



# UNIVERSITY OF THE PUNJAB

First Semester 2018  
Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Introduction to Computing**  
**Course Code: IT-101**

**TIME ALLOWED: 2 hrs. & 30 mins.**  
**MAX. MARKS: 50**

*Attempt this Paper on Separate Answer Sheet provided.*

## PART – II (Short Questions)

### QUESTION # 2

[20 marks]

Write short answers to all of the following questions:

1. A computer has 5 MB of memory. How many words can be stored in it at a time? Where each word consists of 16-bits.
2. How a worm and a virus are different from each other?
3. What is data compression? Why and where it is used?
4. What is a firewall?
5. What is a computer terminal? Explain.
6. List various branches of AI (Artificial Intelligence).
7. What is software reliability in e-commerce?
8. Describe some of the advantages of DBMS over file system.
9. What is a computer topology? Discuss some commonly used LAN topologies.
10. What is kernel? Why it is important?

## PART – III (Subjective)

### QUESTION # 3

[10 marks]

- a) How an optical disk is different from magnetic disk? Briefly discuss the physical organization of both the storage devices. [5]
- b) Discuss the concept of parallel processing and pipelining? How it helps improving the overall performance of a computer? [5]

### QUESTION # 4

[10 marks]

- a) Describe the following methods that computer criminals use to gain illegal access to computer systems: [5]
  - i. Denial of service attacks

(P.T.O.)

- ii. Trojan Horse
- iii. Zapping
- iv. Piggybacking
- v. Data diddling

b) What is a modem? Discuss different types of modems.

[5]

**QUESTION # 5**

**[10 marks]**

a) Write code to print the count of digits in an array named **A** of type **char** of size 20. You may test whether a **char c** is digit or not by using conditional expression  $c \geq '1' \ \&\& \ c \leq '9'$ .

[5]

b) Write HTML code to produce the following form:

[5]

Here, the text "Sign Up Page" should be a first level heading and "Go Back" should be a hyperlink to home page named *home.html*

## Sign Up Page

First Name :

Last Name :

Email :

Password :

Gender :  Male  Female

Country : Pakistan ▼

[Go Back](#)





# UNIVERSITY OF THE PUNJAB

Second Semester - 2018  
Examination: B.S. 4 Years

Roll No. ....

PAPER: Programming Fundamentals  
Course Code: IT-102, IT-12395 Part – II

TIME ALLOWED: 2 Hrs. & 45 Min.  
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Question # 2 Short Answer Questions.

4 x 5 = 20 marks

i) Write down the output of the following code segment.

<pre> 3) #include&lt;iostream&gt; using namespace std; int main() {     int a=2;     for(int a=2;a&lt;=10;a++)         a=a+2;         cout&lt;&lt;a&lt;&lt;endl;     return 0; } </pre>	<pre> 4) #include&lt;iostream&gt; using namespace std; int main() {     int i = 4;     int j = i;     for(i = 0 ; j &gt; i ; j--)     {         cout&lt;&lt; j-1&lt;&lt;" ";     }     return 0; } </pre>
---	---

ii) A car holds 12 gallons of gasoline and can travel 350 miles before refueling. Write a program that calculates the number of miles per gallon the car gets. Display the result on the screen.

[Use the following formula to calculate miles per gallon (MPG)]

$$\text{MPG} = \text{Miles Driven} / \text{Gallons of Gas Used}$$

iii) Write a function name isPositive, which takes an integer as an argument and returns true if the argument is a positive number, or false otherwise.[only write the definition for this function].

```
bool isPositive ( int num );
```

iv) Draw Flow chart in which you get restaurant bill as input and then it will computes the tax and tip on a restaurant bill. The tax should be 6.75 percent of the meal cost. The tip should be 15 percent of the total after adding the tax. Display the meal cost, tax amount, tip amount, and total bill on the screen.

Question # 3:

3 x 10 = 30

Write a program for the following Input a positive integer from the user (lets say n) and display the sum of the first n terms of the following series:

$$1^2 + 2^2 + 3^2 + 4^2 + 5^2 + 6^2 + \dots$$

Three sample runs of your algorithm might look like (Input is underlined in sample run, only to distinguish from display messages):

```
Enter the number of terms: 3
Sum of first 3 terms of the series is: 14
```

```
Enter the number of terms: 0
Sum of first 0 terms of the series is: 0
```

```
Enter the number of terms: 5
Sum of first 5 terms of the series is: 55
```

Question # 4:

Implement a function specialSearch which takes a one-dimensional array of integers, its size, and an integer key as arguments. This function will determine the number of elements less than, number of elements greater than and equal to key in the given array. The prototype of your function should be:

```
void specialSearch (int arr[], int n, int key, int& numLess, int& numGreater, int & numEqual)
```

In the above function prototype: arr is an array which contains n integers in unsorted order, key is the value based upon which the searching will be performed, numLess, numGreater and numEqual are reference parameters which will be used to return the counts of the number of elements less, greater and equal to the key.

[Note: only write the definition of function]

Question # 5:

Write a program that take three distinct integers from user and display the second smallest of them?





# UNIVERSITY OF THE PUNJAB

Second Semester - 2018  
Examination: B.S. 4 Years

Roll No. ....

PAPER: Digital Logic Design

TIME ALLOWED: 15 Min.

Course Code: IT-104 / IT-12397 Part – I (Compulsory)

MAX. MARKS: 10

**Attempt this Paper on this Question Sheet only.**

**Please encircle the correct option. Each MCQ carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.**

Q.1.

(10x1=10)

- i.  $(10110001101011.11110010)_2$  in hexadecimal is:  
a) 2C5B.F2                      b) 2C6B.F2  
c) 3D5B.F2                      d) 3D6B.F2
- ii. NOT gate is also known as:  
a) Converter                      b) Inverter  
c) Complementor                  d) Both b and c
- iii. Which one of the following is not a valid rule of Boolean algebra?  
a)  $A+1=1$                       b)  $A=\bar{A}$   
c)  $A.A=A$                       d)  $A+0=A$
- iv. Assumer SR flip flop is designed and it is reset initially. The state of the flip flop when  $S=1$  and  $R=1$  will become:  
a) 1                                  b) 0  
c) Q                                  d) Q'
- v. Decoder is a:  
a) Combinational circuit          b) Sequential circuit  
c) Complex circuit                  d) Gate
- vi. To design a full adder circuit using ROM, the size of the ROM will be \_\_\_\_\_.  
a) 32 x 4                              b) 8 x 2  
c) 8 x 1                                d) 32 x 3
- vii. The simplified expression of half adder carry is:  
a)  $c = xy + x$                       b)  $c = y + x$   
c)  $c = xy + y$                       d)  $c = xy$
- viii. Memory that is called a read write memory is:  
a) ROM                                b) EPROM  
c) RAM                                d) Registers
- ix. The output of AND gates in SOP is connected to:  
a) NOT gates                      b) OR gates  
c) AND gates                      d) XOR gates
- x. Types of RAM are:  
a) 2                                      b) 3  
c) 4                                      d) 5



# UNIVERSITY OF THE PUNJAB

Second Semester - 2018  
Examination: B.S. 4 Years

Roll No. ....

PAPER: Digital Logic Design  
Course Code: IT-104 / IT-12397 Part – II

TIME ALLOWED: 2 Hrs. & 45 Min.  
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet provided.

Question # 2. Short Questions:

(20 marks)

- a) Convert 4245.40 from Decimal to Hexadecimal number system. (3)
- b) Simplify the function in SOP using Boolean Algebra. (4)  
 $F(A,B,C) = A'B'C + A'BC + A'BC' + ABC$
- c) We have to design a circuit that takes 4-bit binary number as input and generates its square as output. How many output variables/ functions are required to design this circuit? (3)
- d) To design a combinational circuit using ROM that converts a decimal digit from 2421 code to BCD, what is the size of ROM? (3)
- e) Write the equation for  $A > B$  for a 3-bit magnitude comparator  $A_2A_1A_0$  and  $B_2B_1B_0$ . (3)
- f) Fill up the Excitation table of JK flip flop. (4)

Q(t)	Q(t+1)	J	K
0	0		
0	1		
1	0		
1	1		

Question # 3. Long Questions

(10x3=30)

- a) Implement the following function using multiplexer. Keep three variables A, B and D as select lines to the multiplexer. (10)  
 $F(A,B,C,D) = \sum (0,1,2,4,8,9,15)$
- b) Design a 8 x 1 MUX by using appropriate number of 2 x 1 MUX. (10)
- c) Design a 2-bit synchronous counter using D flip flops, whose counting sequence is controlled by a control input x in the following way: (10)

Control Input x	Counting Sequence
0	0->1 ->2 ->3 ->Repeat
1	2->1->3->0-> Repeat

show the transition table, derive the input equations and draw the circuit diagram of the counter to get full credit.



# UNIVERSITY OF THE PUNJAB

Third Semester 2018  
Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Object Oriented Programming  
Course Code: IT-201/21400

TIME ALLOWED: 2 hrs. & 30 mins.  
MAX. MARKS: 50

*Attempt this Paper on Separate Answer Sheet provided.*

## SUBJECTIVE

**Question # 02:-**

[4 x 5 = 20]

Give precise and short answers of the following:

1. Private and Protected access identifiers.
2. Inheritance and Aggregation.
3. Shallow and Deep copy constructor.
4. Virtual table.

**Question # 03:-**

[30]

Provide the implementation of a class named **Rational** having **two data** members (a and b) of type float with **private** access.

1. **Data member** of this class should contain **negative data** or **-1 (default value)** for a particular object. Write all the **set functions** for each data member to **set** their values. [02 + 02 + 02]
2. Implement **default** (sets all data members to -1), **parameterized** and **copy constructor**. [02 + 02 + 02]
3. Implement **getData** member function for taking the inputs for a particular object's data. [02]
4. Overload **arithmetic assignment operator (/=)** to divide and assign the data of one object to another. [03]
5. Overload **stream insertion operator** to display the data of object on the console. [03]
6. Overload **arithmetic product (\*) operator** to return the result of two objects after multiplication. [03]
7. Overload **unary minus (-) operator**, returns true if an object contains data less than zero, false otherwise. [02]
8. Implement **getEqualObjects** member function which accepts an array of **Rational** objects and return the **index** of an object which is equal to the left hand side object. [05]





# UNIVERSITY OF THE PUNJAB

Roll No. ....

Third Semester 2018  
Examination: B.S. 4 Years Programme

**PAPER: Object Oriented Programming**  
**Course Code: IT-201/21400**

**TIME ALLOWED: 30 mins.**  
**MAX. MARKS: 10**

*Attempt this Paper on this Question Sheet only.*

## **OBJECTIVE**

**Question # 01:-** Write the selected option (A or B) on your answer sheet against each of the following [1 x 10 = 10]

1. The analysis, design and implementation of information systems using object oriented programming languages, technologies and techniques is called object-oriented development? **A. True** **B. False**
2. The pointer, automatically supplied when you call a non-static class member function is this? **A. True** **B. False**
3. When you call a public static function from outside its class, you can use an object? **A. True** **B. False**
4. A member function can always access the data in the private part of its class? **A. True** **B. False**
5. Game(); is a legal constructor for the Game class? **A. True** **B. False**
6. The primary advantage to overloading functions is use one function name for many types of items? **A. True** **B. False**
7. If you do not overload an = operator for a class the compiler will not give an error? **A. True** **B. False**
8. The number of associations possible between classes of objects is called multiplicity? **A. True** **B. False**
9. An advantage of inheritance includes facilitating abstract classes? **A. True** **B. False**
10. A virtual function is a function that causes its class to be abstract? **A. True** **B. False**



# UNIVERSITY OF THE PUNJAB

Third Semester 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Computer Organization and Assembly Language**  
**Course Code: IT-203/21402**

**TIME ALLOWED: 2 hrs. & 30 mins.**  
**MAX. MARKS: 50**

*Attempt this Paper on Separate Answer Sheet provided.*

## **SUBJECTIVE**

### **Part - II**

**Question # 2:**

**[20]**

- Describe the purpose of the different flag bits in the flags register.
- What are the different addressing modes used in intel architecture?
- The CPU is connected to the rest of the computer using what three buses?
- Write an assembly language instruction that sets all the bits of AL register.

### **Part - III**

**Question # 3:**

**[10]**

Write a procedure that copies a (text) paragraph from a file, changes it into uppercase and then writes the modified text into the other file.

**Question # 4:**

**[10]**

Write a program that inputs 10 digits, stores them into an array and finds the maximum digit.  
Input Validation: you should input only digits and make sure that no other character can be input.

**Question # 5:**

**[10]**

Write a program that inputs two strings and checks them whether they are same or not.



# UNIVERSITY OF THE PUNJAB

Roll No. ....

Third Semester 2018  
Examination: B.S. 4 Years Programme

PAPER: Computer Organization and Assembly Language  
Course Code: IT-203/21402

TIME ALLOWED: 30 mins.  
MAX. MARKS: 10

*Attempt this Paper on this Question Sheet only.*

## OBJECTIVE

### Part - I

**Question # 1:**

[10]

Answer all parts in this question on answer sheet. Write on the answer sheet the part number and your answer against it. **No need to write the question statement on the answer sheet.**

1. Cross Assemblers are used to make the source code compatible for different family of processors.  
A. True B. False
2. It is not necessary that program written for 80386 runs on 8086.  
A. True B. False
3. The segment registers can only be used when the program is running in the real mode.  
A. True B. False
4. Assembly language is a machine independent language and has one to one correspondence with machine language.  
A. True B. False
5. IRET instruction performs POPF, POP IP.  
A. True B. False
6. PROCedures are more time efficient than MACROs.  
A. True B. False
7. Local descriptor table is defined by a segment descriptor.  
A. True B. False
8. MOV AX, [SP] is an invalid instruction.  
A. True B. False
9. DOS Interrupt handlers are faster than those provided by BIOS.  
A. True B. False
10. CLI instruction affects FLAGS register.  
A. True B. False



# UNIVERSITY OF THE PUNJAB

Fourth Semester - 2018  
Examination: B.S. 4 Years

Roll No. ....

**PAPER: Web Engineering**  
**Course Code: IT-205 / IT-22405 Part – I (Compulsory)**

**TIME ALLOWED: 15 Min.**  
**MAX. MARKS: 10**

**Attempt this Paper on this Question Sheet only.**

**Please encircle the correct option. Each MCQ carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.**

**Question # 1.**

[Marks: 1 x 10 = 10]

Evaluate the statement and write down the correct option number.

1. In CSS, we can apply different styles to a group of elements.
  - a. True
  - b. False
  
2. JSP stands for \_\_\_\_\_.
  - a. Java Super Pages
  - b. Java Super Program
  - c. Java Server Pages
  - d. Java Server Program
  
3. If we uses post method technique, then the data will be sent through \_\_\_\_\_.
  - a. body of request
  - b. url
  - c. both a & b
  - d. none of these
  
4. HTML stands for \_\_\_\_\_.
  - a. High Thread Markup Language
  - b. High Text Markup Language
  - c. Hyper Text Markup Language
  - d. Hyper Thread Markup Language
  
5. INIT function is executed only \_\_\_\_\_ times in a life cycle of servlet.
  - a. 0
  - b. 1
  - c. More than 1 times
  - d. It will be executed randomly

(P.T.O.)

6. In N-Tier architecture, which layer is present in middle?
  - a. Presentation / View Layer
  - b. Business Logic Layer
  - c. Data Access Layer
  - d. None of these
  
7. MVC stands for \_\_\_\_\_.
  - a. Model View Color
  - b. Model Visual Controller
  - c. Model View Controller
  - d. None of these
  
8. Cookies are stored on \_\_\_\_\_ side/s.
  - a. Client
  - b. Server
  - c. Both a & b
  - d. None of these
  
9. In a JSP page, service method code is written in \_\_\_\_\_ tag.
  - a. JSP Declaration
  - b. JSP Scriptlet
  - c. JSP Expression
  - d. None of these
  
10. For HttpServletRequest, which implicit object is available in JSP?
  - a. req
  - b. request
  - c. Either a or b
  - d. None of these



# UNIVERSITY OF THE PUNJAB

Fourth Semester - 2018  
Examination: B.S. 4 Years

Roll No. ....

**PAPER: Web Engineering**  
**Course Code: IT-205 / IT-22405 Part – II**

**TIME ALLOWED: 2 Hrs. & 45 Min.**  
**MAX. MARKS: 50**

**Attempt this Paper on Separate Answer Sheet provided.**

**Question # 2.**

[2 x 10 = 20 Marks]

Precisely write down the answers of the following questions.

1. Describe the two attributes i.e. action and method of 'table' tag in html?
2. Write down a life cycle of JSP page.
3. What is meant by Server-side scripting language?
4. What is meant by a mark-up language?
5. What is the purpose of JSP directives?
6. What is meant by AJAX?
7. Define Java Beans.
8. What are the differences between sessions and cookies?
9. What are the components of a HTTP Response?
10. What is the benefit of N-Tier Architecture?

**Question # 3.**

[3 x 10 = 30 Marks]

Briefly write down the answers of the following questions.

1.
  - a. What are the differences between a servlet and JSP? [5]
  - b. What do you mean by request dispatcher and send redirection? [5]
2. Write a servlet class which will dynamically create an ordered list of all items stored in database.  
Table contains two columns (Item Name, Number of items).  
DB Name: Database  
Table name: Item(item\_Name(varChar(50)), no\_Of\_Items(int))
3. Write a JSP page, which will dynamically create a table with politician's information stored in the database. Table contains two columns (Politician Name, Politician Current Party Name).  
DB Name: Database  
Table name: Politician(pol\_Name(varChar(50)), pol\_Party(varChar(50)))



# UNIVERSITY OF THE PUNJAB

Fourth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Software Engineering**  
**Course Code: IT-206 / IT-22406 Part – I (Compulsory)**

**TIME ALLOWED: 15 Mints.**  
**MAX. MARKS: 10**

**Attempt this Paper on this Question Sheet only.**

**Please encircle the correct option. Each MCQ carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.**

**Question #: 1**

**(1x10=10)**

1. Linear Sequential Model is suitable when?
  - A. Requirements are clear
  - B. Frequent changes are there
  - C. Time is less
  - D. Resources are short
2. Sequence/arrangement of steps to achieve a particular goal is known as:
  - A. Software Process
  - B. Process
  - C. Software Engineering
  - D. Both 'A' and 'B'
3. A software must have:
  - A. Instructions to do the task
  - B. Data structures
  - C. Documentations
  - D. All of the above
4. "Line of Code" based estimation is heavenly dependent on \_\_\_\_\_.
  - A. Historical Data
  - B. Technology
  - C. Management Skills
  - D. None of above
5. The main objective of "Critical Path Method (CPM) analysis" is \_\_\_\_\_.
  - A. To make project schedule
  - B. To identify slack (float) time of project activities
  - C. To identify critical path
  - D. To allocate resources
6. Which one of the following is not part of "Structured Analysis Model"?
  - A. Functional Model
  - B. Data Model
  - C. Data Design
  - D. Behavioral Model
7. Which of the following is not true about component-level design
  - A. It enables transformation of design model into operational software
  - B. It occurs when data, architectural, and interface designs have been established
  - C. It has the high degree of software design abstraction.
  - D. It establishes the algorithmic detail required to manipulate data structures
8. Which one of the following shows the identification of data structures in structured design?
  - A. Data Design
  - B. Architectural Design
  - C. User Interface Design
  - D. Component Design
9. Which one of the following is not a "golden rule of user interface design"?
  - A. "Place the user in control"
  - B. "Reduce the user's memory load"
  - C. "Make the interface consistent"
  - D. None of the above
10. Testing can show the absence and as well as the presence of errors.
  - A. True
  - B. False



# UNIVERSITY OF THE PUNJAB

Fourth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Software Engineering**  
**Course Code: IT-206 / IT-22406 Part – II**

**TIME ALLOWED: 2 Hrs. & 45 Mints.**  
**MAX. MARKS: 50**

**Attempt this Paper on Separate Answer Sheet provided.**

**Question #: 2 Short Questions (4x5=20)**

*Each question is of 4 marks*

- 1:  
Define 'Software' and "Software Engineering"?
- 2:  
Name the 4 Ps of Project Management?
- 3:  
Explain the unit of 'Effort'?
- 4:  
Define "transactional flow" with respect to "architectural design"?
- 5:  
Differentiate "Black Box Testing" and "White Box Testing"?

**Question #: 3 Subjective Questions (10x3=30)**

*Each question is of 10 marks*

- 1:  
Why "Data Flow Diagram" is used for "Functional Modeling"? Explain the procedure to draw the diagram?
- 2:  
Define 'Risk'? How "Risk Analysis is conducted"?
- 3:  
Explain the concepts of 'coupling' and 'cohesion' by taking relevant examples?





# UNIVERSITY OF THE PUNJAB

Fourth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Data Structure and Algorithm**  
**Course Code: IT-207 / IT-22408 Part – I (Compulsory)**

**TIME ALLOWED: 15 Mints.**  
**MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Each MCQ carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.

**Question#1. Multiple Choice Questions.**

**(1x10=10)**

- i. Stack is used for:
  - a. CPU Resource Allocation
  - b. Breadth First Traversal
  - c. Recursion
  - d. None of the above
- ii. How many swaps are required to sort the given array using bubble sort – {2, 5, 1, 3, 4}:
  - a. 4
  - b. 5
  - c. 6
  - d. 7
- iii. A binary tree whose every node has either zero or two children is called:
  - a. Complete binary tree
  - b. Binary search tree
  - c. Extended binary tree
  - d. None of the above
- iv. What is the worst case time complexity of linear search algorithm?
  - a.  $O(1)$
  - b.  $O(n)$
  - c.  $O(\log n)$
  - d.  $O(n^2)$
- v. In the deletion operation of max heap, the root is replaced by:
  - a. Next available value in the left sub-tree
  - b. Next available value in the right sub-tree
  - c. Any random value from the heap
  - d. Last element of the last level
- vi. Which of the below is not divide and conquer approach?
  - a. Selection sort
  - b. Bubble Set
  - c. Counting sort
  - d. Merge Sort
- vii. In which notation operator is comes after operand?
  - a. Infix
  - b. Prefix
  - c. Postfix
  - d. None
- viii. Two main measures for the efficiency of an algorithm are:
  - a. Processor and memory
  - b. Complexity and capacity
  - c. Time and space
  - d. Data and space
- ix. The memory address of the first element of an array is called:
  - a. Floor address
  - b. Foundation address
  - c. First address
  - d. Base address
- x. Linear order linked list is provided through:
  - a. Variables
  - b. Arrays
  - c. Pointer
  - d. Strings



# UNIVERSITY OF THE PUNJAB

Fourth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Data Structure and Algorithm**  
**Course Code: IT-207 / IT-22408 Part – II**

**TIME ALLOWED: 2 Hrs. & 45 Mints.**  
**MAX. MARKS: 50**

**Attempt this Paper on Separate Answer Sheet provided.**

Question # 2. Short Questions:

(4 x 5 =20 marks)

- a) Write down the code for the Insertion Sort.  
void InsertionSort ( int A[ ], int size); // you have to define this function only
- b) Write down the code of the following function of Link List Class.  
void remove(int key) // remove the node having value equal to key.
- c) The following given function runs in time O(n), you have to write an equivalent function that runs in time O(1).

```
int fun( int size, int a[ ])
{
    s=0;
    for( i = 1 to n )
        s=s+a[i] - a[i-1]
    return s;
}
```

- d) How many times "Hello" will be displayed on screen by running this code, also draw recursion tree for calculating your answer.

```
#include <iostream>
using namespace std;
void f(int n)
{
    if (n == 1 || n == 0)
        return;
    else
    {
        cout << "Hello" << endl;
        f(n - 1); // recursive call
        f(n - 2); // recursive call
        cout << "Hello" << endl;
    }
}
int main()
{
    f(5);
    return 0;
}
```

Question # 3. Long Questions

(3x 10=30 marks)

- a) Write a program to check whether a given string is of the form a<sup>n</sup>b<sup>n</sup> where n = 0, 1, 2, 3... using appropriate data structure.  
Examples:  
aaabbb – is of the form a<sup>n</sup>b<sup>n</sup>  
bbbaaa – is not a form of a<sup>n</sup>b<sup>n</sup>  
ababab – is not a form of a<sup>n</sup>b<sup>n</sup>

- b) For the following given data below draw the following:
  - i. BST(Binary Search Tree)
  - ii. Min Heap

Data is:

15, 3, 6, 18, 5, 9, 11, 20, 17, 7, 2, 3, 14

- c) What is a circular queue? Write a program to implements a circular queue.



# UNIVERSITY OF THE PUNJAB

Roll No. ....

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

PAPER: Theory of Automata (IT)  
Course Code: IT-301

TIME ALLOWED: 30 mins.  
MAX. MARKS: 10

*Attempt this Paper on this Question Sheet only.*

## OBJECTIVE TYPE

Question # 01: Choose the correct option.

[1\*10]

1) Which one is not true?

- a.  $\Lambda a = \Lambda a \Lambda$
- b.  $\{\} = \{\Lambda\}$
- c.  $\Lambda = \Lambda \Lambda \Lambda$
- d. None of above

2) Minimum number of states in a FA are:

- a. 0
- b. 1
- c. 2
- d. 3

3) There is one and only one FA for a language:

- a. True
- b. False

4) Which one is true?

- a.  $\{\Lambda\}^* = \{\}^*$
- b.  $\{\Lambda\}^* = \{\Lambda\}^*$
- c. Both a & b
- d. None of the above

5) Regular expression for all strings starting with "ab" and ending with "bba" is:

- a.  $aba^*b^*bba$
- b.  $ab(ab)^*bba$
- c.  $ab(a+b)^*bba$
- d. All of the above

6) For  $\Sigma = \{a, b\}$  and L: all strings containing "aba" as Substring. Difference of transactions made in constructing DFA & an equivalent NFA?

- a. 2
- b. 3
- c. 4
- d. Can't be determined

7) Valid strings for a language are:

- a. Which are over given  $\Sigma$
- b. Follow the rules of that specific language.
- c. Both a & b
- d. None of above.

P.T.O.

8) For a string "aaaaa" What is the smallest valid length? If  $\Sigma = \{a, aa, aaa\}$

- a. 6
- b. 2
- c. 3
- d. 0

9) If  $S = \{ab, bb\}$  then  $S^*$  will not contain

- a. abbbab
- b. bbba
- c. bbbbab
- d. ababbb

10) Which one is true?

- a. All FA's are also NFA
- b. All NFA's are also FA
- c. Both are true
- d. None of them



# UNIVERSITY OF THE PUNJAB

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Theory of Automata (IT)  
Course Code: IT-301

TIME ALLOWED: 2 hrs. & 30 mins.  
MAX. MARKS: 50

*Attempt this Paper on Separate Answer Sheet provided.*

## SUBJECTIVE TYPE

### Question # 02

[5 \* 4]

- Give Recursive definition of Regular Expressions.
- Give the definition of CNF and also describe its advantages.
- Define ambiguity, give an ambiguous grammar and also prove it.
- Give comparison among the power of FA, NFA, PDA, NPDA, and Turing Machine.
- Discuss the difference between the input tapes of Turing Machine and Post Machine.

### Question # 03

[5 \* 6]

- Construct a Turing Machine which will double every 'b' in all inputted string over {c, d}.
- Construct a PDA for the language PALINDROME over {c, d}.
- Construct MOORE machine (an FA with output) which can subtract any two inputted binary strings.
- Give the Regular Expression and FA for the language EVEN EVEN.
- Write the CFG for the Language EQUAL.
- Write the Context Sensitive Grammar for language  $a^n b^n c^n; n \geq 0$ .



# UNIVERSITY OF THE PUNJAB

Roll No. ....

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

PAPER: Principles of Management (SS)  
Course Code: IT-302

TIME ALLOWED: 30 mins.  
MAX. MARKS: 10

*Attempt this Paper on this Question Sheet only.*

## OBJECTIVE TYPE

Q1. Choose the correct Answer.

(10x1=10)

1) A ----- uses its own employees to do some work activities and networks of outside suppliers to provide other needed product components or work processes.

- A: Network organization  
B: Learning organization  
C: Virtual organization  
D: Boundary-less organization

2) A person needs for internal factors such as self-respect, autonomy, and achievement, and external factors such as status, recognition, and attention are called -----?

- A: Hygiene factors  
B: Referents  
C: Safety needs  
D: Esteem needs

3) ----- are any constituencies in the organization's environment that are affected by an organization's decisions and actions.

- A: Workplace spirituality  
B: Strong cultures  
C: Socialization  
D: Stakeholders

4) ----- means that the two merging companies became history and a new firm is established.

- A: Acquisition  
B: Merger  
C: Joint Venture  
D: Both A and B

5) ----- means the degree to which a job provides substantial freedom, independence, and discretion to the individual in scheduling work and determining the procedures to be used in carrying it out.

- A: Job scope  
B: Autonomy  
C: Task significance  
D: Both A and B

6) ----- says that authority comes from the willingness of subordinates to accept it.

- A: Employee empowerment  
B: Decentralization  
C: Acceptance theory of authority  
D: Both A and C

7) Which element of structure refers to the continuous line of authority that extends from the highest organizational levels to the lowest and clarifies who reports to whom?

- A: Work specialization  
B: Span of control  
C: Centralization  
D: Unity of command

8) For a manager to control or direct the work of an employee, the manager must have \_\_\_\_\_.

- A: Line authority  
B: Responsibility  
C: Referent power  
D: Staff authority

9) Which one of the following is not an example of a lowest level of management?

- A: Shift manager  
B: Supervisor  
C: Regional manager  
D: Office manager

10) Sofa Makers recently bought an upholstery firm, Fabulous Fabrics, in an effort to control its inputs by becoming its own supplier. This is an example of \_\_\_\_\_.

- A: Concentration  
B: Vertical integration  
C: Horizontal integration  
D: Diversification



# UNIVERSITY OF THE PUNJAB

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Principles of Management (SS)  
Course Code: IT-302

TIME ALLOWED: 2 hrs. & 30 mins.  
MAX. MARKS: 50

*Attempt this Paper on Separate Answer Sheet provided.*

## SUBJECTIVE TYPE

**Q2. Give Short Answers.**

**(10x2=20)**

1. Explain Management by Objectives with a focus on IT industry?
2. What type of technical skills are required for the managers, explain?
3. Explain Advantages, Limitations of democratic type of leadership with examples?
4. What are the major sources of potential job candidates, briefly explain?
5. Describe Henri Fayol's four functions of management?
6. Define SWOT Analysis in detail?
7. Differentiate between organizational goal and strategy with examples?
8. How efficiency and effectiveness vary from each other, explain with examples?
9. Differentiate between:
  - a. Specific plans and Directional plans
  - b. Job Description and Job Specification
10. Explain the concept of bounded rationality in the decision making process?

**Q3. Give Answers of the following Questions.**

**(3x10=30)**

1. Differentiate between planning and controlling process. Mention four advantages and four limitations of planning?
2. What is meant by environmental scanning? Explain why is it important for managers to understand the external environmental components?
3. Define motivation? Explain how do goal-setting and reinforcement theories explain employee motivation?



# UNIVERSITY OF THE PUNJAB

Roll No. ....

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

PAPER: Formal Logic  
Course Code: IT-303 NA

TIME ALLOWED: 30 mins.  
MAX. MARKS: 10

*Attempt this Paper on this Question Sheet only.*

## OBJECTIVE TYPE

Any over writing and cutting will be considered as mistake.

1. Encircle the right one. 10 marks
  1. Which of the following sentence can be a proposition?
    - a. It is raining.
    - b. Get out from the class.
  2. Strong / Weakness is a attribute of
    - a. Proposition
    - b. Argument
  3. If E is true then I is
    - a. True
    - b. False
    - c. Undetermined
  4. What is the Obversion of "Some S is not-P"?
    - a. Some S is not non-P.
    - b. Some S is non-P.
    - c. Some S is non not - P.
  5. The Symbol  $\vee$  means
    - a. Disjunction
    - b. Conditional
  6. If I is true then A is
    - a. True
    - b. False
    - c. Undetermined
  7. If A is true then I is
    - a. True
    - b. False
    - c. Undetermined
  8. Minor term means
    - a. Subject of the conclusion
    - b. Predicate of the conclusion
  9. Cogency is an attribute of
    - a. Deduction
    - b. Induction
    - c. Syllogism
  10. What is Contraposition of All S is P?
    - a. Some non-P is not non- S.
    - b. All non-P is non-S.





# UNIVERSITY OF THE PUNJAB

Fifth Semester 2018

Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Formal Logic  
Course Code: IT-303 NA

TIME ALLOWED: 2 hrs. & 30 mins.  
MAX. MARKS: 50

*Attempt this Paper on Separate Answer Sheet provided.*

## SUBJECTIVE TYPE

2. Answer the following:

20 marks

- Define Rule of Inference.
- Draw Traditional Square of Opposition.
- Define Contradiction, Contrary, and Sub-alternation.
- Define Conversion.
- Enumerate rule of distribution
- Why imperatives, exclamation is not proposition.
- Define minor term.
- Draw four figures of the Categorical Syllogism.
- Explain Argument
- Define Soundness of the Argument.

3. Use Venn diagram to determine the validity of the following syllogism. And also apply fallacy if commit.

10 marks

- EIO-2
- AAA-3
- AOO-1
- EAE-2
- OOO-4

4. Symbolize the following statements:

10 marks

- New Zealand does not have nuclear weapons.
- Either Poland or Ireland outlaws abortion.
- Scotland declares independence only if England reduces Imports.
- Greenland's protecting its fishing rights, implies that Iceland will not repays its debt.
- Hungary adopts political reforms if, either Romania freezes wages or Bulgaria broadens services.
- Neither Sweden nor Norway reduces deficit spending.
- If Canada's creating jobs then, if the United States raises taxes, then Mexico stabilizes its currency
- Either Guatemala does not end its civil war or, if Honduras does not reduces poverty then so does Nicaragua.
- If either the House and the Senate vote against it or the president vetoes it, the bill will fail.
- Abortion is exactly not the same as murder.

5. Define deductive argument? Discuss kinds of argument with example. 10 marks



*Attempt this Paper on this Question Sheet only.*

Q1: Choose the correct option. **OBJECTIVE TYPE**

1. Which of the following may contain null values
  - a. Super Key
  - b. Alternate Key
  - c. Candidate Key
  - d. Foreign Key
  - e. All of above
  
2. If every times we get 'Lahore' as a city name against city code '042' then Database is
  - a. Consistent
  - b. Neither Consistent nor Integral
  - c. Consistent but not Integral
  - d. Not Consistent But Integral
  - e. Integral
  
3. Which of the following is result of Redundancy
  - a. Increase Size
  - b. Inefficient Database
  - c. Fast Update but Slow Retrieval
  - d. Consistency
  - e. All of above
  
4. The main user of Metadata is
  - a. Programmer
  - b. Application Software
  - c. DBMS
  - d. Operating System
  - e. None of above
  
5. Updates that violate \_\_\_\_\_ are disallowed.
  - a) Integrity constraints
  - b) Transaction control
  - c) Authorization
  - d) DDL constraints
  
6. A relation is in \_\_\_\_\_ if an attribute of a composite key is dependent on an attribute of other composite key.
  - a) 2NF
  - b) 3NF
  - c) BCNF
  - d) 1NF
  
7. The functional dependency can be tested easily on the materialized view, using the constraints \_\_\_\_\_.
  - a) Primary key
  - b) Null
  - c) Unique
  - d) Both Null and Unique
  
8. Aggregate functions can be used in the select list or the \_\_\_\_\_ clause of a select statement or subquery. They cannot be used in a \_\_\_\_\_ clause.
  - a) Where, having
  - b) Having, where
  - c) Group by, having
  - d) Group by, where
  
9. Subqueries cannot:
  - a) Use group by or group functions
  - b) Retrieve data from a table different from the one in the outer query
  - c) Join tables
  - d) Appear in select, update, delete, insert statements.
  
10. \_\_\_\_\_ operator is used for appending two strings.
  - a) &
  - b) %
  - c) ||
  - d) \_



# UNIVERSITY OF THE PUNJAB

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Database Systems (CMP)  
Course Code: IT-304

TIME ALLOWED: 2 hrs. & 30 mins.  
MAX. MARKS: 50

*Attempt this Paper on Separate Answer Sheet provided.*  
**SUBJECTIVE TYPE**

**Q2: Answer the following short questions.**

(03 \* 5 = 15)

1. What is the purpose of Backup and Recovery?
2. Define Candidate Key?
3. Explain Self Join?
4. What is Security in database?
5. Differentiate between consistency and integrity.

**Q3: Normalize the following table up to 3rd Normal form but step by step show each intermediate resultant table with its data. (05 Marks)**

**Branch\_Staff**

BID	Address	Tel	SID	Sname	Salary	CID	CName	Tel
B1	PU Old Campus	042-5763456	S1	Furqan	45,000	C1	PUCIT	111-923-923
			S2	Madiha	20,000	C2	PUCAD	042-9258796
			S3	Tehseen	38,000	C1	PUCIT	111-923-923
B2	PU New Campus	042-6345678	S4	Maria	46,000	C1	Math Dept.	042-9254361
			S5	Muzahir	50,000	C2	Phy. Dept.	042-9200921
			S6	Faiza	34,000	C3	Eng. Dept	111-921-921

**BID:** Branch Identification Code

**SID:** Staff Identification Code

**SName:** Staff name

**CID:** Client Identification Code

**CName:** Client name

**P.T.O.**

(Long Questions)

**Q4: Draw E-R Diagram for following scenario.**

**(10 Marks)**

Student can appear in the exam. Question Paper only contains MCQs but having variation of options and also there is a variation of correct number of options in one question. Different Questions may contain different marks and some of them may have negative marking. System Calculates the student Results and student can review there incorrect questions with their correct answers. System can also maintain the history of Personal information for our students.

**Q5: Write SQL Queries for the given statements:**

**(20 Marks)**

- Show Emp name salary of those employees working in LHR and working in finance and having salary less than the average salary of all employees.
- Find ename and salary of those employees getting salary less than the average salary of any department.
- Find the total numbers of employees department wise.
- Show emp-name of those employees whose getting salary more than smith and less than lara.
- Show ename salary of employees working in Jordan department but getting salary more than Jordsan

Emp_ID	Emp_Name	Dept_ID	Salary	Deptno
01	John	01	20000	10
02	Smith	01	20000	10
03	Lee	02	12000	10
04	Sam	03	12000	10
05	Jordan	03	70000	20
06	Lara	04	50000	20
07	Adam	02	60000	30
08	Michel	01	80000	30
09	Andrew	03	50000	30

Deptno	Deptname	Location
10	Finance	LHR
20	Accounts	ISL
30	IT	KHI



# UNIVERSITY OF THE PUNJAB

Roll No. ....

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

**PAPER: Operating Systems (CMP)**  
**Course Code: IT-306**

**TIME ALLOWED: 30 mins.**  
**MAX. MARKS: 10**

*Attempt this Paper on this Question Sheet only.*

## OBJECTIVE TYPE

### Part-I

Select the best option for the following multiple choice questions.

[10]

1. What is operating system?
  - a) collection of programs that manages hardware resources
  - b) system service provider to the application programs
  - c) link to interface the hardware and application programs
  - d) all of the mentioned
  
2. To access the services of operating system, the interface is provided by the
  - a) system calls
  - b) API
  - c) library
  - d) assembly instructions
  
3. Which one of the following is not true?
  - a) kernel is the program that constitutes the central core of the operating system
  - b) kernel is the first part of operating system to load into memory during booting
  - c) kernel is made of various modules which cannot be loaded in running operating system
  - d) kernel remains in the memory during the entire computer session
  
4. In operating system, each process has its own
  - a) address space and global variables
  - b) open files
  - c) pending alarms, signals and signal handlers
  - d) all of the mentioned
  
5. A process stack does not contain
  - a) function parameters
  - b) local variables
  - c) return addresses
  - d) PID of child process
  
6. Which module gives control of the CPU to the process selected by the short-term scheduler?
  - a) dispatcher
  - b) interrupt
  - c) scheduler
  - d) none of the mentioned

**P.T.O.**

7. Spinlocks are :

- a) CPU cycles wasting locks over critical sections of programs
- b) locks that avoid time wastage in context switches
- c) locks that work better on multiprocessor systems
- d) All of these

8. The number of resources requested by a process :

- a) must always be less than the total number of resources available in the system
- b) must always be equal to the total number of resources available in the system
- c) must not exceed the total number of resources available in the system
- d) must exceed the total number of resources available in the system

9. Deadlock prevention is a set of methods :

- a) to ensure that at least one of the necessary conditions cannot hold
- b) to ensure that all of the necessary conditions do not hold
- c) to decide if the requested resources for a process have to be given or not
- d) to recover from a deadlock

10. If one thread opens a file with read privileges then

- a) other threads in the another process can also read from that file
- b) other threads in the same process can also read from that file
- c) any other thread cannot read from that file
- d) all of the mentioned



# UNIVERSITY OF THE PUNJAB

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Operating Systems (CMP)  
Course Code: IT-306

TIME ALLOWED: 2 hrs. & 30 mins.  
MAX. MARKS: 50

*Attempt this Paper on Separate Answer Sheet provided.*

## SUBJECTIVE TYPE

### Part-II

A very short answer is required for each of the following questions.

[10 x 2 = 20]

1. Which system call is used to create a process in UNIX?
2. How hardware devices use the functionality of an operating system?
3. What is meant by CPU-protection?
4. What is meant by dual-mode operation?
5. What is the function of ready queue?
6. What is the difference between Long Term Scheduler and Short Term Scheduler?
7. In which memory management technique process can be divided into equal parts?
8. In which memory management technique, system suffers from External Fragmentation?
9. What is meant by critical section?
10. What is meant by race condition?

### Part -III

Answer the following questions briefly.

[6 x 5 = 30]

1. Explain five states process model.
2. What are the different multithreading models?
3. Name the different techniques used for process synchronization.
4. What are the necessary conditions for the deadlock to exist?
5. Determine the system state for the following resource allocation state by using Banker's algorithm.

	<u>Allocation</u>				<u>Max</u>				<u>Available</u>			
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
P0	2	1	0	1	5	1	6	3	3	1	8	1
P1	2	5	1	1	4	8	3	2				
P2	0	1	0	1	0	2	0	1				
P3	0	2	2	1	0	2	2	5				
P4	3	1	1	0	9	1	8	0				
P5	0	1	2	2	0	1	7	7				

6. Consider a computer system with a 24-bit logical address space and with 2 KB page size. Suppose that the maximum physical memory size is 64 MB, and the system is byte-addressable. Let paging be implemented for the system. Give answer to following five questions:
  - a. How many bits for p and d are there in the logical address?
  - b. How many pages are there in the process?
  - c. How many frames are there in the memory?
  - d. What is the size of the page table if one entry in the page table is of 4 bytes?
  - e. How many levels of paging will be required for the above scenario?



# UNIVERSITY OF THE PUNJAB

Roll No. ....

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

PAPER: Object Oriented Analysis and Design  
Course Code: IT-307

TIME ALLOWED: 30 mins.  
MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

## OBJECTIVE TYPE

Q1: Choose the correct Answer.

(10\*1 = 10)

- 1) Abstraction is classified into \_\_\_\_\_ types.  
A) 4                      B) 3  
C) 2                      D) 1
- 2) A Class diagram shows relationship between/among \_\_\_\_\_.  
A) Classes                      B) Interfaces  
C) Organization                      D) None of them
- 3) What is the programming style of the object oriented conceptual model?  
A) Invariant relationship                      B) Algorithms  
C) Classes and objects                      D) Goals, often expressed in a predicate calculus
- 4) 9) \_\_\_\_\_ is the property that distinguishes an active object from one that is not active.  
a) Persistence                      b) Typing  
c) Aggregation                      d) Concurrency
- 5) Single inheritance, multiple inheritance, and Aggregation comes under \_\_\_\_\_.  
a) Modularity                      b) Typing  
c) Hierarchy                      d) None of the mentioned
- 6) What is that concept in type theory in which a single name may denote objects of many different classes that are related by some common super class referred to \_\_\_\_\_.  
a) Homomorphism                      b) Type Checking  
c) Polymorphism                      d) Generalization
- 7) Superclass represents \_\_\_\_\_ abstractions  
a) Generalized abstractions                      b) Specialization abstractions  
c) Both                      d) None of the mentioned
- 8) In which of the following mechanisms, types of all variables and expressions are not known until runtime  
a) Strong typing                      b) Weak Typing  
c) Static Binding/ early binding                      d) Dynamic Binding/ late binding
- 9) The method of design encompassing the process of object oriented decomposition and a notation for depicting both logical and physical and as well as static and dynamic models of the system under design is known as:  
a) Object- Oriented Programming                      b) Object- Oriented Design  
c) Object- Oriented Analysis                      d) None of the mentioned
- 10) During analysis an architect is concerned about \_\_\_\_\_.  
a) Technology                      b) deployment  
c) Implementation                      d) behavioral





# UNIVERSITY OF THE PUNJAB

Fifth Semester 2018  
Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Object Oriented Analysis and Design**  
**Course Code: IT-307**

**TIME ALLOWED: 2 hrs. & 30 mins.**  
**MAX. MARKS: 50**

Attempt this Paper on Separate Answer Sheet provided.

## SUBJECTIVE TYPE

**Q2: Give short answers**

**(5\*4=20)**

- 1) Define aggregation and composition with examples.
- 2) Differentiate between linear and iterative process modeling approaches with examples.
- 3) Differentiate between Software verification & software validation.
- 4) What is waterfall SDLC?
- 5) Define prototype. Give the types of prototype.

**Q3: Give answers to the following questions.**

**(3\*10=30)**

- 1) Write a detailed note on **Encapsulation, inheritance, polymorphism and abstraction**
- 2) Define **use-case, class diagram and object diagram**. Make their diagrams with respect to School management system which should handle attendance, time-in, time-out, student & teachers list, results and yearly report.
- 3) What is **inheritance**? Write a detailed note on types of inheritance, give two examples for each type.



# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Internet Programming (IT)**

**TIME ALLOWED: 2 Hrs. & 45 Mints.**

**Course Code: IT-308 Part – II**

**MAX. MARKS: 50**

**Attempt this Paper on Separate Answer Sheet provided.**

**Question # 2.**

[2 x 10 = 20 Marks]

Precisely write down the answers of the following questions.

1. What is the purpose of threading?
2. What is difference between static and constant variable in java?
3. Why does java allow multiple inheritance between interfaces but not between classes?
4. In event handling, what is the purpose of KeyListener interface?
5. Write down a life cycle of java servlets.
6. What is the purpose of packages?
7. What is the purpose of Statement object in JDBC?
8. In CSS, how can we apply style to the components?
9. What does JDBC, HTML, CSS and JSP stands for?
10. How can we achieve polymorphism in java?

**Question # 3.**

[3 x 10 = 30 Marks]

Briefly write down the answers of the following questions.

1. A client wants to send a request to server for reversing a string. So, you have to make a server-client application, in which client sends a string to the server and server resends it after reversing the string. (Do your task with serialization method in which either you can use built-in class String or make your own string class).
2. Write a JSP page, which will dynamically create a drop down list with all smartphones along with their company saved in data base.  
*DB Name: Database*  
*Table name: Smartphone(model (varChar(15)), company(varChar(15)))*
3. Write a program in which a thread will be created. This thread will take a positive number as input from main thread and display all number from 0 to that number.



**PAPER: Internet Programming (IT)**  
**Course Code: IT-308 Part – I (Compulsory)**

**TIME ALLOWED: 15 Mints.**  
**MAX. MARKS: 10**

**Attempt this Paper on this Question Sheet only.**

**Please encircle the correct option. Each MCO carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.**

**Question # 1.**

[Marks: 1 x 10 = 10]

Evaluate the statement and write down the correct option number.

1. Every program has at least \_\_\_\_\_ number of thread/s.
  - a. 1
  - b. 2
  - c. It is not compulsory that every program has at least any number of thread/s
  - d. None of these
  
2. Which of the following is a valid declaration of an object of class Box?
  - a. new Box obj;
  - b. obj = new Box();
  - c. Box obj = new Box();
  - d. Box obj = new Box;
  
3. On pressing OK button, prompt box returns \_\_\_\_\_ value.
  - a. message written in text box
  - b. null
  - c. prompt box is not a type of Pop up box
  - d. none of above
  
4. Which of these cannot be declared static?
  - a. Class
  - b. Object
  - c. Variable
  - d. Method
  
5. Init function of a servlet will be called only \_\_\_\_\_ times in a life cycle of servlet.
  - a. 1
  - b. 2
  - c. Multiple
  - d. None of the above
  
6. Finalize method is \_\_\_\_\_ in java.
  - a. a destructor
  - b. a garbage collector
  - c. called before destroying the objects
  - d. called after destroying the objects
  
7. There \_\_\_\_\_ a this reference in static methods.
  - a. exists
  - b. does not exist
  
8. If we uses get method technique, then the data will be sent through \_\_\_\_\_.
  - a. body of request
  - b. url
  - c. both a & b
  - d. none of these
  
9. Which keyword is used by method to refer to the object that invoked it?
  - a. import
  - b. catch
  - c. abstract
  - d. this
  
10. What will be the output of the program?

```
public class Foo{
    public static void main(String [] args){
        try{
            return;
        }
        Finally{
            System.out.println("Finally");
        }
    }
}
```

  - a. Finally
  - b. Compilation fails
  - c. The code runs with no output
  - d. An exception is thrown at runtime



# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Computer Networks (CMP)**

**TIME ALLOWED: 2 Hrs. & 45 Mints.**

**Course Code: IT-309 Part – II**

**MAX. MARKS: 50**

**Attempt this Paper on Separate Answer Sheet provided.**

**Question No 2: Give the short answers of the following short Questions? [2x10=20]**

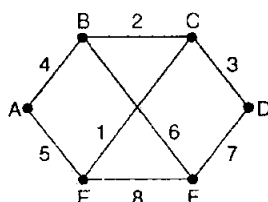
- 1: What is the size in Bytes of PORT address?
- 2: Which layer is responsible for the delivery of data from one process to another?
- 3: Which topology is the ideal one for point to point networks?
- 4: The attenuation of a signal is -10 Db. What is the final signal power if it was originally 5 Watt?
- 5: Calculate the bit rate for the baud rate of 1000 baud under 8-PSK modulation?
- 6: How many bits can be transmitted in 1 sec if 10 bits can be transmitted in 0.1 ms?
- 7: What are the three types of decision taken by a bridge for an incoming frame?
- 8: Using a 4 bit sequence number, what is the maximum size of the send and receive windows for each of the following protocol:  
 Selective Repeat ARQ  
 Go-Back-N ARQ
- 9: What is the type of the following MAC destination addresses?  
 i. 5E:30:10:21:10:1A  
 ii. FF:FF:FF:FF:FF:FF
- 10: How the hop by hop choke packets approach is better than the other choke packets approach (affect only the source)?

**Question No 3: Give the answers of the following Questions? [6x5=30]**

- (1) Discuss three transmission Impairments?
- (2) Encode the bit stream **01001101** into digital signal with the following encoding schemes?  
 NRZ-L  
 Manchester  
 Differential Manchester
- (3) The code 11010101101 was received. Using the Hamming encoding algorithm, what is the original code sent?
- (4) Two nodes (assume 'A' is sender and 'B' is receiver) use a sliding window (go-back-N) protocol. Show the sender and receiver window positions for the following succession of events: (Assume that sender window size is 4)  
 a) Before 'A' sends any frame.  
 b) After 'A' sends frame 0, 1, 2 and receives acknowledgement from 'B' for 0 and 1  
 c) After 'A' sends frames 3, 4, and 5 and 'B' acknowledges 3, and 4 and the ACK of 4 is lost whereas ACK of 3 is received by 'A'.
- (5) Determine the level of sensitivity ('High' or 'Low') of each application in the following table for given parameters.

Application	Reliability	Delay	Jitter	Bandwidth
Email				
File sharing				
Web access				
Audio on demand				
Video conferencing				

(6) From the following network find the shortest path from 'A' to all destinations using Dijkstra's Algorithm.







# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018  
Examination: B.S. 4 Years

Roll No. ....

**PAPER: Information Systems (IT)**  
**Course Code: IT-311 Part – II**

**TIME ALLOWED: 2 Hrs. & 45 Min.**  
**MAX. MARKS: 50**

**Attempt this Paper on Separate Answer Sheet provided.**

**Question # 2.**

**[2 x 10 = 20 Marks]**

**Precisely write down the answers of the following questions.**

1. "To achieve the objectives of Information Technology, firm must be able to implement new technology effectively". Now what are the problems in achieving the objectives?
2. Define information system w.r.t functional perspective.
3. Define the following terms
  - a. Process
  - b. Knowledge
4. Differentiate lower and higher productivity.
5. What are the risks involved in utilizing information systems?
6. What is meant by customer relationship management?
7. Describe the stages of innovation based model of Information system implementation?
8. What are the management issues in information technology?
9. What is meant by forecasting?
10. What are the common type of issues in an organization?

**Question # 3.**

**[3 x 10 = 30 Marks]**

**Briefly write down the answers of the following questions.**

1. Write a brief explanation about business information systems.
2. What are the benefits of strategic management? Also explain the process of strategic management.
3. Briefly describe the global challenges in information systems.



# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018  
Examination: B.S. 4 Years

Roll No. ....

**PAPER: Information Systems (IT)**  
**Course Code: IT-311 Part – I (Compulsory)**

**TIME ALLOWED: 15 Min.**  
**MAX. MARKS: 10**

**Attempt this Paper on this Question Sheet only.**

**Please encircle the correct option. Each MCO carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.**

**Question # 1.**

**[Marks: 1 x 10 = 10]**

Evaluate the statement and write down the correct option number.

1. Cooperation between business managers and IS personnel is the key to \_\_\_\_\_ the potential of any new or modified system.
  - a. Unlocking
  - b. Locking
  - c. Both a & b
  - d. None of these
2. If \_\_\_\_\_ is not accurate or complete – People can make poor decisions.
  - a. Information
  - b. Expenditure
  - c. Profit
  - d. None of these
3. Valuable \_\_\_\_\_ – Can help managers decide whether to invest in additional information systems and technology.
  - a. Sources
  - b. Things
  - c. Information
  - d. None of these
4. \_\_\_\_\_ mechanism – The component that helps organizations achieve their goals, such as increasing profits or improving customer service.
  - a. Input
  - b. Output
  - c. Feedback
  - d. None of these
5. World's largest computer network is known as \_\_\_\_\_.
  - a. Skype
  - b. Internet
  - c. Whatsapp
  - d. None of these

**(P.T.O.)**

6. \_\_\_\_\_ management systems – Organized collection of people, procedures, software, databases, and devices.
  - a. Information
  - b. Knowledge
  - c. Artificial
  - d. None of these
7. Systems analysis – Defines problems and opportunities of the \_\_\_\_\_ system.
  - a. New
  - b. Existing
  - c. Currently
  - d. None of these
8. Technology \_\_\_\_\_ model – Specifies factors that can lead to higher acceptance and usage of technology
  - a. Acceptance
  - b. Repentance
  - c. Both a and b
  - d. None of these
9. People who create, use, and disseminate knowledge are known as \_\_\_\_\_.
  - a. IT Experts
  - b. Knowledge Workers
  - c. Both a and b
  - d. None of these
10. Long range forecast is usually greater than 2 years.
  - a. Less than 2 years
  - b. More than 2 years
  - c. In between 1 – 4 years
  - d. None of these





# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Linear Algebra (MA)**  
**Course Code: IT-312 Part – II**

**TIME ALLOWED: 2 Hrs. & 45 Mints.**  
**MAX. MARKS: 50**

**Attempt this Paper on Separate Answer Sheet provided.**

**Q. 2** **SHORT QUESTIONS** (4x5 = 20 Marks)

(i) Determine the values of  $a$  for which the system of linear equations has no solution, exactly one solution and infinitely many solutions.

$$x + y + 7z = -7$$

$$2x + 3y + 17z = -16$$

$$x + 2y + (a^2 + 1)z = 3a.$$

(ii) Prove that 
$$\begin{vmatrix} \frac{a^2 + b^2}{c} & c & c \\ a & \frac{b^2 + c^2}{c} & a \\ b & b & \frac{c^2 + a^2}{c} \end{vmatrix} = 4abc$$

(iii) Show that the vectors  $(1, -2)$ , and  $(3, -5)$  span the vector space  $\mathbb{R}^2$

(iv) Define  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$  by  $T(x_1, x_2, x_3) = (-x_3, x_1, x_1 + x_3)$ . Find  $N(T)$ . Is  $T$  one-to-one?

(v) Show that the matrix 
$$\begin{bmatrix} 0 & 1 & -1 \\ 4 & -3 & 4 \\ 3 & -3 & 4 \end{bmatrix}$$
 is involutory

### SECTION-III

**LONG QUESTIONS** (6x5 = 30 Marks)

**Q.3** If  $A$  and  $B$  are  $3 \times 3$  matrices such that  $\det(A^2 B^3) = 108$  and  $\det(A^3 B^2) = 72$  then find  $\det(2A)$  and  $\det(B^{-1})$ .

**Q.4** Find the real orthogonal matrix  $P$  for which  $P^{-1}AP$  is orthogonal, where  $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$

**Q.5** If possible, find the inverse of the matrix 
$$\begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 2 \end{bmatrix}$$

**Q.6** Show that any finite dimensional vector space contains a basis.

**Q.7** Determine whether or not the given set of vectors is a basis of  $\mathbb{R}^3$

$$\{(1, 2, -1), (0, 3, 1), (1, -5, 3)\}$$



# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

PAPER: Linear Algebra (MA)

TIME ALLOWED: 15 Mints.

Course Code: IT-312 Part – I (Compulsory)

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Each MCQ carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.

Q. 1

MCQs (1x10 = 10 Marks)

- (i) The set  $S = \{(1, 2), (2, 3), (0, 0)\}$  of vectors in  $R^2$  is -----  
 (a) linearly independent (b) linearly dependent (c) basis of  $R^2$  (d) None of these
- (ii) The basis of trivial subspace  $A = \{0\}$  is -----  
 (a)  $\{0\}$  (b)  $\{1\}$  (c)  $\{ \}$  (d) None of these
- (iii) If  $A$  is a matrix of order  $3 \times 3$  and  $\det(A) = -2$ , then the value of  $\det(3A)$  is -----  
 (a) -24 (b) -6 (c) -27 (d) -54
- (iv) A system of  $m$  homogeneous linear equations  $Ax = 0$  in  $n$  variables has a non-trivial solution if and only if the rank of  $A$  is -----  
 (a) equal to  $n$  (b) less than  $n$  (c) greater to  $n$  (d) None of these
- (v) The subspace of  $R^3$  spanned by the vector  $(a, b, c)$  is -----  
 (a)  $x = t, y = bt, z = ct$  (b)  $x = -at, y = -bt, z = -ct$   
 (c)  $x = at, y = bt, z = ct$  (d) None of these
- (vi) The property  $\forall a, b \in R$  then  $a + b \in R$  is called  
 (a) Associative property (b) Transitive property  
 (c) Closure property (d) None of these
- (vii) A linear transformation  $T: U \rightarrow V$  is one-to-one if and only if -----  
 (a)  $N(T) = \{0\}$  (b)  $N(T) \neq \{0\}$  (c)  $N(T) = \{1\}$  (d)  $N(T) = \{-1\}$
- (viii) Let  $R^3$  be the vector space of all ordered triples of real numbers. Then the transformation  $T: R^3 \rightarrow R^3$  defined by  $T(x, y, z) = (x, y, 0)$  is  
 a) Linear (b) Not Linear (c) Rational (d) None of these
- (ix) The dimension of  $\text{Ker}T$  is called -----  
 (a) Rank (b) Nullity (c) basis (d) none of these
- (x) The characteristic polynomial of the matrix  $\begin{pmatrix} 2 & 0 \\ 0 & 3 \end{pmatrix}$  is -----  
 (a)  $p(\lambda) = (1 - \lambda)^2$  (b)  $p(\lambda) = (2 - \lambda)(3 - \lambda)$   
 (c)  $p(\lambda) = \lambda^2$  (d) None of these



# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Introduction to Psychology (HM)**

**TIME ALLOWED: 2 Hrs. & 45 Mints.**

**Course Code: IT-313 Part – II**

**MAX. MARKS: 50**

**Attempt this Paper on Separate Answer Sheet provided.**

**Question – 2:**

**Short Questions (2 Marks X 10 Question = 20 Marks)**

- I. Define Clinical Psychology?
- II. What is meant by Personality?
- III. Name the stages of Survey?
- IV. Differentiate between mind and brain?
- V. What is meant by Motivated Forgetting?
- VI. Draw the diagram of Ear?
- VII. Differentiate between perception and illusion.
- VIII. Differentiate between STM and LTM.
- IX. Define Intelligence?
- X. How will you explain figure-ground relationship?

**Question – 3:**

**Long Questions (10 Marks X 3 Question = 30 Marks)**

- I. Write a detailed note on Central Nervous System?
- II. Explain in detail the “Psychodynamic Theory” of Sigmund Freud?
- III. Define “Hypnotism”. Discuss the application of Hypnotism in medical.



# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Introduction to Psychology (HM)**  
**Course Code: IT-313 Part – I (Compulsory)**

**TIME ALLOWED: 15 Mints.**  
**MAX. MARKS: 10**

**Attempt this Paper on this Question Sheet only.**

**Please encircle the correct option. Each MCQ carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.**

**Question – 1: MCQ'S (1 Mark X 10 Questions = 10 Marks)**

1. Who focused on Psychology as the science of Consciousness :  
(a) William Wundt (b) Sigmund Freud  
(c) J. B. Watson (d) Carl Rogers
2. A tube like structure that carries the neural message to other cells:  
(a) Neuron (b) Soma  
(c) Glial (d) Axon
3. Our episodic memory consists of:  
(a) Educational events (b) Economical events  
(c) All important life events (d) None of these
4. Variables that are result of introduced stimuli in the experimental method are :  
(a) The Independent Variable (b) The Dependent Variables  
(c) Both (a) & (b) (d) None of these
5. Who presented theory of Social Learning?  
(a) Albert Bandura (b) Wilhelm Wundt  
(c) Ivan Pavlov (d) Roger Wolcott
6. psychoanalysis is a meethod of searching a person's:  
(a) Conscious Memories (b) Unconscious Memories  
(c) Latent Memories (d) None of them
7. whole is the greater than the sum of parts is the key point of  
(a) Cognitive School of thought (b) Functionalism  
(c) Behaviorism (d) Getalt School of thought
8. E.B. Titchener used the method of:  
(a) Functionalism (b) Introspection  
(c) Observation (d) Clinical Method
9. Sleep walking murder cases occurred to date:  
(a) 65 (b) 69  
(c) 68 (d) 67
10. Who opened the first psychology lab at the university of Leipzig?  
(a) Wilhelm Wundt (b) B.F. Sinner  
(c) Ivan Pavlov (d) E.B. Titchener



# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Introduction to Sociology (SS)**

**TIME ALLOWED: 2 Hrs. & 45 Mints.**

**Course Code: IT-314 Part – II**

**MAX. MARKS: 50**

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**Attempt this Paper on Separate Answer Sheet provided.**

**Question – 2:**

**Short Questions (5 Marks X 4 Question = 20 Marks)**

- I. Define research. Differentiate between social and scientific research.
- II. Explain briefly the conflict theory of Karl Marx.
- III. Explain the formal & informal means of social control.
- IV. What is social interaction? Discuss the various types of social interaction.

**Question – 3:**

**Long Questions (10 Marks X 3 Question = 30 Marks)**

- I. Define the term sociology? Sociology is the scientific study of human relationship & interaction elaborate
- II. Define the term “Socialization”. Discuss the different Agents of Socialization in detail.
- III. Terrorism has become a real and potential threat to global peace and stability. What role social scientist can play to combat their problem?



# UNIVERSITY OF THE PUNJAB

Sixth Semester - 2018

Examination: B.S. 4 Years Programme

Roll No. ....

**PAPER: Introduction to Sociology (SS)**  
**Course Code: IT-314 Part – I (Compulsory)**

**TIME ALLOWED: 15 Mints.**  
**MAX. MARKS: 10**

**Attempt this Paper on this Question Sheet only.**

**Please encircle the correct option. Each MCQ carries 1 Mark. This Paper will be collected back after expiry of time limit mentioned above.**

**Question – 1: MCQ's (1 Mark X 10 Questions = 10 Marks)**

1. Survey means:  
(a) Overlooking  
(b) Observation  
(c) Organizing social data  
(d) None of these
2. A stimulus response condition between two persons is called :  
(a) Exchange  
(b) Dialogue  
(c) Interaction  
(d) None of these
3. When two or more persons interact with each other they form”  
(a) Community  
(b) Group  
(c) Society  
(d) None of these
4. A Socially accepted behavior is called:  
(a) Folkway  
(b) Social Norm  
(c) More  
(d) None of these
5. Who can be taken as early pure sociology among the social thinkers?  
(a) Auguste comte  
(b) Ibn-e-khuldun  
(c) Durkheim  
(d) None of these
6. Who called sociology “social Physics”  
(a) Wilfred  
(b) Auguste comte  
(c) Herbet Spencer  
(d) None of these
7. Who said man is a social animal:  
(a) Aristotle  
(b) Plato  
(c) Socrates  
(d) None of these
8. Max Weber focused on the idea of:  
(a) Communism  
(b) Symbolic interactionism  
(c) Functionalism  
(d) None of these
9. Sociology originated as a separate discipline in:  
(a) 1836  
(b) 1837  
(c) 1838  
(d) None of these
10. who used the analogy of living organism for society”  
(a) Max weber  
(b) C.W. Mill  
(c) Auguste Comete  
(d) Herbert spencer