**088/2023**

1. Which of the following function is not a mathematical function?

   (A) many-to-one                    (B) one-to -many

   (C) one-to-one                     (D) all of the above

2. Which of the following is a binary operation on $\mathbb{N}$?

   (A) Subtraction                    (B) Multiplication

   (C) Division                       (D) All of the above

3. If the set $A = \{1, 3\}$ and set $B = \{b, d\}$. Then what is the Cartesian product of set $A$ and set $B$?

   (A) $\{(1, b), (1, d), (3, b), (d, d)\}$     (B) $\{(1, 1), (3, 3), (b, b), (d, d)\}$

   (C) $\{(3, b), (1, d), (1, b), (3, d)\}$     (D) $\{(1, 1), (3\ b), (b, b), (1, d)\}$

4. If $p * q = (p^3 + q^3)^{1/3}$ on the real numbers, then '$*$' is

   (A) commutative but not associative        (B) associative but not commutative

   (C) both commutative and associative       (D) neither commutative nor associative

5. The mapping $\phi$ from $R^*$ to $R^*$ defined by $\phi(x) = |x|$ is a homoeomorphism with ker $(\phi) = $ ———?

   (A) $\{1, 0\}$                      (B) $\{0, 1\}$

   (C) $\{1, -1\}$                     (D) None

6. The matrix $A = \begin{bmatrix} -3 & -1 \\ 2 & 0 \end{bmatrix}$ satisfies which of the following relation :

   (A) $A + 3I + 2A^{-2} = 0$          (B) $A^2 + 2A + 2I = 0$

   (C) $(A + I)(A + 2I) = 0$           (D) None

**A**

**3**

**7.** For a matrix $A$, the row space of $A^T$ is same as :

    (A)   Row space of $A$             (B)   Column space of $A$

    (C)   Column space of $A^T$      (D)   Null space of $A$

**8.** If the matrix $B$ is diagonalizable, then :

    (A)   $B^N = P^N D^N P$           (B)   $B^N = PD^N P$

    (C)   $B^N = PD^N P^{-1}$        (D)   $B^N = P^N D^N P^N$

**9.** Find the eigen vector for the value of $\lambda = -2$ for the given matrix $A = \begin{bmatrix} 3 & 5 \\ 3 & 1 \end{bmatrix}$ :

    (A)   $\begin{pmatrix} 0 \\ -1 \end{pmatrix}$           (B)   $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$

    (C)   $\begin{pmatrix} -1 \\ -1 \end{pmatrix}$       (D)   $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$

**10.** What is the determinant of the matrix whose eigen values are 4, 3, 5 ?

    (A)   12                 (B)   15

    (C)   24                 (D)   60

**11.** What is the chromatic polynomial for a complete graph $k_3$ ?

    (A)   $t^3$                 (B)   $t(t-1)(t+1)$

    (C)   $t(t-1)(t-2)$        (D)   $t^2(t-1)$

**12.** What is the number of spanning trees in a complete graph $k_5$ ?

    (A)   $3^5$                 (B)   $5^3$

    (C)   45                 (D)   none

**13.** If $G$ is a connected plane graph of order $u$, size $e$, and with faces $f$, then :

    (A)   $u - e + f = 2$          (B)   $u + e - f = 2$

    (C)   $e - u + f = 2$          (D)   $e + u - f = 2$

**14.** For any two propositions $r$ and $s$, which of the following is incorrect :

    (A)   $\sim(r \vee s) \equiv (\sim r) \wedge (\sim s)$     (B)   $\sim(r \wedge s) \equiv (\sim r \vee \sim s)$

    (C)   $\sim(r \vee s) \equiv \sim r \sim s$        (D)   $\sim(\sim r) \equiv r$

**15.** $p \lor q$ is logically equivalent to :

    (A)   $\sim q \to \sim p$           (B)   $q \to p$

    (C)   $\sim p \to q$            (D)   $\sim p \to \sim q$

**16.** In how many ways can we rearrange the letters in "MATHS IS FUN" with the first and last letter must be vowels?

    (A)   $3 \times 8!$           (B)   $2 \times 8!$

    (C)   $6 \times 10!$         (D)   None

**17.** Which of the following is a tautology?

    (A)   $(p \land q) \land \sim (p \lor q)$         (B)   $((p \lor q) \land \sim p) \to q$

    (C)   $(p \to q) \leftrightarrow (\sim p \to q)$     (D)   none

**18.** How many numbers are there between 99 and 1000 having at least one of their digits 3?

    (A)   225            (B)   252

    (C)   215            (D)   250

**19.** What is the chromatic number of a complete graph $k_{15}$ ?

    (A)   3            (B)   15

    (C)   6            (D)   none

**20.** You are a start-up incubator and you have $10 million to invest in 4 companies (in $1 million increments). How many ways can you allocate this money?

    (A)   628            (B)   286

    (C)   682            (D)   680

**21.** Transmission capacity of a bus consisting of 32 lines is :

    (A)   5-bit unit of data (in parallel at a time)

    (B)   32-bit unit of data (in parallel at a time)

    (C)   $2^{32}$ bit unit of data (in parallel at a time)

    (D)   $32^{2}$ bit unit of data (in parallel at a time)

**22.** Suppose the size of the Main Memory is 32 K * 16 bits. What are the sizes of address bus and data bus?

    (A)   Address bus = 32 bits, Data bus = 16 bits

    (B)   Address bus = 15 bits, Data bus = 8 bits

    (C)   Address bus = 5 bits, Data bus = 4 bits

    (D)   Address bus = 15 bits, Data bus = 16 bits

**23.** How many memory chips of configuration 2K × 16 Bits are required to implement an 8K × 32 Bits memory?

    (A)   4                 (B)   8

    (C)   16              (D)   32

**24.** In 2's complement arithmetic overflow can be detected using the logic expression :

    (A)   $c_n + c_{n-1}$           (B)   $x_n + y_n$

    (C)   $(x_n + y_n)^1$       (D)   $(c_n + c_{n-1})$

**25.** The DMA module force the processor to suspend operations temporarily to take control over system bus, this technique is called :

    (A)   Rotating            (B)   Cycle stealing

    (C)   Daisy chaining      (D)   Special masking

**26.** The TRAP flag is used for :

    (A)   Debugging          (B)   Interfacing

    (C)   Identification      (D)   Parity checking

**27.** The micro code stored in read only memory is :

    (A)   Software           (B)   Firmware

    (C)   Diskette           (D)   RAID

**28.** A memory assignment system where lower byte addresses are used for less significant bytes of the word is :

    (A)   Little endian       (B)   Big endian

    (C)   Little Indian      (D)   Big Indian

**29.** What is the hexadecimal equivalent of a binary number 11001110?

    (A) AE                  (B) BC

    (C) CD                  (D) CE

**30.** When 1101 is used to divide 100010010 the remainder is :

    (A) 100                (B) 101

    (C) 10                  (D) 1

**31.** Multiplexing of address bits is done by :

    (A) Processor         (B) SRAM

    (C) DRAM            (D) Memory controller

**32.** The expression (AB+A'B+BC)' in sum-of-products form is :

    (A) $A'B' + AB' + BC'$       (B) $B'$

    (C) $AB' + A'B$           (D) $A' + C'$

**33.** The logical X-OR operation of 1110100 and 0110001 is :

    (A) 1000110         (B) 1110001

    (C) 1000101         (D) 1010101

**34.** The minimum no of 2 input NAND gates required to realize the function $F = AB + C'D'$ is :

    (A) 2                (B) 3

    (C) 4                (D) 5

**35.** In addition to the parallel adders in the last stage, what will be the min. no of carry save adders required to add 10 numbers?

    (A) 7                (B) 8

    (C) 9                (D) 10

**36.** What will be the value of n and i after the execution of the following code?

```c
#include <stdio.h>
int main ()
{
    int i = 4, n = 2;
    while (i++<=15)
    {
        n++;
    }
    printf("n = %d, i = %d", n, i);
    return 0;
}
```

(A)  n = 13, i =16  
(B)  n = 13, i =17  
(C)  n = 14, i =17  
(D)  n = 14, i =16  

**37.** If **int a[3] [3] [3]= {**

**{{1,2,3},{4,5,6},{7,8,9}},**
**{{10,11,12},{13,14,15},{16,17,18}},**
**{{19,20,21},{22,23,24},{25,26,27}}**

**};**

Which statement will print the value of '24'?

(A)  printf("%d",*(*(*(a+2)+2)+2));

(B)  printf("%d",*(*(*(a+2)+0)+2));

(C)  printf("%d",*(*(*(a+2)+1)+1));

(D)  printf("%d",*(*(*(a+2)+1)+2));

**38.** What will be the output of the following code?

```c
#include<stdio.h>
int main ()
{
    int a = 5, b = 10;
    b = a * (a=11);
    printf("%d",b);
    return 0;
}
```

(A)  25  
(B)  55  
(C)  121  
(D)  Compilation error

**39.** The return type of *sizeof()* operator is:

(A)  unsigned int                    (B)  long

(C)  char                            (D)  float

**40.** ───────── function allocates multiple blocks of memory with each block of the same size. :

(A)  calloc                          (B)  malloc

(C)  realloc                         (D)  salloc

**41.** What will be the output of the following code?

```
#include <stdio.h>
int main ()
{
    {
    int number = 2;
    number = 5;
    }
    printf("%d", number);
    return 0;
}
```

(A)  2                               (B)  5

(C)  0                               (D)  Compile time error

**42.** What will be the output of the following code?
```
#include<stdio.h>
int main()
{
    int i = 0, j = 0;
    for (i = 0; i < 20; i++)
    {
        for (j=0; j<5; j++)
    {
        if (i > 2)
            continue;
            printf("Kerala \n");
        }
    }
   return 0;
}
```

(A)  Kerala will be printed 100 times      (B)  Kerala will be printed 15 times

(C)  Kerala will be printed 30 times       (D)  Kerala will be printed 5 times

**43.** Which all statements are true in C++?:

(i) It is possible to declare functions inside structure in C++

(ii) *const* qualifier can be applied to functions inside class

(iii) In a class, the default access modifier for class member and member functions is private

(iv) Dynamic polymorphism is another name for compile time polymorphism

    (A)   (i) and (iii) only         (B)   (i), (ii) and (iii) only

    (C)   (iii) only                 (D)   (iii) and (iv) only

**44.** Which all statements are true about operator overloading in C++?

(i) Associativity and precedence of operators does not change

(ii) Ternary or conditional operator (?:) cannot be overloaded

(iii) Only arithmetic operators can be overloaded

    (A)   (i) and (ii) only         (B)   (ii) and (iii) only

    (C)   (ii) only                (D)   All the three statements are true

**45.** Which among the following can be passed by non-type template parameters during compile time in C++?

    (A)   int                  (B)   float

    (C)   string               (D)   constant expression

**46.** How many constructors can be present inside a class?

    (A)   Only 1                 (B)   2

    (C)   3                    (D)   Multiple

**47.** What is the use of *this* pointer?

    (A)   Used to return reference to the calling object

    (B)   Used for chain function calls on an object

    (C)   When the local variable's name is same as member's name, *this* pointer can be used to access the member

    (D)   All of the above

**48.** Which of the following statements is true in C++?

(i)   A constructor can be virtual

(ii)  A destructor can be virtual

(iii) If a class has a pure virtual function, then the class becomes abstract class and an instance of this class cannot be created

(iv)  Virtual functions are functions that can be overridden in derived class with the same signature

    (A)   (iii) and (iv) only              (B)   (iii) only

    (C)   (ii), (iii) and (iv) only        (D)   All the four statements are true

**49.** What will be the output of the following code?

```
#include <iostream>
using namespace std;
class A
{
    int a ;
    A() {a = 2;}
};
    int main()
{
    A*obj = new A;
    cout < < obj->a;
}
```

    (A)   Compilation error         (B)   2

    (C)   0                         (D)   Garbage value

**50.** Passing the address of a variable is known as:

    (A)   Pass by value            (B)   Pass by address

    (C)   Pass by reference       (D)   Pass by pointer

**51.** ─────────── programming paradigm is in which the desired result is declared as the answer to a question about a system of facts and rules :

    (A)   Declarative             (B)   Imperative

    (C)   Logic                   (D)   Functional

**52.** —————— binding is used to define the scope in terms of the lexical structure of a program :

(A) Static scope                 (B) Dynamic scope

(C) Runtime scope             (D) Execution scope

**53.** What will be printed by the print statements in the program *Pro* assuming call by reference parameter passing is used?

*Program Pro()*
*{*
    *a=5;*
    *b=2;*
    *c=10*
    *fun(b,a,c) ;*
    *print a ;*
    *print b ;*
    *print c ;*
*}*
*fun (a, b, c)*
*{*
    *b = b – 2;*
    *c = a + b;*
*}*

(A) 5, 2, 10                 (B) 3, 2, 5

(C) 2, 3, 7                  (D) 5, 0, 5

**54.** Consider the following relational schemes for a database:

R(A, B, C, D, E, F)

S(A, B, C) with the following functional dependencies:

$AB \rightarrow C$

$C \rightarrow ABDE$

$ADE \rightarrow F$

Assume $\{A, B\}$ is the key for both schemas. Which of the following statements is true?

(A) R is in 2NF and S is in 3 NF

(B) Both R and S are in BCNF

(C) Both R and S are in 3NF only

(D) Both R and S are in 2NF only

**55.** A relation schema R is in BCNF if whenever a nontrivial functional dependency $X \rightarrow A$ holds in R, then which all statements are true?:

(i)   X can be a superkey of R

(ii)  X can be a primary key of R

(iii) X can be secondary of R

(iv)  X can be any candidate key of R

(A)   (i) only

(B)   (i) and (ii) only

(C)   (i), (ii) and (iv) only

(D)   All the four are true

**56.** A file has r = 10,000 Employee records of fixed length. Each record has the following fields: *Name (30 bytes), Aadhar_Number (12 bytes), Address (40 bytes), Phone (10 bytes), Birth_date (8 bytes), Sex (1 byte), Department (4 bytes), date of Joining (8 bytes), Post (10 bytes)*. An additional byte is used as a deletion marker. How many blocks will be required to store the records using unspanned organization if the block size, B is 512 bytes?

(A)   2000 blocks

(B)   2500 blocks

(C)   5000 blocks

(D)   7500 blocks

**57.** Consider the three transactions $T_1, T_2$ and $T_3$, and the schedule $S_1$ given below:

$T_1 : r_1(X); r_1(Z); w_1(X);$
$T_2 : r_2(Z); r_2(Y); w_2(Z); w_2(Y);$
$T_3 : r_3(X); r_3(Y); w_3(Y);$
$S_1 : r_1(X); r_2(Z); r_3(X); r_1(Z); r_2(Y) r_3(Y); w_1(X); w_2(z);$
$w_3(Y); w_2(Y)$

Which of the following is true?

(A)   The Schedule cannot be made serializable

(B)   The schedule is serializable and the equivalent serial schedule is $T_1 \rightarrow T_2 \rightarrow T_3$

(C)   The schedule is serializable and the equivalent serial schedule is $T_2 \rightarrow T_1 \rightarrow T_3$

(D)   The schedule is serializable and the equivalent serial schedule is $T_3 \rightarrow T_1 \rightarrow T_2$

**58.** Consider a relation, R(A,B,C,D,E,F,G,H,I,J,K) with the following functional dependencies

$A \rightarrow CDE$
$ABGH \rightarrow FIJK$
$GHIJ \rightarrow ABF$

Which attribute or sets of attributes form the candidate keys of the relation R?

(A) A only          (B) A and GHIJ

(C) ABGH and GHIJ          (D) ABGH only

**59.** In Entity – Relationship (ER) diagrams, identifying relationship is represented using :

(A) Rectangle          (B) Double diamond

(C) Double rectangle          (D) Diamond

**60.** Consider a relation, $R(A,B,C,D,E,F,G)$ with the following functional dependencies.

$AB \rightarrow CD, AF \rightarrow D, DE \rightarrow F, C \rightarrow G, F \rightarrow E, G \rightarrow A$

What is the closure of CF?

(A) $\{ACDEFG\}$          (B) $\{ACEFG\}$

(C) $\{ACDGF\}$          (D) $\{ACDEG\}$

**61.** In C language if an array is declared as double arr[50]; how many bytes will be allocated to it?

(A) 50          (B) 100

(C) 200          (D) 400

**62.** The postfix expression for the infix expression:

$X + Y * (Z + W) / I + W * J$ is

(A) $XY + ZW + *I/W + J*$          (B) $XYZW + *I/ + WJ* ++$

(C) $X*Y + ZW/I*WJ++$          (D) $X + *YZW/I*WJ++$

**63.** Let $P$ be a singly linked list. Let Q be the pointer to an intermediate node x in the list. What is the worst-case time complexity of the best known algorithm to delete the node x from the list?

(A) O(n)          (B) O(log²n)

(C) O(log n)          (D) O(1)

**64.** In the balanced binary tree in the figure given below, how many nodes will become unbalanced when a node is inserted as a child of the node "g"? :
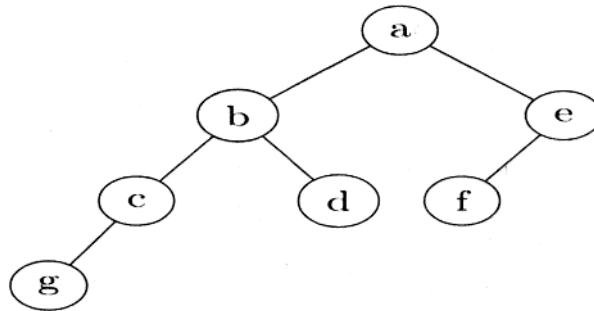


(A) 1

(B) 3

(C) 7

(D) 8

**65.** The preorder traversal and inorder traversal sequence of a binary search tree are A, B, D, G, H, L, E, C, F, I, J, K and G, D, H, L , B, E, A, C, I, F, K, J respectively. Which one of the following is the postorder traversal sequence of the same tree?

(A) B, E, A, C, H, L, D, G, I, F, J, K

(B) G, D, H, L, B, E,A, C, I, F, K, J

(C) D, B, H, I, G, F, E,C, K, L, J, A

(D) G, L, H, D, E, B, I, K, J, F, C, A

**66.** A list of n strings, each of length n, is sorted into lexicographic order using the merge sort algorithm. The worst-case running time of this computation is:

(A) $O(n \log n)$

(B) $O(n^2 \log n)$

(C) $O(n^2 + \log n)$

(D) $O(n^2)$

**67.** Match the algorithms with their time complexities::

List-I (Algorithm)

(P) Towers of Hanoi with n disks

(Q) Binary search given n sorted numbers

(R) Heap sort given n numbers at the worst case

(S) Addition of two n × n matrices

List-II (Time Complexity)

(i) $\ominus (n^2)$

(ii) $\ominus (n \log n)$

(iii) $\ominus (2^n)$

(iv) $\ominus (\log n)$

(A) P – (iii), Q – (iv), R – (i), S – (ii)

(B) P – (iv), Q – (iii), R – (i), S – (ii)

(C) P – (iii), Q – (iv), R – (ii), S – (i)

(D) P – (iv), Q – (iii), R – (ii), S – (i)

**68.** A sorting technique is called stable if:

    (A)   It takes O(n log n) time

    (B)   It maintains the relative order of occurrence of non-distinct elements

    (C)   It uses divide and conquer paradigm

    (D)   It takes $O(n)$ space

**69.** Which of the following is an application of dynamic programming?:

    (A)   Warshall's algorithm for finding the transitive closure

    (B)   Floyd's algorithm for the all-pairs shortest-paths problem

    (C)   Kruskal's algorithm for finding minimum spanning tree

    (D)   Both (A) and (B)

**70.** Which of the following branch and bound strategy leads to DFS?

    (A)   LIFO branch and bound

    (B)   FIFO branch and bound

    (C)   Lowest cost branch and bound

    (D)   Highest cost branch and bound

**71.** A discovery of a polynomial-time algorithm for any of the known NP-complete problems would imply that :

    (A)   P = NP               (B)   P is proper subset of NP

    (C)   NP is proper subset of P    (D)   P and NP are inter-changeable

**72.** The smallest FA which accepts the language {x/length length of x is divisible by 3} has:

    (A)   2 states              (B)   3 states

    (C)   4 states              (D)   5 states

**73.** Which of the following regular expressions over {0,1} denotes the set of all strings not containing 100 as substring?

    (A)   0*(1+0)*            (B)   0*1010*

    (C)   0*1*01              (D)   0*(10+1)*0*

**74.** Choose the correct statements for regular languages:

    (A) A class of languages that is closed under union and complementation has to be closed under intersection

    (B) Languages that are closed under intersection and complementation need not be closed under union

    (C) Languages that are closed under union and intersection need not be closed under complementation

    (D) All of the above

**75.** What is the language generated by the CFG?

$S->aSb$
$S->aAb$
$S->aBb$
$A->aA/a$
$B->Bb/b$

Here $V = (S, A, B)$ and $T = \{a, b\}$

    (A) $\{a^n b^m, m > 0, |n - m| >= 2\}$         (B) $\{a^n b^m, m > 1, |n - m| >= 1\}$

    (C) $\{a^n b^m, m > 0, |n - m| >= 1\}$         (D) $\{a^n b^m, m > 0, |n - m| >= 0\}$

**76.** Context free languages are closed under:

    (A) Union, Intersection         (B) Union, Kleene closure

    (C) Intersection, Complement         (D) Complement, Kleene closure

**77.** The stack in PDA has:

    (A) unlimited memory         (B) read only

    (C) limited memory         (D) None

**78.** Which of the following conversion is not possible (algorithmically)?:

    (A) Regular grammar to Context-free grammar

    (B) Non-deterministic FSA to deterministic FSA

    (C) Non-deterministic PDA to deterministic PDA

    (D) Non-deterministic TM to deterministic TM

**79.** If a Context Free Grammar is generating finite number of strings, then it is a _____ grammar.:

   (A) Recursive                                  (B) Non-recursive

   (C) Ambiguous                                  (D) Unambiguous

**80.** In some programming languages, an identifier is permitted to be a letter followed by any number of letters or digits. If L and D denotes the sets of letter and digits respectively. Which of the following expression defines an identifier?

   (A) (L+D)+                                      (B) L(L+D)*

   (C) $(L.D)$*                                    (D) L$(L.D)$*

**81.** Among simple LR(SLR), canonical LR and look-ahead LR (LALR), which of the following pairs identify the method that is very to implement and the method that is most powerful in that order?

   (A) SIR, LALR                                   (B) Canonical LR, LALR

   (C) SLR, Canonical LR                           (D) LALR, Canonical LR

**82.** Consider the following C code segment:

   for (i=0, i<n; i++)

   {

   for (j=0;j<n; j++)

   {

   if(i%2)

   {

   x+=(4*j+5*i);

   y+=(7+4*j);

   }

   }

   }

   Which one of the following is false?

   (A) The code contains loop invariant computation

   (B) There is scope of common sub-expression elimination in this code

   (C) There is scope of strength reduction in this code

   (D) There is scope of dead code elimination in this code

83. Which type of values should be held in registers:

    (A) Frequently used pointers into run-time data structures such as the run-time stack

    (B) Values of parameters of functions and procedures

    (C) Values of temporary variables used in evaluating expressions

    (D) All of the above

84. Loading process can be divided into two separate programs, to solve some problems. If the first is binder, then the other is:

    (A) Linkage editor                    (B) Module Loader

    (C) Relocator                         (D) None of these

85. If a linker is given object modules for a set of programs that were compiled separately then what information need not be included in an object module?

    (A) Object code

    (B) Relocation bits

    (C) Names and locations of all external symbols defined in the object module

    (D) Absolute addresses of internal symbols

86. Round-robin scheduling :

    (A) allows interactive tasks quicker access to the processor

    (B) is quite complex to implement

    (C) gives each task the same chance at the processor

    (D) allows processor-bound tasks more time in the processor

87. Which of the following statements is false?

    (A) a small page size causes large page tables

    (B) internal fragmentation is increased with small pages

    (C) a large page size causes instructions and data that will not be referenced brought into primary storage

    (D) I/O transfers are more efficient with large pages

**88.** The Banker's algorithm is used:

    (A)  to rectify deadlock             (B)  to detect deadlock

    (C)  to prevent deadlock           (D)  to solve deadlock

**89.** Information about a process is maintained in :

    (A)  Stack                     (B)  Process Control Block

    (C)  Program Control Block       (D)  Translation Lookaside Buffer

**90.** Consider the statements about process state transitions for a system using pre-emptive scheduling.

    (i)    A running process can move to ready state

    (ii)   A ready process can move to running state

    (iii)  A blocked process can move to running state

    (iv)  A blocked process can move to ready state

    Which of the above statements are TRUE?

    (A)  (i), (ii) and (iii) only         (B)  (ii) and (iii) only

    (C)  (i), (ii) and (iv) only         (D)  (i), (ii), (iii) and (iv)

**91.** Which of the statements are true about the short term scheduler:

    (i)    Select from among the processors that are ready to execute and allocates the CPU to one of them

    (ii)   Select processes from mass-storage device and loads them into memory for execution

    (iii)  The short term scheduler must select a new process for the CPU frequently

    (iv)  The short term scheduler executes much less frequently

    (A)  (i) only                 (B)  (ii) and (iii) only

    (C)  (i), (ii) and (iv) only         (D)  (i) and (iii) only

**92.** A system using inverted page table where logical address space is 16MB and physical address space is 8GB and page size is 4KB. Memory is byte addressable and page entry size is 8 bytes. What is the page table size?

    (A)  16 KB                 (B)  128 KB

    (C)  16 MB                (D)  128 MB

**93.** Which of the below statement is incorrect?

    (A)    Demand paging brings a page into the memory only when it is needed

    (B)    Demand paging can bring entire process into memory at load time

    (C)    Demand paging require more memory than normal paging

    (D)    None of the above

**94.** Consider 3 CPU intensive processes, which require 10,20,30 time unit and arrive at times 0,2 and 6 respectively. How many context switches are needed if the OS implements a shortest remaining first scheduling algorithm?

    (A)    1                    (B)    2

    (C)    3                    (D)    4

**95.** A process has been allocated 3 page frames. Assume that none of the pages of the process are available in the memory initially. The process makes the following sequence of page references (reference string): 1, 2, 1, 3, 7, 4, 5, 6, 3, 1.

If optimal page replacement policy is used, how many page faults occur for the above reference string?

    (A)    7                    (B)    8

    (C)    9                    (D)    10

**96.** A Page replacement algorithm is to:

    (A)    Replace the page faster

    (B)    Maximize the page fault rate

    (C)    Minimize the page fault rate

    (D)    To allocate multiple pages to processes

**97.** Consider the virtual page reference string 1, 2, 3, 2, 4, 1, 3, 2, 4, 1 on a demand paged virtual memory system running on a computer system that has main memory size of 3 page frames which are initially empty. Let LRU, FIFO and OPTIMAL denote the number of page faults under the corresponding page replacement policy. Then:

    (A)    OPTIMAL<LRU<FIFO

    (B)    OPTIMAL< FIFO<LRU

    (C)    OPTIMAL = LRU

    (D)    OPTIMAL = FIFO

98. Which page replacement policy sometimes leads to more page faults when size of memory is increased:

    (A)   LRU                          (B)   FIFO

    (C)   OPTIMAL                  (D)   CLOCK

99. The operating system keeps the table containing information about all open files in :

    (i)    Per-process table

    (ii)   Open-file table

    (iii)  Look ahead table

    (iv)  Look aside table

        (A)   (i) only

        (B)   (ii) and (iii) both

        (C)   (i) and (ii) both

        (D)   (i), (iii) and (iv)

100. Consider three concurrent process with three binary semaphores, initialized as $S0=1$, $S1=0$ and $S2=0$. How many times will the process P0 print "0"?:

| Process P0 | Process P1 | Process P2 |
|---|---|---|
| While (true) { Wait (S0); Print '0'; Release (S1); Release (S2); } | Wait (S1); Release (S0); | Wait (S2); Release (S0); |

    (A)   Atleast twice

    (B)   Exactly twice

    (C)   Exactly thrice

    (D)   Exactly once

———————

**SPACE FOR ROUGH WORK**