# PUNJAB PUBLIC SERVICE COMMISSION

## COMBINED COMPETITIVE EXAMINATION FOR RECRUITMENT TO THE POSTS OF PROVINCIAL MANAGEMENT SERVICE, ETC -2022 CASE NO. 2C2023

**SUBJECT: COMPUTER SCIENCE (PAPER-I)**

**TIME ALLOWED: THREE HOURS** **MAXIMUM MARKS: 100**

**NOTE:**

i. All the parts (if any) of each Question must be attempted at one place instead of at different places.
ii. Write Q. No. in the Answer Book in accordance with Q. No. in the Q. Paper.
iii. No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.
iv. Extra attempt of any question or any part of the question will not be considered.

**NOTE: Attempt FIVE Questions in All. Attempt at least ONE question from each Section.**

## SECTION-A

**Q No.1:** **a)** The instruction set architecture (ISA) is the set of basic instructions that a processor understands. Historically, there are two philosophies of instruction sets. Write down the names of these two philosophies.

**b)** Differentiate between Compilers and Interpreters. Give at least two differences.

**(6+14=20 Marks)**

**Q No.2:** **a)** How would you define a function in programming language? Explain the main components of a function.

**b)** Write a program in any programming language to add the matrix of 3X3 using arrays.

**(10+10=20 Marks)**

**Q No.3:** **a)** How program testing is done? Explain different types of software testing in detail.

**b)** Write a program using functions to differentiate between pass by value and pass by reference.

**(10+10=20 Marks)**

## SECTION-B

**Q No.4:** **a)** Consider yourself as the network administrator for a surveillance company. Your company has offices in several countries, and they need to create a network that allows those offices to connect with one another. In this situation, you must determine the type of network that will emerge.

**b)** Thick Ethernet uses thick coax cable. Transceiver or drop cables connect NIC to transceiver. Different machines send data on the cable which can cause reflectance that in turn damages the data. Keeping in view thick Ethernet, you are required to answer the following questions:

i. Which device is used to avoid the Reflectance of signal?
ii. Which form of signal does AUI carry?

**(8+12=20 Marks)**

**Q No.5:** **a)** What do you know about Minterms and Maxterms? Also explain sum of Minterms and Product of Maxterms with examples.

**b)** Define Logic Gates. Enlist the Digital Logic Gates alongwith their names, graphical symbols, algebraic functions & Truth Tables. **(10+10=20 Marks)**

**Q No.6:** **a)** What is meant by adder? Explain half adder and full adder with example.

**b)** Draw the NAND logic diagram for each of the following using multiple-level NAND gate circuits:

i. $(AB' + CD')E + BC(A + B)$
ii. $w(x + y + z) + xyz$

**(10+5+5=20 Marks)**

## SECTION-C

**Q No.7:** **a)** Write down the three ways in which we can implement the Queue data structure.

**b)** What is the output of following program?

```
MyQueue q;
MyStack s;
q = new MyQueue();
s = new MyStack();
s.push(5);
s.push(6);
s.push(7);
q.enqueue(s.pop());
q.enqueue(5);
cout<<s.pop();
q.enqueue(6);
cout<< q.dequeue();
s.push(q.dequeue());
cout<<s.pop();
cout<<s.pop();
```

**(6+14=20 Marks)**

**Q No.8:** **a)** Consider performance of FCFS algorithm for three computer-bound processes. If process P1 takes 24 seconds, P2 takes 3 seconds and P3 takes 3 seconds and processes arrive in the given order P1, P2, P3. You need to calculate the following.

i. Turnaround time per process
ii. Average turnaround time of processes

**b)** Enlist the four conditions of the deadlock. **(12+8=20 Marks)**

**Q No.9:** **a)** What do you know about inter process communication? Explain semaphores and binary semaphores in detail

**b)** In which technique paging and segmentation are combined? Explain with example.
**(10+10=20 Marks)**

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