0 \\ 19 \end{bmatrix}$$

Q4) Attempt any Four of the following. **[4×5=20]**

a) Explain RSA encryption process with example.

b) Explain Cipher Block Chaining (CBC) mode of an algorithm.

c) Apply playfair cipher on plain text "My college"& use keyword as "systems".

d) A and B want to establish a secret key using Diffie Hellman Key exchange protocol assuming the values as N = 7, g = 17, X = 13, y = 9. Find out the values of Al B1 K1 and K2.

e) Write a short note on IDEA Algorithm.

Q5) Attempt any One of the following. **[1×10=10]**

a) i) Write a short note on Principles of Security. **[5]**

ii) Explain the working of 3-D secure protocol. **[3]**

iii) What is encryption and decryption? **[2]**

OR

b) i) Explain Secure Hash Algorithm algorithm. **[5]**

ii) What is ElGamal encryption algorithm? **[3]**

iii) Explain Symmetric Cipher Model. **[2]**

