

Total No. of Questions : 4]

SEAT No. :

P5149

[Total No. of Pages : 2

[5823]-501

T.Y. B.Sc.

COMPUTER SCIENCE

CS - 351 : Operating Systems - I

(2019 Pattern) (CBCS) (New) (Semester - V) (Paper - I)

Time : 2 Hours]

[Max. Marks : 35

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 × 1 = 8]

- a) Define bootstrapping.
- b) Explain posix pthread.
- c) What is role of dispatcher?
- d) List the solutions to critical section problem.
- e) What do you mean by page hit?
- f) What is kernel?
- g) What is ready queue?
- h) What do you mean by I/O bound process?
- i) What are the two types of semaphores?
- j) What is virtual memory?

Q2) Attempt any Four of the following.

[4 × 2 = 8]

- a) What is system call? Explain system call related to device manipulation.
- b) Write short note on multilevel queue scheduling.
- c) Explain producer, consumer problem.
- d) Explain paging in brief.
- e) Write difference between preemptive and non preemptive scheduling?.

P.T.O.

**Q3)** Attempt any Two of the following. **[2 × 4 = 8]**

- a) What is thread? Explain any 2 multithreading models in brief with diagram.
- b) Write short note on logical address and physical address binding with diagram.
- c) Consider following set of processes with the length of CPU burst time and arrival time given in milliseconds. Calculate waiting time, turnaround time per each process. Also calculate the average waiting time and average turn around time using preemptive priority scheduling.

Process	Burst time	Arrival time	Priority
P <sub>1</sub>	14	4	3
P <sub>2</sub>	5	2	1
P <sub>3</sub>	6	9	2
P <sub>4</sub>	5	5	3
P <sub>5</sub>	9	0	4

**Q4)** Attempt any Two of the following. **[2 × 4 = 8]**

- a) Define process. Explain process state diagram in brief.
- b) Explain reader-writer problem in brief.
- c) Consider a reference string 3,2,1,0,3,2,4,3,2,1,0,4 No. of frames = 3. Find out the number of page faults using i) LRU ii) OPT.

**Q5)** Attempt any One of the following. **[1 × 3 = 3]**

- a) Explain layered operating system in brief with diagram.
- b) Explain first fit, best fit, worst fit, next fit algorithm.



Total No. of Questions : 5]

SEAT No. :

**P5150**

[Total No. of Pages : 2

**[5823]-502**

**T.Y. B.Sc. (Computer Science)**

**CS - 352 : COMPUTER NETWORKS - II**

**(2019 Pattern) (Credit) (Semester - V)**

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates:*

- 1) *All Questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

**Q1) Attempt any Eight of the following (out of Ten)**

**[8 × 1 = 8]**

- a) SMTP is a push protocol. State true or false, Justify.
- b) Write two types of connections used by FTP. Also write their port numbers.
- c) What is sampling?
- d) What is used of "BYE" message in SIP (Session Initiation Protocol)?
- e) What is VPN (Virtual Private Network)?
- f) What is multicasting?
- g) Write advantages of packet filter firewall.
- h) Define cryptography.
- i) Encrypt the following plain text with given key using substitution cipher.  
Plain text: India is my county, Key = 4.
- j) List methods for verifying the authenticity of the claimant.

**Q2) Attempt any Four of the following (out of Five)**

**[4 × 2 = 8]**

- a) Which are traditional ciphers? Write working of shift cipher.
- b) List types of server. Write short note on any one type.
- c) Write advantage or POP.
- d) What is streaming live audio/video?
- e) Write note on IPSec modes.

**P.T.O.**

**Q3) Attempt any Two of the following (out of Three) [2 × 4 = 8]**

- a) Explain PGP certificates.
- b) Using columnar transposition cipher convert the given plain text to cipher text.

Plaintext : COMMUNICATIONMUSTBESECURE, Key = FASTER

- c) What is Electronic Code Book (ECB), write it's advantages and disadvantages.

**Q4) Attempt any Two of the following (out of Three) [2 × 4 = 8]**

- a) Write difference between flat name space and hierarchical name space.
- b) Explain symmetric key cryptography.
- c) Explain Streaming Stored Audio / Video first approach: using a web server, with advantages and disadvantages.

**Q5) Attempt any One of the following (out of Two) [1 × 3 = 3]**

- a) Explain Real-Time Interactive Audio / Video with diagram.
- b) Explain SSL services in detail.



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P5151

[Total No. of Pages : 3

[5823]-503

T.Y. B.Sc.

COMPUTER SCIENCE

CS - 353 : Web Technologies - I

(CBCS) (2019 Pattern) (Semester - V)

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates:*

- 1) *All questions are compulsory.*
- 2) *Assume suitable data, if necessary.*
- 3) *Neat diagrams must be drawn wherever necessary.*

**Q1)** Attempt any eight of the following :

**[8 × 1 = 8]**

- a) What is hyperlink?
- b) List the advantages of CSS
- c) Which tag is used to set the text in superscript format?
- d) State the purpose of pathinfo()
- e) What is DSN?
- f) List any two features of HTTP protocol.
- g) State the use of foreach() function.
- h) What is web server?
- i) Give any two functions of random access of file data.
- j) How to delete file in PHP?

**Q2)** Attempt any four of the following :

**[4 × 2 = 8]**

- a) Write any 2 features of PHP & HTML.
- b) Write the output of the following PHP Script

```
<?php
    $age = array("Anna"=>"45", "Julie"=>"38", "Benne"=>"53");
    usort($age);
    print_r($age);
?>
```

***P.T.O.***

c) Write the output of the following script?

```
<?php
    $a='PHP';
    $b='$a interpolation ';
    echo $b;
?>
```

d) Write the output of the following PHP Script.

```
$str=' abc,pqr,lmn,xyz';
$p=explode(',',$str,3);
print_r($p);
```

e) What is the output of the following?

```
<?php
    $p=array(1,2,3,4,5);
    $q=array(1,3,5,7,9);
    $s=array_diff($p,$q);
    print_r($s);
?>
```

**Q3)** Attempt any 2 of the following :

**[2 × 4 = 8]**

- a) Design HTML form that will accept user input as first name, middle name and last name, address, contact number. Provide buttons to submit the input as well as to refresh form.
- b) Explain any two of the following functions with syntax
  - i) `array _ intersect ()`
  - ii) `array _ slice ()`
  - iii) `shuffle ()`
- c) Explain how to send email with PHP.

**Q4)** Attempt any 2 of the following :

**[2 × 4 = 8]**

- a) Explain different types of arguments passing to function with example.

- b) Write a PHP script to read a file abc.txt where file contains character, B,C,T,G and space. Count occurrences of each character and write it to the abccount.txt file.
- c) Explain advantages and disadvantages of IMAP4 protocol.

**Q5) Attempt any ONE of the following :** **[1 × 3 = 3]**

- a) Write a PHP script accept and insert records in employee table.
- b) What is associative array? Explain with example how is it different from indexed array?



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SEAT No. :

P5152

[Total No. of Pages : 2

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T.Y. BSc.

COMPUTER SCIENCE

CS - 354 : Foundations of Data Science  
(2019 Pattern) (CBCS) (Semester - V)

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates:*

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

**Q1)** Attempt any EIGHT of the following :

**[8 × 1 = 8]**

- a) Define volume characteristic of data in reference to data science.
- b) Give examples of semistructured data.
- c) Define Data Discretization.
- d) What is a quartile?
- e) List different types of attributes.
- f) Define Data object.
- g) What is Data Transformation?
- h) Write the tools used for geospatial data.
- i) State the methods of feature selection.
- j) List any two libraries used in Python for data analysis.

**Q2)** Attempt any FOUR of the following :

**[4 × 2 = 8]**

- a) Explain any two ways in which data is stored in files.
- b) Explain role of statistics in data science.
- c) Explain two methods of data cleaning for missing values.
- d) Explain any two tools in data scientist tool box.
- e) Write a short note on wordclouds.

**P.T.O.**



**Q3)** Attempt any TWO of the following : **[2 × 4 = 8]**

- a) Explain data science life cycle with suitable diagram.
- b) Explain concept and use of data visualisation.
- c) Calculate the variance and standard deviation for the following data.

X: 14 9 13 16 25 7 12

**Q4)** Attempt any TWO of the following : **[2 × 4 = 8]**

- a) Write a short note on hypothesis testing.
- b) Differentiate between structured data and unstructured data.
- c) Explain data visualization libraries in Python.

**Q5)** Attempt any ONE of the following : **[1 × 3 = 3]**

- a) i) Define data science. **[1]**
- ii) Explain any one technique of data transformation. **[2]**
- b) i) Write any two applications of data science. **[1]**
- ii) Explain any one type of outliers in detail. **[2]**



Total No. of Questions : 5]

SEAT No. :

P5153

[Total No. of Pages : 2

[5823]-505

**T.Y. B.Sc. (Computer Science)**

**CS-355 : Object Oriented Programming Using Java - I  
(2019 Pattern) (CBCS) (Semester - V) (Paper - V)**

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates:*

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

**Q1)** Attempt any EIGHT of the following :

**[8 × 1 = 8]**

- a) Define exception
- b) Define Interface
- c) What is javadoc?
- d) What is AWT?
- e) What is use of static keyword?
- f) What is command line argument?
- g) List the types of constructor.
- h) What is package?
- i) How to open a file in read mode?
- j) List any two listener.

**Q2)** Attempt any FOUR of the following :

**[4 × 2 = 8]**

- a) List any two methods of string buffer class.
- b) What is use of 'throw' keyword.
- c) Differentiate between final and finally keyword.
- d) What is method overloading?
- e) What is anonymous inner class?

**P.T.O.**

**Q3)** Attempt any TWO of the following : **[2 × 4 = 8]**

- a) Write a Java program using AWT to change background color of table to 'RED' by clicking on button.
- b) Write a Java program to copy content from one file into another file, while copying digits are replaced by '\*'.
- c) Define an interface shape with abstract method area( ). Write a Java program to calculate area of rectangle.

**Q4)** Attempt any TWO of the following : **[2 × 4 = 8]**

- a) Write a Java program to accept a number from user. If it is zero then throw user defined exception "Number is zero". Otherwise calculate its factorial.
- b) Explain uses of super-keyword with suitable example.
- c) Differentiate between AWT and swing.

**Q5)** Attempt any ONE of the following : **[1 × 3 = 3]**

- a) Write a Java program to count number of vowels from given string.
- b) Explain the features of Java.



Total No. of Questions : 5]

SEAT No. :

P5154

[Total No. of Pages : 2

[5823]-506

T.Y. B.Sc.

COMPUTER SCIENCE

CS - 356 : Theoretical Computer Science  
(2019 Pattern) (CBCS) (Semester - V)

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates:*

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

**Q1)** Attempt any EIGHT of the following (Out of TEN) :

**[8 × 1 = 8]**

- a) If  $A = \{ \epsilon \}$  Find the value of  $|A|$ .
- b) List all the proper suffixes of the string "0123".
- c) Define Useless symbol.
- d) Give formal definition of Turning Machine.
- e) Define left linear grammar.
- f) State True or False. DFA do not have multiple final states.
- g) Name the type of language accepted by Pushdown Automata.
- h) Write the tuples of LBA.
- i) State true or false. Pumping lemma is used to show that language is not context tree.
- j) Write smallest possible string accepted by the following regular expression.

$a(a+b)^*ab$

**Q2)** Attempt any FOUR of the following (Out of FIVE) :

**[4 × 2 = 8]**

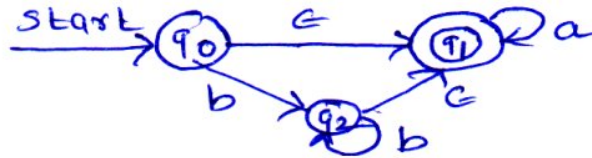
- a) Explain types of grammar.
- b) Construct FA for regular expression.

$(1+0)^*0$

- c) Differentiate between CNF and GNF (any two points).

**P.T.O.**

- d) Write down the  $\epsilon$ -closure of each state from the following FA.



- e) Define types of Turing Machine.

**Q3)** Attempt any TWO of the following (Out of THREE) : **[2 × 4 = 8]**

- a) Construct a DFA for a language

$$L1 \cap L2$$

$L1 = \{\text{All strings starting with 'a'}\}$

$L2 = \{\text{All strings not having 'ab' as substring}\}$

- b) Construct the following CFG into Normal Form (CNF)

$$S \rightarrow aSa \mid bSb$$

$$S \rightarrow a \mid b \mid aa \mid bb$$

- c) Design TM for language,

$$L = \{WCW^R \mid W \text{ is in } (0+1)^*\}$$

**Q4)** Attempt any TWO of the following (Out of THREE) : **[2 × 4 = 8]**

- a) Construct a PDA for the language

$$L = \{a^n b^n c^n \mid n \geq 0\}.$$

- b) Construct a Moore machine for the language  $L$  over  $\Sigma = \{0,1\}$  which outputs '\*' if the string contains '11' in it and outputs '#' otherwise.

- c) Compare DFA and NFA.

**Q5)** Attempt any ONE of the following (Out of TWO) : **[1 × 3 = 3]**

- a) Construct a Mealy machine over alphabet  $\{0, 1\}$  which toggles its input.

- b) Show that  $L = \{0^n 1^n \mid n \geq 1\}$  is not regular.



Total No. of Questions : 5]

SEAT No. :

P5155

[Total No. of Pages : 2

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T.Y. B.Sc.

COMPUTER SCIENCE

CS-3510 : Python Programming

(2019 Pattern) (CBCS) (Semester - V)

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates:*

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Total number of questions are five.*

**Q1)** Attempt any 8 of the following :

**[8 × 1 = 8]**

- a) What is dry run in Python?
- b) Give the purpose of selection statements in Python.
- c) List the types of type conversion in Python.
- d) What is the use of pass statement?
- e) Explain the function enumerate( ).
- f) Explain the extend method of list.
- g) What are required arguments in function?
- h) Explain any 2 functions in time module.
- i) What are the types of file in Python?
- j) Write the use of seek & tell function.

**Q2)** Attempt any 4 of the following :

**[4 × 2 = 8]**

- a) How to handle exception in Python?
- b) Explain any 2 metacharacters used in regular expression.
- c) Explain any 2 built-in list functions.
- d) Explain backward indexing in strings.
- e) Define identifiers.

**P.T.O.**

**Q3)** Attempt any 2 of the following : **[2 × 4 = 8]**

- a) Write a Python program to check if a given number is Armstrong.
- b) Write a Python program to display power of 2 using anonymous function.
- c) Write a Python program to print even length words in a string.

**Q4)** Attempt any 2 of the following : **[2 × 4 = 8]**

- a) Write a Python program to check for Zero Division Error Exception.
- b) Write a Python program to find gcd of a number using recursion.
- c) Write a Python program to check if a given key already exists in a dictionary.

**Q5)** Attempt any 1 of the following : **[1 × 3 = 3]**

- a) Trace the output of the following :

```
sum = 0
for i in range (12, 2, -2) :
    sum + = i
print sum
```

- b) Trace the output of the following :

```
count = 1
def doThis ( ) :
    global count
    for i in (1, 2, 3) :
        count + = 1
doThis( )
```



Total No. of Questions : 5]

SEAT No. :

P5156

[Total No. of Pages : 2

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T.Y. B.Sc.

COMPUTER SCIENCE

CS - 3511 : Blockchain Technology

(2019 Pattern) (CBCS) (Semester - V)

*Time : 2 Hours]*

*[Max. Marks : 35*

*Instructions to the candidates:*

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*

**Q1)** Attempt any EIGHT of the following :

**[8 × 1 = 8]**

- a) Who published a white paper proposing Ethereum in 2013?
- b) In which type of network each and every node is itself client and server?
- c) Give the command to find the current difficulty level.
- d) What happens if someone loses the private key of his wallet?
- e) What is EVM?
- f) Which institute standardized AES algorithm?
- g) What is Nonce?
- h) What is Non-repudiation?
- i) What is ICO?
- j) Who owns the Blockchain?

**Q2)** Attempt any FOUR of the following :

**[4 × 2 = 8]**

- a) What is Gas & Gas limit?
- b) What is Public & Private blockchain?
- c) List & Explain value data types in solidity.
- d) What are the benefits of immutable ledger in blockchain?
- e) What is stream cipher and block cipher?

**P.T.O.**



**Q3) Attempt any TWO of the following :** **[2 × 4 = 8]**

- a) Write a short note on crypto wallet.
- b) What are the tasks of miners?
- c) Which are the components of blockchain?

**Q4) Attempt any TWO of the following :** **[2 × 4 = 8]**

- a) Write a short note on DES.
- b) What are the advantages of smart contract? Explain any four.
- c) What are the layers of blockchain?

**Q5) Attempt any ONE of the following :** **[1 × 3 = 3]**

- a) Define transaction and explain its structure.
- d) What are the uses of SHA algorithm?

