



FEDERAL PUBLIC SERVICE COMMISSION
SECTION OFFICERS PROMOTIONAL EXAMINATION - 2016

Roll No.

566

COMPUTER SCIENCE

TIME ALLOWED: THREE HOURS

MAXIMUM MARKS: 100

- NOTE:**(i) Attempt **FIVE** questions in all. **ALL** Questions carry **EQUAL** Marks.
(ii) All the parts (if any) of each Question must be attempted at one place instead of at different places.
(iii) Candidate must write **Q. No.** in the **Answer Book** in accordance with **Q. No.** in the **Q. Paper**.
(iv) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.
(v) Extra attempt of any question or any part of the attempted question will not be considered.
(vi) Leave some blank space and draw two horizontal lines (====) at the end of each answer.

- Q. 1.** (a) List OSI Seven Layers in order and briefly describe functions of each layer. (10)
(b) What is the difference between IPv4 and IPv6? Why IPv6 was developed when IPv4 was already available and implemented? (6)
(c) What is the difference between LAN, MAN, WAN and PAN? (4) (20)
- Q. 2.** (a) What is an operating system? List any three operating systems? (6)
(b) What is a process? How processes are scheduled to the processor? List any three Scheduling algorithms. (8)
(c) What is the difference between uni-programming, multi-programming/multi-tasking and parallel processing? (6) (20)
- Q. 3.** (a) Convert the following numbers from binary to decimal: (8)
(i) $(110001)_2$ (ii) $(100101)_2$ (iii) $(100111)_2$
(iv) $(11100)_2$
(b) Convert the following numbers from decimal to binary (6)
(i) 65 (ii) 89 (iii) 122
(iv) 99
(c) Define the following terms: (6) (20)
(i) URL (ii) Protocol (iii) DNS
(iv) WiFi
- Q. 4.** (a) Write a program in C++ that adds two numbers X and Y. It should display sum with following output: (8)
Enter first integer X:
Enter second integer Y:
Sum = X+Y=
(b) Define following terms: (8)
(i) Class (ii) Encapsulation (iii) Shadowing
(iv) Polymorphism (v) Inheritance (vi) Copy constructor
(vii) Serialization (viii) Trigger
(c) Write the output of following program: (4) (20)

```
#include<iostream.h>
void main()
{
    clrscr();
    char str [20];
    cout<<"Enter your name : ";
    cin>>str;
    cout<<"Hello, "<<str<<"You are appearing in FPSC exam";
    getch();
}
```

567

COMPUTER SCIENCE

Q. 5. (a) Consider the following array, write a heap out as binary tree. (8)

0	1	2	3	4	5	6	7	8	9	10
1	8	27	10	45	83	91	31	12	52	51

(b) Add 23 to the heap, making sure to restore the heap invariant. How does the array look now? (8)

(c) Two of the most common divide-and-conquer sorting algorithms are quicksort and mergesort. In practice quicksort is often used for sorting data in main storage rather than mergesort. Give a reason why quicksort is likely to be the preferred sorting algorithm for this application. (4) (20)

Q. 6. (a) Why normalization is used in relational databases? Define first and second normal form with an example. (10)

(b) What is primary key and why is it used in each relation? (3)

(c) What is the difference between an entity and an attributes? (3)

(d) Draw an entity relationship diagram between EMPLOYEES, and DEPARTMENTS assuming that each employee can be employed by only one department at a time. Write down any other assumption if you use it. (4) (20)

Q. 7. (a) What is e-Commerce? What are the advantages & disadvantages of e-commerce? (8)

(b) Explain Software Development Life Cycle (SDLC). (8)

(c) Write codes in html that displays following output: (4) (20)

This is a sample website.

It is written using HTML codes.

Q. 8. Define the following concepts with suitable examples. (5 marks each) (20)

(a) Machine vision

(b) Image acquisition

(c) Feature extraction

(d) OCR (Optical Character Recognition)
