PeP 2008 CS 1b

<div style="border:1px solid black;">

Read instructions on this page carefully.
Do not turn this page until you are asked to do so.

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Test Paper ID: 41
Duration: 60 Minutes
Number of questions: 40

Instructions:

1. Do not write anything on this test paper.

2. Separate sheets will be provided for rough work. Please ask if you need more.

3. Fill all the details clearly in the answer sheet.

4. Mark answers in the answer sheet provided by filling the circle of the correct choice corresponding to the question number.

5. To change your answer, erase the earlier mark clearly and mark the new answer. It is better to use a pencil if you want to change your answers.

6. Some questions may have more than one correct answer.In that case, it is indicated as part of the question.You must mark all the correct answers.Partial answers will be considered wrong.

7. Wrong answers will carry negative marks. Therefore, do not guess answers.

8. Do not use any tools like calculators, cell phones during the test.

9. Switch off your cell phone now.

10. After completing the test, you must return all the papers including this test paper, answer sheet and the rough sheets.

We wish you the very best!

Do not turn this page. Wait until you are asked to do so.

1. The number of possible ordered trees with 3 nodes A, B, C is

   A) 16

   B) 12

   C) 6

   D) 14

2.
```cpp
#include <iostream.h>
class A
{
    private:
        int i;
    public:
        A(){
            cout << "Came inside constructor";
        }
        virtual void func() = 0;
};
void A::func()
{
    cout << "Came inside the function of A class" << endl;
}
int main()
{
    A aObj;

    aObj.func();
    return 0;
}
```

   The output is:

   A) Came inside constructor

   B) Came inside the function of A class Came inside constructor

   C) Came inside constructor Came inside the function of A class

   D) Compilation error

3.
```cpp
#include <iostream.h>

int main(int argc, char *argv[])
{
    cout << argv[0] <<argv[1] << argv[2];
    return 0;
}
```
   The above program is run as ./a.out 1 2 3: What will be the output ?

   A) ./a.out 1 2 3

   B) a.out 1 2

   C) ./a.out 1 2

   D) a.out 1 2 3

4. String::~String() {
    ```
                cout << " String() " << endl;
                }
    ```
    Assuming that all the necessary using-directives have been made, in the sample code above, which one of the following statements pertaining to the destructor is TRUE?

    A) The destructor should be ~String::String().

    B) The destructor is incorrect because it is declared outside the class definition.

    C) The destructor has been defined correctly.

    D) The destructor is incorrect because of the scope resolution operator ::

5. In deciding which search algorithm to use on a list, which of the following should not be a factor in your decision?

    A) The length of the list to be searched

    B) Whether or not the list contains negative numbers

    C) Whether or not the list is already in sorted order

    D) The number of times the list is to be searched

6.
    ```cpp
    #include <iostream.h>
    int main()
    {
        for (int i = 4; i > 2; i--) {
            switch ( i ) {
            case 1 :
                    cout << "In case 1";
                    break;
            case 2 :
                    cout << "In case 2";
                    break;
            case 3 :
                    cout << "In case 3";
                    break;
            case default :
                    cout << "In case default";
                    break;
            }
        }
        return 0;
    }
    ```

    The output is:

    A) In case default, In case 3

    B) In case 1, In case 2

    C) No output

    D) Compilation error

7. If we use struct to get the same functionality as classes in C++

A) The members are public by default instead of private.

B) The members are private by default instead of public.

C) The members are protected by default instead of private.

D) The members are protected by default instead of public.

8. Suppose we have a List class with private data listVals (an array holding the list items) and listLength (a variable indicating the current list length). What does the following function do?

```
void List::Mystery()
{
  ItemType beta;
   int count1;
   int count2;
   int i;
  for (count1 = 0; count1 < listLength - 1; count1++)
     {
        i = count1;
        for (count2 = count1 + 1; count2 < listLength; count2++)
          if (listVals[count2] > listVals[i])
             i = count2;
        beta = listVals[i];
         listVals[i] = listVals[count1];
         listVals[count1] = beta;
     }
  }
```

A) It inserts a new item into a sorted list.

B) It inserts a new item into an unsorted list.

C) It sorts a list into ascending order.

D) It sorts a list into descending order.

9. Given the declaration
   int listVals[7] = {10, 15, 20, 25, 30, 35, 40};
   a binary search is used to search the list for the value 35. In each iteration of the search loop, the index variables first, middle, and last define the range of items being searched. When the search is finished, what is the value of first? (Remember that C++ arrays begin at index 0.)

A) 0

B) 2

C) 3

D) 4

10. #include<stdio.h>
    #include<malloc.h>
    int main()
    {
        char *mem[5];
        for (int i = 0; i < 5; i++)
            mem[i]=(char*)malloc(sizeof(5));
        return 0;
    }
    For memory allocation done as above which is the correct way to free the memory?

A) None of the options mentioned

B) free (mem);

C) for (int i = 0; i < 5; i++) free(mem[i]);

D) Any of the two options mentioned;

11. Which of the following statement is valid for string copy?

```
        char *srt, *ptr;
```

A) While (*str)
```
    {
       *str=*ptr;
       ++str=++ptr;
    }
```

B) While (*str)
```
    {
       *++str=*++ptr
    };
```

C) While (*ptr)
```
    {
       *str = *ptr;
        ++ptr, ++str;
    }
    *str=*ptr;
```

D) While (*str)
```
    {
       *str = *ptr;
        ++str, ++ptr;
    };
    *str = *ptr;
```

12.
```
#include <stdio.h>
int main()
{
    int arr[] = { 2,4,6,7,8};
    int i,*p;
    for (p = arr, i = 0; p + i <= arr + 4; p++,i++)
        printf("%d ", *(p+i));
}
```
The output is:

A) 4 7 8

B) 2 4 6

C) 2 6 8

D) 2 7 8

13. Print the output of the program

```
#include <stdio.h>
main()
{
  struct Data {
   int a;
   int b;
      } y[4] = { 1, 10, 3, 30, 2, 20, 4, 40};
      struct Data *x = y;
      int i;
      for(i=0; i<4; i++) {
          x->a = x->b, ++x++->b;
          printf("%d %d\t", y[i].a, y[i].b);
      }
}
```

A) 10 11 30 31 20 21 40 41

B) 11 10 31 30 21 20 41 40

C) 1 10 3 30 2 20 4 40

D) 10 10 30 30 20 20 40 40

14. If the following program (myprog) is run from the command line as myprog 1 2 3, what would be the output?

```
main(int argc,char *argv[])
 {
     int i;
      i=argv[1]+argv[2]+argv[3];
     printf("%d",i);
 }
```

A) 123

B) 6

C) error

D) "123"

15. The minimum number of times the while loop is executed is

A) 0

B) 1

C) 2

D) Can not be predicted

16.
```
struct f { int x;} ;
int f(int x) { printf("%d\n" , x);}
main ( )
{
  int x = 10;
   f (x);
}
```

A) 10

B) Error

C) Will not compile

D) None of the options mentioned

17. Causes fragmentation of the free store

    A) Array and Vector

    B) Vector and Linked List

    C) Linked List

    D) All of the options

18. Which infix expression corresponds to the postfix expression a b c + d e + g h * * + +

    A) (a+b+c)+((d+e)*(g*h))

    B) a+(b+c)+((d+e)*(g*h))

    C) a*(b+c)+(d+e)+(g*h)))

    D) None of the options mentioned

19. A Queue of characters currently contains a, b, c, d. What would be the contents of the queue
    after the following operations:
    1. A deletion
    2. The addition of w then of x
    3. A deletion
    4. The addition of y

    A) a, b, c, w, y

    B) Y, x, c, d

    C) Y, x, w, a, b

    D) c, d, w, x, y

20. The following operations executed on a stack machine will evaluate which postfix expression ?
    PUSH A
    PUSH B
    PUSH C
    ADD
    POP E
    PUSH E
    PUSH E
    MULT
    ADD
    POP F

    A) F=E+E

    B) F=A*(B+C)

    C) F= A+(B+C)*(B+C)

    D) F=B+C+(B+C)*(B+C)

21. The cube root of natural number n is defined as the largest natural number m such that $m^3 <=$
    n. The complexity of the computing the cube root of n (n is represented in binary notation) is
    (Pls note that the symbol ^ stands for power, for ex. m^3 means m to the power 3 or m cube)

A) O((log n)^k) for some constant k > 0, but not O((log log n)^m) for any constant m > 0

B) O((log log n)^k) for some constant k > 0.5, but not O((log log n)^0.5)

C) O(n) but not O(n^0.5)

D) O(n^0.5) but not O((log n)^k) for any constant k > 0

22. The minimum-queens problem asks for the minimum number of queens that can attack all of the squares of an nxn board. (i.e., the minimum number of queens such that each row, column and diagonal contains at least one queen). What will be minimum-queens problem for n = 6.

   A) 6

   B) 1

   C) 3

   D) 4

23. Which of the following decision problems are in P ?

   A) DNF-Satisfiability : Given a Boolean expression in disjunctive normal form (the disjunction of clauses, each of which is a conjunction of a literals), is it satisfiable ?

   B) CNF-Tautology : Given a Boolean expression in CNF, is it a tautology (i.e., satisfied by every possible truth assignment) ?

   C) The 2-colorability problem (Given a graph, is there a 2-coloring of the vertices?)

   D) All of these

24. If there is an NP-complete language L whose complement is in NP, then the complement of any language in NP is in

   A) P

   B) NP

   C) Both P and NP

   D) None of the options

25. Which of the following propositional forms is tautology ?

   A) $p \wedge \rceil q$

   B) $p \Rightarrow (p \vee q)$

   C) $p \Rightarrow (p \wedge q)$

   D) $(p \vee q) \Rightarrow (p \wedge q)$

26. $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$ is equivalent to

   A) $S \wedge R$

   B) $S \rightarrow R$

   C) $S \vee R$

   D) None of these

27. Indicate which of the following well-formed formula(s) are valid

   A) $((P \Rightarrow Q) \vee (Q \Rightarrow R)) \Rightarrow (p \Rightarrow R)$

   B) $(P \Rightarrow Q) \Rightarrow (\rceil P \Rightarrow \rceil Q)$

   C) $(P \wedge (\rceil P \vee \rceil Q)) \Rightarrow Q$

   D) $((p \Rightarrow R) \vee (Q \Rightarrow R)) \Rightarrow (P \vee Q) \Rightarrow R$

28. Given two union compatible relations R1 (A,B) and R2 (C,D), what is the result of the operation R1 A = C AB = D R2?

    A) R1 union R2

    B) R1 x R2

    C) R1 - R2

    D) R1 intersection R2

29. Satellite Switched Time-Division Multiple access (SS/TDMA) is

    A) The method of determining which device has access to the transmission medium at any time.

    B) A medium access control technique for multiple access transmission media

    C) A form of TDMA in which circuit switching is used to dynamically change the channel assignments

    D) All of the above

30.
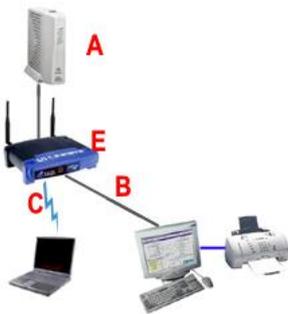
The figure above shows a typical Home Network Setup. Identify the network component marked by "A".

    A) Cable/DSL Modem

    B) CAT 5 Ethernet cable

    C) Wireless Signal

    D) Wireless Router

31. Which of the following characterisitics of a programming language is best specified using a context-free grammar?

    A) Identifier Length

    B) Maximum level of nesting

    C) Operator precedence

    D) Type Compatibility

32. A 16-bit integer is being used to represent a set of 16 elements. Bit -I will be set to 0 if element I is in the set. For example, the set {0,1,5} will be represented by 0000000000100011. What will be the following C code achieve?
    int a,b,c,d;   /* Correspond to sets A,B,C,D */
    D = a | b & c;

    A) Generates D = A Union B-C

    B) Generates D = A Union (B Intersection C)

    C) Generates D = (A Union B) Intersection C

    D) None of the options mentioned

33. A date is often entered in a format such as 81/12/30 because

    A) The military prefers this format

    B) The reader can find the year faster

    C) To allow the user to sort by year

    D) None of these

34. Which command is the fastest among the following?

    A) COPY TO <New File>

    B) COPY FILE < File1> <File 2>

    C) COPY STRUCTURE TO <new file>

    D) COPY TO M FILE - DAT DELIMITED

35. Which of the following is NOT a component of the ALU?

    A) General register

    B) Functional unit

    C) Instruction register

    D) They are all components of an ALU.

36. Somu and Dinesh are using a program P to generate personalized greeting cards on their cucumber AT microcomputer. Business is so good that they must generate one card every three seconds. However the memory requirements of run of program p range between 0 and 1,000,000 bytes, distributed uniformly. Furthermore, if a run require r bytes, and the cucumber's memory is m bytes, then the run takes
    I) 1 second of r <= m and takes
    II) r/m seconds if r > m because of byte swapping.
    The minimum amount of memory that somu and dinesh must buy so that they can produce an average of one card every three seconds is approximately

    A) 732,000 bytes

    B) 172,000 bytes

    C) 333,000 bytes

    D) 484,000 bytes

37. An unprogrammed PROM contains

    A) Predefined AND array and programmable OR array

    B) Predefined OR array and programmable AND array

    C) programmable AND array and programmable OR array

    D) Predefined AND array and predefined OR array

38. The main advantage of the associative-mapping technique compared to direct mapping technique in case of a cache is

    A) shorter page table

    B) less hardware overhead

    C) less search time in translation of virtual to physical address

    D) None of the options

39. A computer with interrupts usually includes instructions to enable/disable interrupts:

A) To prevent overhead due to slow devices.

B) To prevent race conditions in the kernel.

C) To synchronize the CPU operation with the power cycle.

D) None of the options.

40. Which of the following is an example of a SPOOLED device?

A) The terminal used to enter the input data for a program being executed

B) The secondary memory device in a virtual memory system

C) A line printer used to print the output of a number of jobs

D) None of the options.