PUNJAB PUBLIC SERVICE COMMISSION

COMBINED COMPETITIVE EXAMINATION FOR RECRUITMENT TO THE POSTS OF PROVINCIAL MANAGEMENT SERVICE, ETC -2021

CASE NO. 3C2022

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) Convert decimal number "25" into binary number using the binary notation method.

b) Write down the names of five devices that uses embedded operating system.

c) What are machine independent languages? Give the names of two machine independent languages.

(8+5+7=20 Marks)

Q No.2: a) What will be the output of the following code?

```
int main()
{
float value =3;
if ( value >=4 )
cout<<"Report is positive";
else
cout<<"Report is Negative";
return 0;
}
```

b) Which devices are used by AI agents for the following purposes?

1. To perceive the environment.
2. To affect the environment.

c) Find any errors in the following function prototypes:

1. int sum(int x,y);
2. int sum(int x,int y)
3. int sum(int x,void y);

(6+8+6=20 Marks)

SECTION-B

Q No.3: a) Write down the names of 5 main components of data communication.

b) Consider the data rate of the signal as 2Kbps having duration of noise signal 1/100 seconds. Calculate the number of impacted /effected bits.

c) Which TCP/IP layer is used for internet working? Write the layer name. Also mention the type of address which is used on this layer.

(5+10+5=20 Marks)

Q No.4: a) Simplify the following Boolean expression so that it uses minimum number of gates.

$$\overline{(\bar{A}+B+C+\bar{D})+(A\bar{B}C)}$$

b) Draw the circuit diagram of NAND based S-R Latch.

(12+8=20 Marks)

Q No.5: a) In case of memory segmentation, what will be the system behavior when it meets a segment fault?

b) What is the difference between computer organization and computer architecture? Write two attributes of both computer organization and computer architecture.

(8+12=20 Marks)

SECTION-C

Q No.6: a) Which method is better to implement "List" if we are not sure about the number of elements that will be inserted in the list? Give reason to support your answer.

b) Given input {23, 46, 12, 59, 78, 87, 2, 3} and a hash function **h(x) =x mod 11**, show the resulting "Chaining hash table".

(8+12=20 Marks)

Q No.7: a) Draw an AVL tree from the following nodes in the given order:

17, 18, 5, 15 and 7

Show all the steps (insertions and rotations) pictorially.

b) Differentiate between Turnaround time and Response time.

c) Suppose a deadlock occurs in the system and the deadlock detection algorithm detects a deadlock then how these deadlocks will be recovered? Mention any two method names.

(8+6+6=20 Marks)

Q No.8: a) Critical section problem has different hardware and software based solution. You have to write an algorithm that shares two variables among processes.

b) In memory management, how does a page fault occur and who is responsible to handle page fault if it occurs?

(12+8=20 Marks)