Computer Science and Applications

PAPER—II

Note : This paper contains **fifty** (50) objective-type questions, each question carrying **two** (2) marks. Attempt **all** of them.

1. A box contains six red balls and four green balls. Four balls are selected at random from the box. What is the probability that two of the selected balls are red and two are green ?

(A) $\frac{3}{7}$ (B) $\frac{4}{7}$

(C) $\frac{5}{7}$ (D) $\frac{6}{7}$

2. The number of edges in a complete graph with n vertices is equal to :

(A) $n(n-1)$ (B) $\frac{n(n-1)}{2}$

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

3. A context free grammar is :

(A) type 0. (B) type 1.

(C) type 2. (D) type 3.

4. Let $e : B^m \rightarrow B^n$ is a group code. The minimum distance of 'e' is equal to :

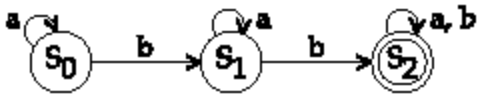
(A) the maximum weight of a non zero code word

(B) the minimum weight of a non zero code word

(C) m

(D) n

5. Consider a Moore machine M whose digraph is :



Then L(M), the language accepted by the machine M, is the set of all strings having :

(A) two or more b's.

(B) three or more b's.

(C) two or more a's.

(D) three or more a's.

6. A WFF that is equivalent to the WFF $x => y$ is :

(A) $y => x$

(B) $\sim y => x$

(C) $\sim y => \sim x$

(D) $y => \sim x$

7. Simplified form of Boolean expression $xy + (\sim x)z + yz$ is :

(A) $xy + (\sim x)z$.

(B) $(\sim x)y + (\sim x)z$.

(C) $(\sim x)y + xz$.

(D) $xy + xz$.

8. In order to build a MOD - 18 counter, the minimum number of flip flops needed is equal to :

(A) 18

(B) 9

(C) 5

(D) 4

9. The dual of the switching function $F = x + yz$ is given by :

(A) $x + yz$

(B) $x(y + z)$

(C) $(\sim x) + (\sim y)(\sim z)$

(D) $(\sim x)((\sim y) + (\sim z))$

10. Amongst the logic families DTL, TTL, ECL and CMOS, the family with the least power dissipation is :

(A) CMOS (B) DTL

(C) TTL (D) ECL

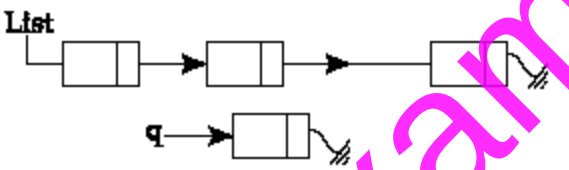
11. What cannot replace '?' in the following C-code to print all odd numbers less than 100 ?

```
for (i=1; ? ; i=i+2)
    printf("%d\n", i);
```

(A) $i \leq 100$ (B) $i \leq 101$

(C) $i < 100$ (D) $i < 101$

12. Consider the following linked list :



Which of the following piece of code will insert the node pointed to by q at the end of the list ?

(A)
```
for (p=list; p != NULL; p=p→next);
    p=q;
```

(B)
```
for (p=list; p != NULL; p=p→next);
    p→next=q;
```

(C)
```
for (p=list; p→next != NULL; p=p→next);
    p=q;
```

(D)
```
for (p=list; p→next != NULL; p=p→next);
    p→next=q;
```

13. Which of the following is a valid C code to print character 'A' to 'C' ?

(A)
```
x = 'A';
switch(x)
{case 'A' = printf ("%d\n", x);
  ....
  case 'C' = printf ("%d\n", x);
  }
```

(B)
```
x = 'A';
switch(x)
{case 'A' <= x <= 'C' : printf ("%d\n", x);}
```

(C)
```
x = 'A';
switch(x)
{
case 'A' : printf ("%d\n", x);
           break;
case 'B' : printf ("%d\n", x);
           break;
case 'C' : printf ("%d\n", x);
           break;
  }
```

(D)
```
x = 'A';
switch(x)
{
case 'A' = printf ("%d\n", x);
case 'B' = printf ("%d\n", x);
case 'C' = printf ("%d\n", x);
  }
```

14. Which of the following is not true in C++ ?

(A) "Private" elements of a base class are not accessible by members of its derived class.

(B) "Protected" elements of base class are not accessible by members of its derived class.

(C) When base class access specified is "Public", public elements of the base class become public members of its derived class.

(D) When base class access specified is "Public", protected elements of a base class become protected members of its derived class.

15. Which of the following is true of constructor function in C++ ?

(A) A class must have at least one constructor.

(B) A constructor is a unique function which cannot be overloaded.

(C) A constructor function must be invoked with the object name.

(D) A constructor function is automatically invoked when an object is created.

16. A primary key for an entity is :

(A) a candidate key

(B) any attribute

(C) a unique attribute

(D) a superkey

17. Aggregate functions in SQL are :

(A) GREATEST, LEAST and ABS

(B) SUM, COUNT and AVG

(C) UPPER, LOWER and LENGTH

(D) SQRT, POWER and MOD

18. If a relation is in 2NF and 3NF forms then :

(A) no non-prime attribute is functionally dependent on other non-prime attributes

(B) no non-prime attribute is functionally dependent on prime attributes

(C) all attributes are functionally independent

(D) prime attribute is functionally independent of all non-prime attributes

19. The end of an SQL command is denoted by :

(A) an end-of-line character

(B) an 'enter-key' marker

(C) entering F4 key

(D) a semicolon (;)

20. Consider the query : SELECT student_name FROM students WHERE class_name = (SELECT class_name FROM students WHERE math_marks = 100); what will be the output ?

(A) the list of names of students with 100 marks in mathematics

(B) the names of all students of all classes in which at least one student has 100 marks in mathematics

(C) the names of all students in all classes having 100 marks in mathematics

(D) the names and class of all students whose marks in mathematics is 100

21. Consider a rooted tree in which every node has at least three children. What is the minimum number of nodes at level i (i > 0) of the tree ? Assume that the root is at level 0 :

(A) 3^i

(B) 3i

(C) 3

(D) 3i + 1

22. Which of the following data structure is used to implement recursion ?

(A) Arrays

(B) Stacks

(C) Queues

(D) Linked lists

23. The height of a binary tree with 'n' nodes, in the worst case is :

(A) O(log n)

(B) O(n)

(C) Ω (n log n)

(D) Ω (n^2)

24. An example of a file extension is :

(A) text

(B) pict

(C) mp3

(D) web

25. The performance of a file system depends upon the cache hit rate. If it takes 1 msec to satisfy a request from the cache but 10 msec to satisfy a request if a disk read is needed, then the mean time (ms) required for a hit rate 'h' is given by :

(A) 1

(B) $h + 10 (1 - h)$

(C) $(1 - h) + 10 h$

(D) 10

26. The best known example of a MAN is :

(A) Ethernet

(B) Cable Television

(C) FDDI

(D) IEEE 802.3

27. In a broadcast network, a layer that is often thin or non-existent is :

(A) network layer

(B) transport layer

(C) presentation layer

(D) application layer

28. The maximum data rate of binary signals on a noiseless 3 KHz channel is :

(A) 3000 bps. (B) 6000 bps.

(C) 9000 bps. (D) 12,000 bps.

29. For pure ALOHA, the maximum channel utilization is :

(A) 100 %

(B) 50 %

(C) 36 %

(D) 18 %

30. An example of an adaptive routing algorithm is :

(A) distance vector routing

(B) flooding

(C) selective flooding

(D) shortest path routing

31. In a two pass compiler, during the first pass :

(A) user defined address symbols are correlated with their binary equivalent

(B) the syntax of the statement is checked and mistakes, if any, are listed

(C) object program is generated

(D) semantic of the source program is elucidated.

32. A single instruction in an assembly language program contains :

(A) one micro operation

(B) one macro operation

(C) one instruction to be completed in a single pulse

(D) one machine code instruction

33. Absolute loader demands that the programmer needs to know the :

(A) start address of the available main memory

(B) total size of the program

(C) actual address of the data location

(D) absolute values of the operands used

34. Top-down parsers are predictive parsers, because :

(A) next tokens are predicted.

(B) length of the parse tree is predicted before hand.

(C) lowest node in the parse tree is predicted.

(D) next lower level of the parse tree is predicted.

35. In the context of compiler design, "reduction in strength" refers to :

(A) code optimization obtained by the use of cheaper machine instructions

(B) reduction in accuracy of the output

(C) reduction in the range of values of input variables

(D) reduction in efficiency of the program

36. How many states can a process be in ?

(A) 2 (B) 3

(C) 4 (D) 5

37. A program has five virtual pages, numbered from 0 to 4. If the pages are referenced in the order 012301401234, with three page frames, the total number of page faults with FIFO will be equal to :

(A) 0 (B) 4

(C) 6 (D) 9

38. Average process size = s bytes. Each page entry requires e bytes. The optimum page size is given by :

(A) $\sqrt{(se)}$ (B) $\sqrt{(2se)}$

(C) s (D) e

39. An example of a directory found in most UNIX system is :

(A) usr. (B) waitpid.

(C) brk. (D) unmap.

40. The aging algorithm with a = 0.5 is used to predict run times. The previous four runs from oldest to most recent are 40, 20, 20, and 15 msec. The prediction for the next time will be :

(A) 15 msec. (B) 25 msec.

(C) 39 msec. (D) 40 msec.

41. A major defect in water fall model in software development is that :

(A) the documentation is difficult

(B) a blunder at any stage can be disastrous

(C) a trial version is available only at the end of the project

(D) the maintenance of the software is difficult

42. Function point metric of a software also depends on the :

(A) number of function needed

(B) number of final users of the software

(C) number of external inputs and outputs

(D) time required for one set of output from a set of input data

43. An error message produced by an interactive system should have :

(A) always the error code

(B) the list of mistakes done by the user displayed

(C) a non-judgmental approach

(D) the past records of the occurrence of the same mistake

44. System development cost estimation with use-cases is problematic because :

(A) of paucity of examples

(B) the data can be totally incorrect

(C) the expertise and resource available are not used

(D) the problem is being over simplified

45. The approach to software testing is to design test cases to :

(A) break the software

(B) understand the software

(C) analyse the design of sub processes in the software

(D) analyze the output of the software

46. Given a parallel algorithm A with computation time t, if parallel algorithm A performs m computational operation, then p processors can execute algorithm A in time given by :

(A) t/p (B) mt/p

(C) $t+(m-t)/p$ (D) $(m-t)/p$

47. With reference to implementation of different association mining algorithms, identify the correct statement :

(A) The FP growth method was usually better than the best implementation of the apriori algorithm

(B) Apriori algorithm is usually better than CHARM

(C) Apriori algorithm is good when the support required is low

(D) At very low support the number of frequent items becomes less

48. Consider a typical mobile communication system. If 840 frequencies are available, how many can be used in a given cell ?

(A) 140 (B) 120

(C) 84 (D) 60

49. Identify the incorrect statement :

(A) The internet has evolved into phenomenally successful e-commerce engine

(B) e-business is synonymous with e-commerce

(C) The e-commerce model B2C did not begin with billboardware

(D) The e-commerce model G2C began with billboardware

50. Identify the incorrect statement :

(A) ATM provides both real time and non-real time service

(B) ATM provides faster packet switching than X.25

(C) ATM was developed as part of the work on broadband ISDN

(D) ATM does not have application in Non-ISDN environments where very high data rates are required

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