IIITDM Kancheepuram

T.O (CSE)
L-2
NOV 23

Post: Technical Officer (CSE)

LEVEL 2 – DESCRIPTIVE TEST

Instruction: This question paper consists of questions given in Part – A, Part – B(i) and Part – B(ii).

PART - A

Answer any TEN questions from the following.
Each question carries three marks.
(10 x 3 = 30 marks)

1.	In a paged memory, the page hit ratio is 0.35. The time required to access a page in secondary memory is equal to 100 ns. The time required to access a page in primary memory is 10 ns. The average time required to access a page is A. 3.0 ns B. 68.0 ns C. 68.5 ns D. 78.5 ns
2.	A computer installation has 1000K of main memory. The jobs arrive and finish in the following sequence ***Job 1 requiring 200 K arrives*** ***Job 2 requiring 350 K arrives*** ***Job 3 requiring 300 K arrives*** ***Job 1 finishes*** ***Job 4 requiring 120 K arrives*** ***Job 5 requiring 150 K arrives*** ***Job 6 requiring 80 K arrives*** Among best fit and First fit. Which performs better for this sequence? A. First Fit B. Best Fit C. Both perform the same D. None of the above
3.	In a web server, there are ten WebPages stored with the URLs of the form "http://www.yourname.com/var.html". Here, var is a distinct number from 1 to 10 for each web page. The client will store the Webpage with var=1 (like W1) in the local machine, edit it, and test it. The rest of the WebPages remains on the webserver. W1 will contain several relative URLs of the form "var.html" referring to the other WebPages. Select the statement that needs to be added in W1 so that the relative URLs in W1 refer to the proper WebPages on the webserver? (a) <base href: "http://www.yourname.com/", range:"...var.html"> (b) <a href: "http://www.yourname.com/"> (c) <base href: "http://www.yourname.com/"> (d) <a href: "http://www.yourname.com/", href:"...var.html">

4.	A process refers to 5 pages, A, B, C, D and E in the order – **A; B; C; D; A; B; E; A; B; C; D; E**. If the page replacement algorithm is FIFO, the number of pages which transfer with an empty internal store of 3 frames is A. 8 B. 10 C. 9 D. 7
5.	A switch on a 10 Gb/s link forwards packets immediately after receiving the last bit of a packet during transmission. If the packet size is 10000 bits and there is a propagation delay of 20 microseconds on the link, the latency on the link is (A) 42 microseconds (B) 36 microseconds (C) 32 microseconds (D) 24 microseconds
6.	How do switches use switching tables to forward data within a LAN? Provide examples to illustrate how switching tables contribute to efficient data transmission.
7.	Define DHCP and its role in network configuration. Explain how DHCP works in dynamically assigning IP addresses to devices in a LAN?
8.	Provide two examples of situations where ping is a valuable tool and describe the information it provides in those scenarios.
9.	Describe two key security settings that can be configured on a WiFi network. Explain how enabling WPA3 encryption and implementing a strong passphrase contribute to the security of a wireless network
10.	Explain the basic function of the traceroute command. Describe the information that traceroute provides. Provide a brief example to illustrate how traceroute works.
11.	a) How to set MySQL root password b) How to check active threads of MySql server c) How to SSH to a remote server using shell script. Note : use mysqladmin to answer the above questions
12.	Is it better to use a macro or a function? Explain by giving their syntax.
13.	What is a void pointer? Explain with reference to int *ip .

PART – B (i)

Answer any FOUR questions from the following.
Each question carries five marks.
(4 X 5 = 20 marks)

I. Suppose a LAN is experiencing connectivity problems. Explain a systematic approach to troubleshooting the network, specifically focusing on issues related to switches. Include common problems, diagnostic tools, and possible solutions to ensure effective LAN troubleshooting.

II. Explain the concept of subnetting in IP networking. Provide a practical example of how subnetting can be applied to optimize IP address allocation within a network.

III. Briefly describe the role of the Domain Name System (DNS) in networking. Explain how DNS translates domain names to IP addresses and discuss the significance of DNS in the context of web browsing and communication on the Internet.

IV. Given an array A of size N. Find the minimum number of operations needed to convert the given array to 'Palindromic Array'.
The only allowed operation is that you can merge two adjacent elements in the array and replace them with their sum.

Examples :

Input : arr[] = {15, 4, 15} Output : 0
Array is already a palindrome. So we do not need any merge operation.

Input : arr[] = {1, 4, 5, 1} Output : 1
We can make given array palindrome with minimum one merging (merging 4 and 5 to
make 9)

Input : arr[] = {11, 14, 15, 99} Output : 3
We need to merge all elements to make a palindrome.

V. Consider the following code :

```
void S( int x, int *y, int *z )
{ int t;
        t = x + y ;
        x = y + z ;
        y =  x + t ;
        z = y + z;
        printf (“%d %d %d”, x, y, z);
}
main()
{  int a = 3 , b = 5 , c = 7 ;
        S( a , b , &c ) ;
       printf (“%d %d %d”, a,b,c);
}
```

In the above code, you should not change **the statements that are in bold**. You have to think and make required changes/corrections in the other statements (that are not bolded) so that the output is
12 20 27
3 20 27

VI.	This question consists of two sub-question (a) and sub-question (b)

(sub-question a) Understand the following code which transform an expression from one notation to the other. Choose the answer among choices given below the code.

```
char s[50];
void xfix_to_yfix(char *xfix, char *yfix)
{
    char ch, elem;
    int i = 0, k = 0;
    push('#');
    while ((ch = xfix[i++]) != '\n')
    {
        if (ch == '(')
                push(ch);
        else if (isalnum(ch))
                yfix[k++] = ch;
        else if (ch == ')')
                {
                while (s[top] != '(')
                yfix[k++] = pop();
                elem = pop(); /* Remove ( */
               }
          else
                {  /* Operator */
                 while (pr(s[top]) >= pr(ch))
                        yfix[k++] = pop();
                 push(ch);
                }
       }
       while (s[top] != '#') /* Pop from stack till empty */
       yfix[k++] = pop();
       yfix[k] = 0; /* Make yfix as valid string */
}
```

Here, push() and pop() perform entering and removing of data from a stack

(A) postfix to infix
(B) infix to postfix
(C) prefix to postfix
(D) prefix to infix

(sub-question b) **What will be the value of 'result' in following Python program?**

```
list1 = [1,2,3,4]
list2 = [2,4,5,6]
list3 = [2,6,7,8]
result = list()
result.extend(i for i in list1 if i not in (list2+list3) and i not in result)
result.extend(i for i in list2 if i not in (list1+list3) and i not in result)
result.extend(i for i in list3 if i not in (list1+list2) and i not in result)
```

a) [1, 3, 5, 7, 8]
b) [1, 7, 8]

	c) [1, 2, 4, 7, 8] d) error

PART – B(ii)

Answer the following TWO questions.
Each question carries five marks.
(2 X 5 = 10 marks)

<table>
<tr><td>VII.</td><td>Given an integer array, check if it contains a contiguous subarray having zero-sum.

Input : [3, 4, -7, 3, 1, 3, 1, -4, -2, -2]
Output: true
Reason: The subarrays with zero-sum are

[3, 4, -7]
[4, -7, 3]
[-7, 3, 1, 3]
[3, 1, -4]
[3, 1, 3, 1, -4, -2, -2]
[3, 4, -7, 3, 1, 3, 1, -4, -2, -2]

Input : [4, -7, 1, -2, -1]
Output: false
Reason: The subarray with zero-sum doesn't exist.

(OR)

A University intends to procure an integrated student management system holding all details of registered students including personal information courses taken and examination marks achieved. The administration is interested student registration for course. However, the procured software doesn’t contain an online registration feature. The administration wants the online registration module to be deployed for the students who are staying at home and register for online courses due to severe COVID-19 pandemic. The administration has instructed to the development team to have the following features:

• Student Authentication
• Student Registration form
• Staff Advisor form (Contains the list of Students registered)
• HOD form (Contains the list of Students registered, year wise)
• Dean Form (Contains the list of Students registered, Branch wise, year wise, program wise)
Print the student registration form.</td></tr>
<tr><td>VIII.</td><td>Find minimum jumps required to reach the destination
Given an array of non-negative integers, where each array element represents the maximum number of positions one can move forward from</td></tr>
</table>

that element. Find the minimum number of jumps required to reach a given destination from a given source within the array.

If any element has value zero in the array, the destination cannot be reached through that element. If the source itself has value zero, return infinity as the destination cannot be reached at all. To make the problem simpler, let's assume the source and destination to be the start and end of the array.

For example,
Input: nums[] = { 4, 2, 0, 3, 2, 0, 1, 8 }
Output: Minimum jumps required to reach the destination are 3.
3 jumps: (4 —> 3 —> 1 —> 8) or (4 —> 2 —> 1 —> 8)
4 jumps: (4 —> 2 —> 3 —> 1 —> 8) or (4 —> 3 —> 2 —> 1 —> 8)
5 jumps: (4 —> 2 —> 3 —> 2 —> 1 —> 8)
Input: nums[] = { 4, 2, 2, 1, 0, 8, 1 }
Output: Minimum jumps required to reach the destination are infinity. This is because no matter what path we choose, we will always end up in a dead cell.
4 —> 2 —> 2 —> 1 —> 0;
4 —> 2 —> 1 —> 0;
4 —> 1 —> 0
4 —> 0

(OR)

A University computer Shop needs a software that process the student orders related to computer peripherals and delivers to designated hostel/academic block. The Shop owner approached and requested you to develop an order processing software for their store with the following features:

- Student Order form
- Customer support form
- Invoice generation
- Generating sales and inventory report every day