

Total No. of Questions : 4]

SEAT No. :

PC1632

[Total No. of Pages : 4

[6331]-31

S.Y. B.C.A. (Science)

BCA - 231 : DATA STRUCTURES

(2019 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 neat diagram wherever necessary.

Q1) Attempt the following :

A) Choose the correct options :

[5×1=5]

- a) _____ notation is used to denote the best case complexity of an algorithm.
 - i) Big O
 - ii) Omega
 - iii) Theta
 - iv) Gamma
- b) The given array is $arr = \{1, 2, 3, 4\}$. Bubble sort is used to sort the array elements _____ number of iterations will be required to sort the array.
 - i) 4
 - ii) 2
 - iii) 1
 - iv) 0
- c) In _____ linked list, the last node points to the first node.
 - i) singly
 - ii) doubly
 - iii) circular
 - iv) generalized

P.T.O.

d) The data structure required to check whether an expression contains balanced parenthesis is _____.

i) stack

ii) queue

iii) array

iv) tree

e) _____ distinct binary search trees can be created out of 4 distinct keys.

i) 4

ii) 14

iii) 24

iv) 42

B) Answer the following :

[5×1=5]

a) What is an abstract data type?

b) What information is stored by linked list node?

c) Which data structure is required for Breadth First Traversal on a graph?

d) Define complete binary tree.

e) What is the maximum degree of any vertex in a simple graph with n vertices?

Q2) Answer the following (any five)

[5×3=15]

a) What are different asymptotic notations? Define any two notations.

b) Differentiate between array and linked list.

c) Write short note on priority queue.

d) Write C function to delete node from singly linked list.

e) Construct the binary search tree for the following data :
70, 35, 9, 85, 90, 22, 1, 6, 75, 105.

f) What is graph? Discuss any two applications of graph.

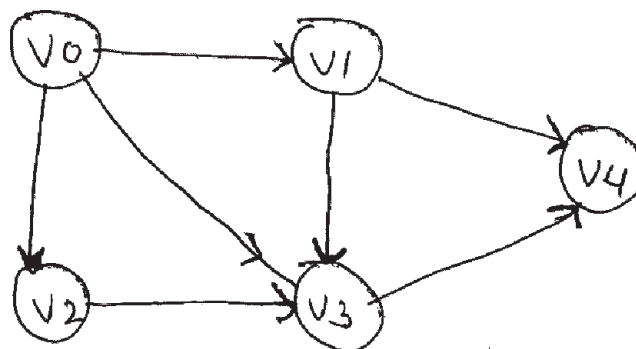
Q3) Answer the following (Any five) :

[5×4=20]

- a) Write an algorithm to search key using binary search method. State its time complexity.
- b) Convert the following expression from infix to postfix show stepwise stack presentation.

$(A/(B-C) * D + E)$

- c) Discuss the insert and delete operations on static circular queue.
- d) Write C function to insert node in a given position in doubly linked list.
- e) What is skewed binary tree? Discuss its type with example.
- f) Construct adjacency matrix and adjacency list for the following graph.



- g) Define frequency count. Find the frequency count for following code :

```
for(i=1 ; i<=n ; i++)
```

```
    for(j=1 ; j<=i ; j++)
```

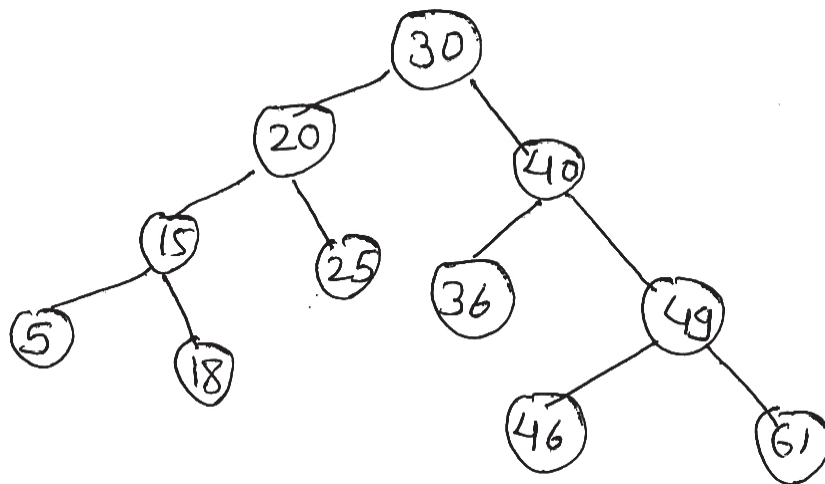
```
        for(k=1 ; k<=j ; k++)
```

```
            x = x + 1 ;
```

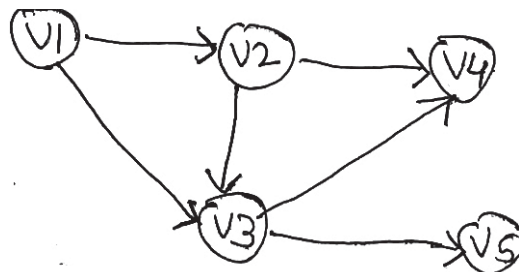
Q4) Answer the following (Any five)

[5×5=25]

- a) Write an algorithm for sorting data using merge sort. Apply it on following data
38, 27, 43, 3, 9, 82, 10
- b) Differentiate between stack and queue.
- c) Write C function to reverse singly linked list.
- d) Define binary search tree. Write C function to count number of nodes in binary search tree.
- e) Discuss the DFS graph traversal method using some suitable example.
- f) Find preorder, in-order and post-order for following BST.



- g) Discuss steps to find out topological order of directed graph. Find the topological order for following digraph.



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SEAT No. :

PC-1633

[Total No. of Pages : 3

[6331]-32

S.Y. B.C.A. (Science)

COMPUTER APPLICATIONS

BCA(232) : Database Management Systems - II
(2019 Pattern) (Semester - III)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer All questions.
- 2) Draw diagram wherever necessary.
- 3) Figures to the right indicate full marks.

Q1) Attempt the following:

[5 × 1 = 5]

A) Choose the correct options

- i) The default timestamp ordering protocol generates schedule that are_____
 - a) Recoverable
 - b) Non Recoverable
 - c) Starving
 - d) Cascading
- ii) _____ of the following is used to declare record.
 - a) % Row TYPE
 - b) % TYPE
 - c) Both a & b
 - d) None
- iii) _____ schedule that will always produce identical results.
 - a) Equivalent schedule
 - b) Complete schedule
 - c) Serial schedule
 - d) Non - serial schedule
- iv) _____ is alternative of log based recovery.
 - a) Disk recovery
 - b) Shadow paging
 - c) Disk shadowing
 - d) Crash recovery
- v) Durability of the transaction is ensured by_____
 - a) Concurrency control
 - b) Application program
 - c) System server
 - d) Recovery manager

B) Answer the following:

[5]

- a) List the types of distributed system.
- b) What is timestamp?
- c) What is Trigger?
- d) What is Transaction?
- e) Define commit and Rollback.

P.T.O.

Q2) Answer the following: (any five)

[5 × 3 = 15]

- a) Explain different Data Types in PL / SQL.
- b) Explain cascadeless schedule and recoverable schedule.
- c) Define term-
 - i) Lock
 - ii) Shared Lock
 - iii) Exclusive Lock
- d) What is server? List and Explain types of server.
- e) Explain how DBA is responsible for managing database security.
- f) List advantages of shadow Paging.

Q3) Answer the following (Any Five)

[5 × 4 = 20]

- a) Explain ACID properties of Transaction in detail .
- b) Explain Two phase locking protocol with example.
- c) Explain Log based Recovery.
- d) What is function? Explain with example.
- e) What is deadlock detection? Explain one method of deadlock detection.
- f) What is schedule? Explain types of schedule
- g) Explain how encryption techniques are used in database security.

Q4) Answer the following (Any Five)

[5 × 5 = 25]

- a) Consider following database.

Student (Sno, Sname, Sclass, Saddr)

Teacher (tno, tname, qualification, experience)

The relationship as follows:

Student Teacher M - M with descriptive attribute subject.

Write stored function to count the number of teachers teaching to student named " " (Accept student name as input parameter)

Raise an Exception if student name doesnot exist.

- b) Consider the following transaction. Give two non- serial schedule that are serializable.

T ₁	T ₂
Read (X)	Read (Z)
X = X +100	Read (X)
Write (X)	X = X – Z
Read (Y)	Write (X)
Read (Z)	Read (Y)
Y = Y + Z	Y = Y – 100
Write (Y)	Write (Y)

- c) Following is the list of events in an interleaved execution of set T_1 , T_2 and T_3 assuming 2PL(Two Phase Lock). Is there a Deadlock? If yes which transactions are involved in Deadlock?

Time	Transaction	Code
t_1	T_1	Lock (A,X)
t_2	T_2	Lock (B,S)
t_3	T_3	Lock (A,S)
t_4	T_1	Lock (C,X)
t_5	T_2	Lock (D,X)
t_6	T_1	Lock (D,S)
t_7	T_2	Lock (C,S)

- d) Explain different types of failure of transaction.
- e) Consider following database:
 Doctor (dno, dname, dcity)
 Hospital (hno, hname, h - city)
 DH (dno, hno)
 Write a cursor which display Hospital wise doctor details.
- f) Write a short note on-
- Checkpoint
 - Multiple Granularity
- g) Following are the log entries at the time of system crash.
- < start - transaction, T_1 >
 - < Write - item, T_1 , A, 10, 100>
 - < Commit, T_1 >
 - < Check point >
 - < Start - transaction, T_2 >
 - < Write - item, T_2 , B, 20, 200 >
 - < Commit, T_2 >
 - < Start-transaction, T_3 >
 - < Write - item, T_3 , C, 30,300 > ← system crash if immediate update technique with a checkpoint is used, what will be the recovery procedure?



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SEAT No. :

PC-1634

[Total No. of Pages : 3

[6331] - 33
S.Y. B.C.A (Science)
BCA-233: Computer Networks
(2019 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 diagram whenever necessary.*

Q1) Attempt the following :

[5 × 1 = 5]

A) Choose the correct option

- a) When data packet is transmitted to a subset of network, it is _____
 - i) Broadcasting
 - ii) Multicasting
 - iii) Unicasting
 - iv) Subcasting
- b) IANA range for registered port is _____.
 - i) 1024 to 49151
 - ii) 0 to 1023
 - iii) 0 to 1024
 - iv) 1025 to 49151
- c) Physical layer concerns with _____ delivery.
 - i) process to process
 - ii) node - to - node
 - iii) end to end
 - iv) bit - to - bit
- d) CRC stands for _____.
 - i) Cyclic redundancy check
 - ii) Code repeat check
 - iii) Code redundancy check
 - iv) Cyclic repeat check
- e) _____ is the size of Host ID in class C.
 - i) 16 bits
 - ii) 8 bits
 - iii) 8 bytes
 - iv) 24 bits

P.T.O.

B) Attempt the following :

[5 × 1 = 5]

- a) What is mean by hamming distance?
- b) List the UDP services.
- c) What is analog and digital signal?
- d) Define computer network.
- e) What is address space for n bit address?

Q2) Answer the following (any five) :

[5 × 3 = 15]

- a) Write note on WWW.
- b) Explain subnetting with help of an example.
- c) Explain HDLC frame format.
- d) Explain circuit switching with advantages and disadvantages.
- e) Enlist and explain function of presentation layer.
- f) Explain the components of data communication with the help of diagram.

Q3) Answer the following (any five) :

[5 × 4 = 20]

- a) What are the services provided by user agent?
- b) Explain how fragmentation of IP datagram takes place.
- c) Identify the address classes for following address
 - i) 192.168.10.5
 - ii) 71.224.183.10
 - iii) 10010110 10110110 11011011 10101111
 - iv) 11011011 10101111 11011000 10110110

- d) What are the different techniques used by data link layer for framing?
- e) Explain the various transmission modes.
- f) Explain concept of layered network model.
- g) Define topology. Explain any three with diagram.

Q4) Answer the following (any five) :

[5 × 5 = 25]

- a) What are the application of computer network?
- b) Compare between TCP/IP and ISO-OSI model.
- c) Explain HTTP request and response message.
- d) Write note of UDP? Explain UDP datagram format.
- e) Describe IPv6 packet format with extension header.
- f) What is channelization? What are the strategies used?
- g) Draw NRZ-L and differential manchester encoding for following data stream.
 - i) 00000000
 - ii) 11111111
 - iii) 10101010
 - iv) 11001100
 - v) 11011100



Total No. of Questions : 4]

SEAT No. :

PC1635

[Total No. of Pages : 5

[6331]-41

S.Y. B.C.A. (Science)

**BCA - 241 : OBJECT ORIENTED PROGRAMMING AND C++
(2019 Pattern) (Semester - IV)**

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 neat diagram wherever necessary.*

Q1) A) Choose the correct option

[5×1=5]

a) Which amongst the following is used to format the data display.

- | | |
|-------------------|-----------------|
| i) Iterators | ii) Punctuators |
| iii) Manipulators | iv) Allocators |

b) For constructor overloading each constructor must differ in _____ and _____.

- i) Number and type of arguments
- ii) Number of arguments and return type
- iii) Return type and type of argument
- iv) Return type and definition

c) ofstream, ifstream and fstream are _____.

- | | |
|-----------------------|-------------------|
| i) Libraries | ii) Header Files |
| iii) Built in classes | iv) String Arrays |

P.T.O.

- d) Multiple use of << and >> in one statement is called as
- i) Cascading
 - ii) Overriding
 - iii) Overloading
 - iv) Repeating
- e) In public inheritance the public and protected data members of base class remain _____ in derived class.
- i) Public
 - ii) Private
 - iii) Public and protected respectively
 - iv) Protected

B) Answer the following : [5×1=5]

- a) State any one advantage of object oriented programming over procedure oriented programming.
- b) Define Inheritance.
- c) The name of constructor and any other function name declared in the class are same. State True/False and justify.
- d) Mention the file mode which is used to open the file for reading purpose only.
- e) List the types of constructors.

Q2) Answer the following (any five) **[5×3=15]**

- a) Explain the following terms
 - i) Object
 - ii) Data Encapsulation
- b) Define Destructor. Write the characteristics of Destructor.
- c) List types of Inheritance. Write advantages of Inheritance (any two)
- d) What is Reference variable? Give its syntax and explain with example.
- e) Explain use of try, catch and throw block.

f) Read the code and answer the questions

```
class Emp
{
    int Eno;
    float salary ;
public ;

        Emp ( ) ----- function 1
    {
        }

        Emp (int no, float sal) ----- function 2
    {
        Eno = no ;
        Salary = sal ;
    }

    void display ( )
    {
        cout << “ Emp no is = ” << Eno ;
        cout << “ Emp salary is = ” << salary ;
    }

    main ( )
    {
        Emp e, e1 ;
        e1(501, 8000.55);
        e. display ( ) ;
        e1. display ( ) ;
    }
```

- i) What is the name of function 2 and by which line in the given code will it be involved.
- ii) What is the name of function 1 and by which statement will it be involved.

Q3) Answer the following (Any five) :

[5×4=20]

- a) What is pure virtual function? Explain with example.
- b) Explain copy constructor with example.
- c) Compare procedure oriented programming and object oriented programming.
- d) Create a class student having Roll No., Name and Marks of five subjects. Write accept and display function for accepting details of 'n' students.
- e) Explain member function defined outside the class with example.
- f) Write a C++ program display area of circle, square and rectangle using inline function.
- g) Trace the output and justify

```
#include <iostream.h>
class Base 1
{
    Public
        Base 1 ( )
        {
            cout << " Base1's constructor called" <<endl ;
        }
};
class Base 2
{
    Public :
        Base 2 ( )
        {
            cout << "Base 2's constructor called" <<endl ;
        }
};
class Derived : Public Base 1, public Base 2
{
    Public :
        Derived ( )
        {
            cout << "Derived's constructor called" <<endl;
        }
};
main ( )
{
    Derived d ;
}
```

Q4) Answer the following (Any five)

[5×5=25]

- a) Explain Multiple Inheritance with example.
- b) Write a C++ program that copies the contents of one file to another.
- c) Write the rules of operator overloading.
- d) What is file? List the operations performed on file. Also list different file opening modes.
- e) What is Function overloading. Give its syntax and explain with example.
- f) Explain Virtual Base class with example.
- g) Explain the following
 - i) Scope Resolution Operator
 - ii) New and Delete Operator

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Total No. of Questions : 4]

SEAT No. :

PC-1636

[Total No. of Pages : 2

[6331]-42

S.Y. B.C.A. (Science)

BCA-242 : WEB TECHNOLOGY

(2019 Pattern) (Semester IV)

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 neat diagram whenever necessary.

Q1) A) Choose the correct option : [5 × 1 = 5]

- i) As compared to associative arrays index arrays are much _____.
 - a) Faster
 - b) Slower
 - c) Stable
 - d) Complex
- ii) Prepare () method is used to _____ the query.
 - a) debug
 - b) run
 - c) compile
 - d) fetch
- iii) AJAX is based on _____.
 - a) JavaScript and XML
 - b) Vbscript and XML
 - c) JavaScript and Java
 - d) JSP and Java
- iv) Which one of the following function is used to start a session?
 - a) begin_session()
 - b) session_begin()
 - c) session_start()
 - d) start_session()
- v) PHP supported variable usage without declaring its _____.
 - a) data type
 - b) object type
 - c) Name
 - d) reference

B) Answer the following: [5 × 1 = 5]

- a) What is the purpose of \$ this variable?
- b) What is Web server?
- c) What is sticky form?
- d) Write any two applications of XML.
- e) Which function is used to execute a query?

P.T.O.

Q2) Answer the following (any five) : [5 × 3 = 15]

- a) Explain the concept of serialization.
- b) Describe passing parameters by value with example.
- c) Compare between GET method and post method.
- d) Write PHP script to calculate factorial of given number using function.
- e) What are the differences between AJAX and JavaScript?
- f) What is Interface? Give its Syntax.

Q3) Answer the following (Any Five) : [5 × 4 = 20]

- a) Explain the function for making connection and executing a query using PEAR DB.
- b) Define constructor. Explain it with the example.
- c) Explain Anonymous function with the example.
- d) Write short note on cookies.
- e) What are the advantages and disadvantages of using database extension to get connected to the database?
- f) Explain rules to write XML elements and attributes.
- g) Write a PHP program to accept student rno, name on first .php and marks of three subjects on second .php and display students all information on third .php.

Q4) Answer the following (Any Five) : [5 × 5 = 25]

- a) Explain different iterator function with example.
- b) What is self - processing form? Explain with the help of example.
- c) Define an Interface which has methods area(), volume(), define constant PI. Create a class cylinder which implements this interface and calculate area and volume.
- d) Write a php script which implements AJAX for addition of two numbers.
- e) What is introspection? Explain any four introspective functions provided by PHP.
- f) What is DOM? How does it relate to XML?
- g) Consider the following relational database student
(seat-no, name, class, P-group_no)
Project (P_group_no, P_title)
Student : project shares many : one relationship.
Write a PHP script to accept project title and display list of students those who are working in the particular project.



Total No. of Questions : 4]

SEAT No. :

PC-1637

[Total No. of Pages : 3

[6331]-43

S.Y. B.C.A. (SCIENCE)

BCA-243: SOFTWARE ENGINEERING

(2019 Pattern) (Semester - IV)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Figure to right indicate full marks.
- 2) All Questions are compulsory.
- 3) Draw neat sketches wherever necessary to illustrate answer.

Q1) A) Choose the correct option:

[5 × 1 = 5]

- i) _____ is not the component of data dictionary.
 - a) Data element
 - b) Structure chart
 - c) Data flow
 - d) Data type
- ii) _____ is the software development activity that is not a part of software processes.
 - a) Validation
 - b) Specification
 - c) Development
 - d) Dependence
- iii) _____ is not the element of the system
 - a) Control
 - b) Feedback
 - c) Risk
 - d) Environment
- iv) _____ is correct sequence of SDLC steps
 - a) Design, Requirement Analysis, Coding, Testing
 - b) Requirement Analysis, Design, Coding, Testing
 - c) Requirement Analysis, Design, Testing, Coding.
 - d) Design, Requirement Analysis, Testing, Coding.
- v) _____ is the technique used to extract information from large number of people.
 - a) Record view
 - b) Questionnaire
 - c) Observation
 - d) Design

P.T.O.

B) Answer the following:

[5 × 1 = 5]

- a) What is Subsystem?
- b) What is process model?
- c) What is agile process.
- d) Define specification.
- e) Define Actions.

Q2) Answer the following (Any 5)

[3 × 5 = 15]

- a) Explain any two phases of XP process along with a neat diagram.
- b) List all phases of SDLC and explain analysis phase in detail.
- c) Write a short note on feasibility study.
- d) Justify 'Software doesn't wear out'.
- e) Define the following terms:
 - i) Pseudocode
 - ii) Questionnaire
 - iii) Data capture
- f) Draw the decision table for the following scenario:

A Co-operative bank will grant loans under the following conditions:

- . If a customer has an account with the bank and has no loan outstanding, loan will be granted
- . If the customer has an account with the bank but some amount outstanding from previous loans, the loan will be granted if special management approval is obtained.
- . Reject loan applications in all other cases.

Q3) Answer the following (Any 5):

[5 × 4 = 20]

- a) Explain process flow in detail.
- b) Draw context level and 1st level DFD of "Library Management System".
- c) Differentiate between open system and closed system.
- d) Explain with neat diagram any three practices in XP.
- e) Explain general principles of software Engineering.
- f) State the advantages and disadvantages of scrum.
- g) Define SRS. Explain characteristics of SRS.

Q4) Answer the following (Any 5):

[5 × 5 = 25]

- a) Differentiate between structured interviews and unstructured interview.
- b) Explain Adaptive Software Development (ASD) life cycle diagrammatically.
- c) Define Software Engineering. Discuss its layers diagrammatically.
- d) Differentiate between physical DFD and Logical DFD.
- e) Explain Software process Framework Activities.
- f) Define system. Explain types of system in detail.
- g) Write comparative analysis of prototyping model, increamental model and spiral model.



Total No. of Questions : 4]

SEAT No. :

PC1638

[6331]-51

[Total No. of Pages :3

T.Y.B.C.A.

SCIENCE

**B.C.A.-351-DSE-I : Programming in Java
(2019 Pattern) (Semester- V)**

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Figures to the right indicate full marks.*
- 2) *Draw diagram wherever necessary.*

Q1) Attempt the following:

[5×1=5]

A) Choose the correct options:

- a) _____ allows the programmer to destroy an object ×?
 - i) x. delete()
 - ii) Runtime.getRuntime().gc()
 - iii) x. finalize()
 - iv) Only garbage collection
- b) Linked List is a collection framework present in _____.
 - i) java.util.*;
 - ii) java.lang.*;
 - iii) java.io.*;
 - iv) java.collection.*;
- c) Final keyword in java is used with _____.
 - i) Class attributes
 - ii) Class
 - iii) Class functions
 - iv) All mentioned
- d) To create a menu user need to use _____ class.
 - i) Jaw+
 - ii) J Frame
 - iii) J Menu
 - iv) J Panel
- e) _____ driver is called as thin-driver of JDBC.
 - i) Type-4 driver
 - ii) Type-1 driver
 - iii) Type-3 driver
 - iv) Type-2 driver

P.T.O.

B) Attempt the following: [5×1=5]

- a) What is the use of JDBC API?
- b) What is a listener?
- c) What is final class?
- d) State any two differences between throw & throws.
- e) Write any two implicit object in JSP?

Q2) Answer the following (any five): [5×3=15]

- a) Why JSP is Fly compilation? Explain in brief Implicit object in JSP.
- b) Explain the use of try, catch & finally block.
- c) Enlist the features of swing.
- d) Explain nested interface.
- e) What is Result set? Explain types of Result set.
- f) Explain Anonymous Inner Class.

Q3) Answer the following (any five): [5×4=20]

- a) What is array? How to declare single & multi-dimensional array with example.
- b) Explain Runtime polymorphism using interface.
- c) Differentiate between checked and unchecked Exception.
- d) Explain types of Drivers with example.
- e) What is swing? Explain MVK Architecture.
- f) Explain life cycle of a servlet.
- g) What is JSP Page Directive & include Directive?

Q4) Answer the following (any five):

[5×5=25]

- a) Define:
 - i) Scriplets
 - ii) Implicit objects
 - iii) Mouse Adapter
 - iv) J Text Field
 - v) JMenu
- b) Differentiate between Statement and prepared statement.
- c) Write a Java program to accept Number from user and display factorial.
- d) Create a following JFrame using Swing.

Hand-drawn diagram of a Java Swing JFrame window. The window contains three labels: "Name:", "Address:", and "Phone:", each followed by a rectangular text input field. Below these fields are two buttons labeled "save" and "cancel".

- e) Write a java program to accept a string from user. Check whether given string is Palindrome or not.
- f) What is event? How to handle awt events? Explain with example.
- g) Explain Abstraction in detail.



Total No. of Questions : 4]

SEAT No. :

PC1639

[Total No. of Pages : 3

[6331]-52

T.Y.B.C.A. (Science)

DSE - II : DATA MINING AND DATA SCIENCE

(2019 Pattern) (Semester - V) (BCA 352)

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 labeled diagram wherever necessary.*

Q1) Attempt the following :

A) Choose the correct option

[5×1=5]

- a) Data stored in Data warehouse for _____ purpose.
 - i) Real - Time operation
 - ii) Validation
 - iii) Analysis
 - iv) None of the above
- b) _____ is a supervised Learning technique.
 - i) Classification
 - ii) Clustering
 - iii) Regression
 - iv) All of the above
- c) Frequency of occurrence of an itemset is called as _____.
 - i) Support
 - ii) Confidence
 - iii) Support Count
 - iv) Rules
- d) Which method shows hierarchical data in a nested format?
 - i) Tree maps
 - ii) Scatter plots
 - iii) Area charts
 - iv) Population pyramids
- e) A distribution where only two outcomes are possible, such as gain or loss is called _____.
 - i) Uniform distribution
 - ii) Binomial distribution
 - iii) Normal distribution
 - iv) Exponential distribution

P.T.O.

- B) Attempt the following. [5×1=5]
- a) What is Data Mart?
 - b) What is data analytics?
 - c) What is perception?
 - d) What is fact table?
 - e) What is binning?

Q2) Answer the following (Any Five) [5×3=15]

- a) Explain benefits of Data visualization.
- b) Explain statistical Modeling.
- c) Explain Bayesian network with example (diagram).
- d) Explain market basket analysis.
- e) Explain working of SVM.
- f) Explain snow - Flake Schema.

Q3) Answer the following (Any Five) [5×4=20]

- a) Explain applications of data science in various fields.
- b) What is clustering? Explain any 2 types of clustering method.
- c) Explain types of Regression.
- d) Explain the terms
 - i) OLTP
 - ii) OLAP
- e) Explain KDD process.
- f) Explain analytical operations of OLAP.
- g) Explain steps in EDA.

Q4) Answer the following (Any Five) [5×5=25]

- a) Consider the following set of transactions. Find the Frequent item sets using Apriori algorithm.

Tid	Itemsets	Given :
T1	A,B	minimum support =2
T2	B,D	
T3	B,C	
T4	A,B,D	
T5	A,C	
T6	B,C	
T7	A,C	
T8	A,B,C,E	
T9	A,B,C	

- b) Explain SVM classifiers and it's types.
- c) Explain any 3 types of probability distribution.
- d) Explain different data visualization techniques.
- e) Explain three tier architecture of Data - warehouse.
- f) Explain Data preprocessing in Data mining.
- g) Explain different types of Association rules.



Total No. of Questions : 4]

SEAT No. :

PC1640

[Total No. of Pages : 3

[6331]-53

T.Y. B.C.A.

SCIENCE

BCA - 353 - DSE - III : Principles of Operating Systems

(2019 Pattern) (Semester - V)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Figures to the right indicate full marks.
- 2) All questions are compulsory.
- 3) Draw neat diagram wherever necessary.

Q1) Attempt the following :—

A) Choose the correct options :

[5×1=5]

- a) _____ is a CPU scheduler.
 - i) Short - Term Scheduler
 - ii) Long - Term Scheduler
 - iii) Medium - Term Scheduler
 - iv) None of the above
- b) Semaphores are mostly used to implement _____.
 - i) System calls
 - ii) System protection
 - iii) System prevention
 - iv) IPC mechanisms
- c) _____ is the deadlock avoidance algorithm.
 - i) Banker's algorithm
 - ii) Round - Robin algorithm
 - iii) Karn's algorithm
 - iv) FCFS algorithm
- d) A logical address is an address generated by _____.
 - i) Memory Unit
 - ii) Last Unit
 - iii) Graphics Processing Unit
 - iv) Central Processing Unit
- e) _____ name defines a path from the current directory to that specified file.
 - i) A relative Path
 - ii) An Absolute Path
 - iii) Both (i) and (ii)
 - iv) None of the above

P.T.O.

- B) Attempt the following. [5×1=5]
- a) Define : Race Condition
 - b) What is Rollback
 - c) State any two advantages of Dynamic Loading
 - d) Define : File
 - e) What is Disk controller?

- Q2)** Attempt the following : (Any Five) [5×3=15]
- a) Discuss the requirements of the critical problem solution.
 - b) Explain necessary conditions for a deadlock.
 - c) Explain overlays.
 - d) List advantages and disadvantages of indexed allocation.
 - e) Explain Methods to handle bad blocks.
 - f) State and explain different types of threads.

- Q3)** Attempt the following : (Any Five) [5×4=20]
- a) Consider the following set of processes with CPU burst time given in milli seconds.

Process	Burst time	Arrival time
P1	5	1
P2	3	0
P3	2	2
P4	4	3
P5	8	2

Illustrate the execution of these process using F.CFS. Calculate average turn around time and average waiting time.

- b) What is a semaphore? Discuss its types.
- c) With the help of example describe resource - allocation graph.
- d) Consider the following page reference string.
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2.
How many page Faults would occur for the LRU (Least Recently Used) page replacement algorithm? Assume three frames.
- e) Write a short note on Virtual File Systems.
- f) Explain disk structure along with diagram.
- g) Explain SCAN disk scheduling algorithm with example.

Q4) Attempt the following : (Any Five)

[5×5=25]

- a) What is priority scheduling? Explain with example.
- b) Explain the producer - consumer problem in detail.
- c) Consider the given snapshot of system.

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	7	5	3	3	3	2
P ₁	2	0	0	3	2	2			
P ₂	3	0	2	9	0	2			
P ₃	2	1	1	2	2	2			
P ₄	0	0	2	4	3	3			

Using Banker's algorithm :

- i) What is the content of matrix need?
- ii) Is the system in safe state?
- d) Compare between MFT and MVT algorithm.
- e) Explain free space management techniques.
- f) Consider a disk queue with requests for F/o to blocks on cylinders 95, 180, 34, 119, 11, 123, 62, 64 With the Read - Write head. Initially Cylinder 50 & tail at 199. Assume direction towards 0. Calculate total head movement using :
 - i) SCAN
 - ii) C- SCAN
- g) Explain file operations in detail.



Total No. of Questions : 5]

SEAT No. :

PC-1641

[Total No. of Pages : 3

[6331]-54

T.Y. B.C.A. (Science)

**BCA - 354 SEC 1 - ARTIFICIAL INTELLIGENCE
(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 indicates full marks.*
- 3) *Draw neat diagrams wherever necessary.*

Q1) Attempt any eight of the following (out of ten) :

[8 × 1 = 8]

- a) Which instruments are used for perceiving and acting upon the environment.
 - i) Sensors and Actuators
 - ii) Sensors
 - iii) Perceiver
 - iv) Perceiver & sensors
- b) Which of the following search method takes less memory.
 - i) Depth First Search
 - ii) Breadth First Search
 - iii) Linear Search
 - iv) optimal search
- c) Which of the following is true regarding BFS?
 - i) BFS will get trapped exploring is single path
 - ii) The entire tree so far been generated must be stored in BFS.
 - iii) BFS is not guaranteed to find a solution.
 - iv) BFS is nothing but Binary First Search.
- d) Which statement is false regarding propositional logic?
 - i) Can have answer other than true or False
 - ii) Each sentence is a knowledge declarative sentence
 - iii) It is knowledge representation
 - iv) None of the above

P.T.O.

- e) Which of the following elements constitute the frame structure?
 - i) Facts or data
 - ii) Procedures and default values
 - iii) Frame name
 - iv) Frame reference in hierarchy
- f) In which of the following learning, the teacher returns reward and punishment to the learner?
 - i) Unsupervised learning
 - ii) Supervised learning
 - iii) Active learning
 - iv) Reinforcement learning
- g) Who is the father of AI?
 - i) Fisher Ada
 - ii) Alan Turing
 - iii) John McCarthy
 - iv) Allen Newell
- h) _____ is a representation of problem elements at a given moment.
 - i) Search
 - ii) Problem
 - iii) State
 - iv) State - Space
- i) What is the problem space of Means-End Analysis?
 - i) An initial state and one or more goal state
 - ii) One or more initial states and one goal
 - iii) One or more initial states and one or more goals
 - iv) One initial and one goal state
- j) Which of the following option is used to build complex sentences in knowledge representation?
 - i) Symbol
 - ii) Connectives
 - iii) Quantifiers
 - iv) Word

Q2) Answer any four of the following.

[4 × 2 = 8]

- a) What is Heuristic search? Give example.
- b) List any two advantages of BFS.
- c) What is resolution? Explain with example.
- d) What are the properties of representation of knowledge?
- e) What are the components of script?

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

- a) Explain how AI and Machine learning differ from each other?
- b) Give state space representation of "Monkey Banana Problem".
- c) Explain A* algorithm.

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

- a) Consider the following statements.
 - i) All philosophers are Indian.
 - ii) All Indians are happy.
 - iii) Either Aryabhatta or C.V. Raman is a Philosopher.
 - iv) C.V. Raman is not a philosopher. Translate above statements in FOPL.
- b) Write a short note on semantic networks.
- c) What is predictive analytics? Explain with example.

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

- a) What is resolution? Explain with example.
- b) Write a detailed note on Generate and test algorithm.



Total No. of Questions : 5]

SEAT No. :

PC-1642

[Total No. of Pages : 3

[6331]-55

T.Y. B.C.A. (Science)

BCA SEC - 11 - 355 : CLOUD COMPUTING

(2019 Pattern) (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) Draw labelled diagram wherever necessary.

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

[8 × 1 = 8]

- i) IaaS usually shares issues with the _____.
 - a) PaaS
 - b) KaaS
 - c) IaaS
 - d) Cloud tab
- ii) The technology used to distribute service requests to resources is referred as _____.
 - a) load balancing
 - b) load performing
 - c) load scheduling
 - d) load adding
- iii) The program which provides partitioning, isolation or abstraction is called _____.
 - a) Hardware hypervisor
 - b) Software hypervisor
 - c) Virtualize hypervisor
 - d) System hypervisor
- iv) _____ of the following is not type of virtualization
 - a) Physical
 - b) Para
 - c) Os-level
 - d) Full
- v) _____ of the following is a structural data store that support indexing and queries to both EC₂ and S₃.
 - a) Amazon cloud front
 - b) Cloud watch
 - c) Amazon simple DB
 - d) Amazon Hardware
- vi) Google offers a suite of cloud computing services called as _____.
 - a) Google Docs
 - b) Google cloud platform
 - c) Google Drive
 - d) Google Web Service

P.T.O.

- vii) _____ is a "Serverless" style offering that lets you write just the code you need.
- a) Azure App Engine b) Azure virtual Machine
- c) Azure Function d) Azure Fabric Service
- viii) _____ Images are more adaptable than some of its competitors since they run on variety of service.
- a) Docker b) Care OS
- c) Cloud Foundry d) Amazon AWS
- ix) _____ containerization has become a key trend in software development.
- a) Web server b) Virtualization
- c) Machine d) API
- x) _____ of the should a company consider before implementing cloud computing technology.
- a) Information Sensitivity b) Potential cost reduction
- c) Employee Satisfaction d) Product

Q2) Attempt any Four of the following : (out of Five) [4 × 2 = 8]

- a) What is PaaS Salesforce?
- b) Write a note on Azure AI.
- c) What are the Benefits of Intelligent SaaS?
- d) Describe the steps involve in cloud risk management framework.
- e) Which services provided by window azure operating system?

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

- a) What are the different emerging technologies in cloud computing?
- b) Give the impact of cloud services on education.
- c) Explain cloud security in detail.

Q4) Attempt any Two of the following : (out of Three)

[2 × 4 = 8]

- a) Explain different types of cloud computing.
- b) How does virtual clustering work?
- c) What are the characteristics of Block chain Technology?

Q5) Attempt any One of the following : (out of Two)

[1 × 3 = 3]

- a) Explain risk management in detail.
- b) Differentiate between Google App Engine and Google compute engine.



Total No. of Questions : 4]

SEAT No. :

PC1643

[6331]-61

[Total No. of Pages :2

T.Y.B.C.A. (Science)

DSE - IV : ANDROID PROGRAMMING

(2019 Pattern) (Semester- VI) (BCA361)

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 diagram wherever necessary.

Q1) Attempt the following:

[5×1=5]

A) Choose the correct options.

- a) _____ is a text messaging service in Android mobile device.
 - i) SMS
 - ii) MMS
 - iii) SEND
 - iv) RECEIVE
- b) CRUD stands for _____.
 - i) Create, delete
 - ii) Create, update, delete
 - iii) Create, read, update
 - iv) Create, read, update, delete
- c) _____ Menu displays information related to the current activity.
 - i) Context
 - ii) Option
 - iii) Pop ups
 - iv) Delete
- d) _____ is a view which groups several items in vertical scrollable list.
 - i) Text view
 - ii) List view
 - iii) Button
 - iv) Check box
- e) ADT is a plugin for _____.
 - i) Android Studio
 - ii) Eclipse
 - iii) AIDE
 - iv) AIC

P.T.O.

- B) Answer the following: [5×1=5]
- a) What is Google Map?
 - b) What is SMS?
 - c) Enlist functions of Open Helper Class (SQLite).
 - d) Example of Button view.
 - e) What dynamic fragmentation?

- Q2)** Answer the following (any five): [5×3=15]
- a) What is Menu? Explain types of menus.
 - b) Define terms:
 - i) SQLite Database
 - ii) SQLite Open Helper
 - c) Create Android application for performing the following operation on the menu
 - i) Factorial
 - ii) Fibonnaci Series.
 - d) Explain any four Layouts with example.
 - e) Explain List view using Adapter with the help of example.
 - f) Write features of Android Programming.

- Q3)** Answer the following (any five): [5×4=20]
- a) How to calling built-in applications using intent? Explain with example.
 - b) Explain the Android stack diagrammatically.
 - c) Explain with the example fragment data sent from one Activity to another.
 - d) Explain the term utilizing action bar in detail.
 - e) What is meant by Progress Bar? Describe with example.
 - f) With the help of example describe getting location data.
 - g) What is scrollview? Explain with example.

- Q4)** Answer the following (any five): [5×5=25]
- a) What is marker? How to add marker?
 - b) Write short note on : Receiving SMS.
 - c) With the help of diagram describe context menu.
 - d) What is dialogfragment? Explain its uses.
 - e) Write Android program to evaluate the perfect number or not.
 - f) Explain the Auto Complete Text View in detail.
 - g) Create android Application to sent email using intent.



Total No. of Questions : 4]

SEAT No. :

PC1644

[Total No. of Pages : 3

[6331]-62

T.Y.B.C.A. (Science)

DSE - V : PROGRAMMING IN GO
(2019 Pattern) (Semester - VI) (BCA - 362)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Figures to the right indicate full marks*
- 2) All questions (Q1, Q2, Q3, Q4) are compulsory*
- 3) Assume suitable data if required*

Q1) Attempt the following :

A) Choose the correct option

[5×1=5]

- a) Which of the following terminates the for loop or switch statement and transfers execution to the statement immediately following the for loop or switch statement in Go
 - i) goto
 - ii) break
 - iii) continue
 - iv) switch
- b) The blank identifier in Go language is the _____ operator
 - i) Underscore
 - ii) Semicolon
 - iii) Colon
 - iv) Constant
- c) Array elements are by default initialized to _____
 - i) Zero
 - ii) 1
 - iii) -1
 - iv) Null undefined value
- d) _____ can be defined inline without the need for a name
 - i) Array
 - ii) Package
 - iii) Class
 - iv) Anonymous functions
- e) _____ is the minimum Go entity that can be executed concurrently
 - i) Go routine
 - ii) Channel
 - iii) Concurrency
 - iv) None of the above

P.T.O.

B) Attempt the following :

[5×1=5]

- a) What is a token?
- b) What is the use of defer statements?
- c) Write the syntax to pass an array as a parameter to a function
- d) What is a type assertion?
- e) Which are the Interface types in Go?

Q2) Answer the following (Any Five) :

[5×3=15]

- a) State any three advantages and disadvantages of Go language.
- b) Explain the string functions : contains, count, tolower with syntax.
- c) Explain length and capacity of array slices? How to create array slice with low and high values?
- d) Write any three points of difference between a Method and a Function.
- e) Write a short note on wait Groups.
- f) What are Buffered and unbuffered channels.

Q3) Answer the following (Any Five) :

[5×4=20]

- a) Write a note on benchmarking.
- b) Explain Table Tests and Random Tests.
- c) What is a Go routine function? How is concurrency implemented with Go routine?
- d) Explain Timer and Ticker.
- e) What are Embedded Interfaces and Empty Interfaces?
- f) Write a note on Slice and Slice parameters.
- g) What are the benefits of multiple return values for a function?

Q4) Answer the following (Any Five) :

[5×5=25]

- a) Write a program in Go language to print whether number is even or odd
- b) Write a program in Go language using function to check whether accepted number is palindrome or not
- c) Write a program in Go language to create and print multi dimensional slice (For integer).
- d) Write a program in Go language to sort array elements in ascending order.
- e) Write a program to illustrate the use of append function (For String).
- f) Discuss 'call by value' and call by Reference' method of passing arguments to a function.
- g) Write a note on Type assertions and Type switches



Total No. of Questions : 4]

SEAT No. :

[Total No. of Pages : 2

PC1645

[6331]-63

T.Y.B.C.A.

SCIENCE

BCA - 363 - DSE- VI : Software Project Management

(2019 Pattern) (Semester - VI)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Figures to the right indicate full marks.*
- 2) Draw labeled diagram whenever necessary.*

Q1) Attempt the following :

A) Choose the correct options.

[5×1=5]

- a) _____ of the following project phases is the project schedule developed.
 - i) Initiate
 - ii) Planning
 - iii) Execution
 - iv) Deployment
- b) There are _____ types of Work breakdown Structures.
 - i) Two
 - ii) Three
 - iii) Four
 - iv) Five
- c) The PERT technique gives most weightage to _____.
 - i) The most pessimistic estimate obtained
 - ii) The most optimistic estimate obtained
 - iii) The most likely estimate obtained
 - iv) All the estimates is equal
- d) Agile is an _____ of software development methodology.
 - i) Linear approaches
 - ii) Incremental approach
 - iii) Iterative approach
 - iv) Simple approach
- e) _____ is a Software Configuration Management concept that helps us to control change.
 - i) Procedure
 - ii) Audit
 - iii) Baseline
 - iv) Process

P.T.O.

- B) Attempt the following. [5×1=5]
- a) Define portfolio management.
 - b) What is project planning.
 - c) Define Forward pass method.
 - d) Staffing in project management.
 - e) What is predictive control?
- Q2)** Answer the following : (Any Five) [5×3=15]
- a) Explain Gantt chart in details.
 - b) Explain Backward pass technique with example.
 - c) What is health and safety management?
 - d) Differentiate predictive process and Empirical process.
 - e) What is change control? How to use it?
 - f) Discuss the project Life Cycle in detail.
- Q3)** Answer the following : (Any Five) [5×4=20]
- a) Describe the PEPT chart in details.
 - b) Explain the different activity relationships in detail.
 - c) Explain Work break down structure.
 - d) What are the responsibilities of an agile team.
 - e) What are the different dependencies? Explain.
 - f) Explain the oldham hackman job model.
 - g) State and explain visualizing progress in detail.
- Q4)** Answer the following : (Any Five) [5×5=25]
- a) Explain critical path method with an example.
 - b) Differentiate between risk management and cost management.
 - c) Explain Network diagram in detail.
 - d) Define organizational structure and explain its types with the help of diagram.
 - e) State and explain SCM in details.
 - f) Explain project knowledge areas of project management.
 - g) Explain project Scheduling in agile methodology.



Total No. of Questions : 5]

SEAT No. :

PC-1646

[Total No. of Pages : 2

[6331]-64

T.Y.B.C.A. (Science)

**BCA 364 : Sec - III : Management Information Systems
(2019 Pattern) (Semester - VI)**

Time : 2½ Hours]

[Max. Marks : 35

Instructions to the candidates :

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicates full marks.*
- 3) *Draw diagram wherever necessary.*

Q1) Attempt any Eight of the following :

[8 × 1 = 8]

- a) _____ is the primary characteristics must be processed by information.
 - i) Accuracy
 - ii) Transformation
 - iii) Conversion
 - iv) Data
- b) _____ is first step in decision making.
 - i) Choice
 - ii) Design
 - iii) Implementation
 - iv) Intelligence
- c) _____ developed a model of Decision making process.
 - i) Ronald A. Howard
 - ii) Robert A Simon
 - iii) Herbert A Simon
 - iv) Herbert A. Howard
- d) → symbol used for _____ in VSM
 - i) Electronic information flow
 - ii) Manual Information flow
 - iii) Safety stock
 - iv) Shipment
- e) There are _____ types of VSM.
 - i) 2
 - ii) 3
 - iii) 0
 - iv) 9
- f) SCM stands for _____
 - i) Supply Chain Management
 - ii) Segment Chain Management
 - iii) Shipment Chain Management
 - iv) Store Chain Management

P.T.O.

Total No. of Questions : 5]

SEAT No. :

PC-1647

[Total No. of Pages : 2

[6331]-65
T.Y.B.C.A. (Science)
BCA 365 : SEC-IV: Internet of Things (IoT)
(2019 Pattern) (Semester - VI)

Time : 2 Hours]

[Max. Marks : 35

Instructions to the candidates :

- 1) *Figures to right indicate full marks.*
- 2) *Draw diagram whenever necessary.*

Q1) Attempt any Eight of the following (Out of Ten) :

[8 × 1 = 8]

- a) _____ of the following is the way in which an IoT device is associated with data.
 - i) Internet
 - ii) Cloud
 - iii) Automata
 - iv) Network
- b) _____ an embedded system communicates with the outside world.
 - i) Memory
 - ii) Output
 - iii) Peripherals
 - iv) Input
- c) _____ of the following IoT networks has a very short range.
 - i) Short Network
 - ii) LPWAN
 - iii) Short range wireless network
 - iv) Sigfox
- d) WSN stands for _____.
 - i) Wireless sensor network
 - ii) Wired sensor node
 - iii) Wireless sensor node
 - iv) Wired sensor network
- e) Role of the cloud in smart grid architecture is _____.
 - i) Collect data
 - ii) Manage data
 - iii) Security
 - iv) Store data
- f) _____ of the following is not an IoT device.
 - i) Table
 - ii) Laptop
 - iii) Arduino
 - iv) Tablet

P.T.O.

