PAPER : DEC. 2015

UGC-NET COMPUTER SCIENCE & APPLICATIONS (87)

PAPER-II

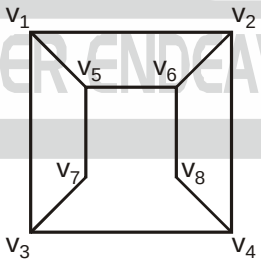
Note : This paper contains **fifty (50)** objective type questions of **two (2)** marks each. All questions are compulsory. Choose the most appropriate option.

1. How many committees of five people can be chosen from 20 men and 12 women such that each committee contains atleast three women?
   (a) 75240 (b) 52492 (c) 41800 (d) 9900

2. Which of the following statement(s) is/are false?
   (a) A connected multigraph has an Euler Circuit if and only if each of its vertices has even degree.
   (b) A connected multigraph has an Euler Path but not an Euler Circuit if and only if it has exactly two vertices of odd degree.
   (c) A complete graph (K_n) has a Hamilton Circuit whenever $n \geq 3$.
   (d) A cycle over six vertices (C_6) is not a bipartite graph but a complete graph over 3 vertices is bipartite.

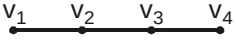
3. Which of the following is/are not true ?
   (A) The set of negative integers is countable.
   (B) The set of integers that are multiples of 7 is countable.
   (C) The set of even integers is countable.
   (D) The set of real numbers between 0 and 1/2 is countable.
   Codes:
   (a) (A) and (C) (b) (B) and (D) (c) (B) only (d) (D) only

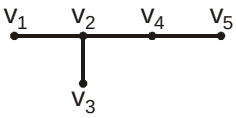
4. Consider the graph given below:

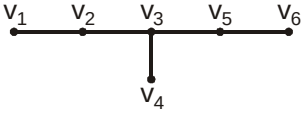


   The two distinct sets of vertices, which make the graph bipartite are :
   (a) (v_1, v_4, v_6); $(v_2, v_3, v_5, v_7, v_8)$ (b) (v_1, v_7, v_8); (v_2, v_3, v_5, v_6)
   (c) (v_1, v_4, v_6, v_7); (v_2, v_3, v_5, v_8) (d) $(v_1, v_4, v_6, v_7, v_8)$; (v_2, v_3, v_5)

5. A tree with n vertices is called graceful, if its vertices can be labelled with integers 1, 2,...., n such that the absolute value of the difference of the labels of adjacent vertices are all different. Which of the following trees are graceful ?

(A) 

(B) 

(C) 

   Codes:
   (a) (A) and (B) (b) (B) and (C) (c) (A) and (C) (d) (A), (B) and (C)

6. Which of the following arguments are not valid ?
(A) "If Gora gets the job and works hard, then he will be promoted. If Gora gets promotion, then he will be happy. He will not be happy, therefore, either he will not get the job or he will not work hard".
(B) "Either Puneet is not guilty or Pankaj is telling the truth. Pankaj is not telling the truth, therefore, Puneet is not guilty".
(C) If n is a real number such that $n > 1$, then $n^2 > 1$. Suppose that $n^2 > 1$, then $n > 1$.
Code:
(a) (A) and (C) (b) (B) and (C) (c) (A), (B) and (C) (d) (A) and (B)

7. Let P(m, n) be the statement "m divides n" where the Universe of discourse for both the variables is the set of positive integers. Determine the truth values of the following propositions.
(A) $\exists m \, \forall n \, P(m, n)$
(B) $\forall n \, P(1, n)$
(C) $\forall m \, \forall n \, P(m, n)$
Codes:
(a) (A)-True; (B)-True; (C)-False (b) (A)-True; (B)-False; (C)-False
(c) (A)-False; (B)-False; (C)-False (d) (A)-True; (B)-True; (C)-True

8. Match the following terms:

List-I	**List-II**
A. Vacuous proof	i. A proof that the implication $p \rightarrow q$ is true based on the fact that p is false.
B. Trivial proof	ii. A proof that the implication $p \rightarrow q$ is true based on the fact that p is true.
C. Direct proof	iii. A proof that the implication $p \rightarrow q$ is true that proceeds by showing that q must be true when p is true.
D. Indirect proof	iv. A proof that the implication $p \rightarrow q$ is true that proceeds by showing that p must be false when p is false.

Codes :

	A	B	C	D
(a)	i	ii	iii	iv
(b)	ii	iii	i	iv
(c)	iii	ii	iv	i
(d)	iv	iii	ii	i

9. Consider the compound propositions given below as :
(A) $p \vee \sim (p \wedge q)$
(B) $(p \wedge \sim q) \vee \sim (p \wedge q)$
(C) $p \wedge (q \vee r)$
Which of the above propositions are tautologies ?
(a) (A) and (C) (b) (B) and (C) (c) (A) and (B) (d) (A), (B) and (C)

10. Which of the following property/ies a Group G must hold, in order to be an Abelian group ?
(A) The distributive property
(B) The commutative property
(C) The symmetric property
Codes:
(a) (A) and (B) (b) (B) and (C) (c) (A) only (D) (B) only

11. Consider the following program :

```
#include<stdio.h>
main( )
{
    int i, inp;
    float term=1, sum=0;
    scanf("%d %f ", & inp, & x);
    for(i = 1; i < = inp;i++)
    {
        term = term * x/i;
        sum = sum + term;
    }
    printf("Result = %f \n", sum);
}
```

The program computes the sum of which of the following series ?

(a) $x + x^2/2 + x^3/3 + x^4/4 + \cdots$
(b) $x + x^2/2! + x^3/3! + x^4/4! + \cdots$
(c) $1 + x^2/2 + x^3/3 + x^4/4 + \cdots$
(d) $1 + x^2/2! + x^3/3! + x^4/4! + \cdots$

12. Consider the following two statements:
(A) A publicly derived class is a subtype of its base class.
(B) Inheritance provides for code reuse.
Which one of the following statements is correct ?
(a) Both the statements (A) and (B) are correct.
(b) Neither of the statements (A) and (B) are correct.
(c) Statement (A) is correct and (B) is incorrect.
(d) Statement (A) is incorrect and (B) is correct.

13. Conisder a "CUSTOMERS" database table having a column "CITY" filled with all the names of Indian cities (in capital letters). The SQL statement that finds all cities that have "GAR" somewhere in its name, is :

(a) Select * from customers where city = '%GAR%';
(b) Select * from customers where city = 'GAR';
(c) Select * from customers where city like '%GAR%';
(d) Select * from customers where city as '%GAR';

14. Match the following database terms to their functions :

List-I	List-II
A. Normalization	i. Enforces match of primary key to foreign key
B. Data Dictionary	ii. Reduces data redundancy in a database
C. Referential Integrity	iii. Defines view(s) of the database for particular user(s)
D. External Schema	iv. Contains metadata describing database structure

Codes :

	A	B	C	D
(a)	iv	iii	i	ii
(b)	ii	iv	i	iii
(c)	ii	iv	iii	i
(d)	iv	iii	ii	i

15. In general, in a recursive and non-recursive implementation of a problem (program) :
(a) Both time and space complexities are better in recursive than in non-recursive program.
(b) Both time and space complexities are better in non-recursive than in recursive program.
(c) Time complexity is better in recursive version but space complexity is better in non-recursive version of the program.
(d) Space complexity is better in recursive version but time complexity is better in non-recursive version of the program.

16. A three dimensional array in 'C' is declared as int A[x][y][z]. Here, the address of an item at the location A[p][q][r] can be computed as follows (where w is the word length of an integer) :
(a) &A[0][0][0] + w(y*z*q + z*p + r) (b) &A[0][0][0] + w(y*z*p + z*q + r)
(c) &A[0][0][0] + w(x*y*p + z*q + r) (d) &A[0][0][0] + w(x*y*q + z*p + r)

17. In C++, which system-provided function is called when no handler is provided to deal with an exception ?
(a) terminate ( ) (b) unexpected ( ) (c) abort ( ) (d) kill ( )

18. Which of the following provides the best description of an entity type ?
(a) A specific concrete object with a defined set of processes (e.g. Jatin with diabetes)
(b) A value given to a particular attribute (e.g. height-230 cm)
(c) A thing that we wish to collect data about zero or more, possibly real world examples of it may exist
(d) A template for a group of things with the same set of characteristic that may exist in the real world

19. Data which improves the performance and accessibility of the database are called :
(a) Indexes (b) User Data
(c) Application Metadata (d) Data Dictionary

20. A relation R = {A, B, C, D, E, F, G} is given with following set of functional dependencies :
$F = \{AD \rightarrow E,\ BE \rightarrow F,\ B \rightarrow C,\ AF \rightarrow G\}$
Which of the following is a candidate key ?
(a) A (b) AB (c) ABC (d) ABD

21. Which of the following services is not provided by wireless access point in 802.11 WLAN ?
(a) Association (b) Disassociation (c) Error correction (d) Integration

22. Which of the following fields in IPv4 datagram is not related to fragmentation ?
(a) Type of service (b) Fragment offset (c) Flags (d) Identification

23. Four channels are multiplexed using TDM. If each channel sends 100 bytes/second and we multiplex 1 byte per channel, then the bit rate for the link is_____.
(a) 400 bps (b) 800 bps (c) 1600 bps (d) 3200 bps

24. In a typical mobile phone system with hexagonal cells, it is forbidden to reuse a frequency band in adjacent cells. If 840 frequencies are available, how many can be used in a given cell ?
(a) 280 (b) 210 (c) 140 (d) 120

25. Using p = 3, q = 13, d = 7 and e = 3 in the RSA algorithm, what is the value of ciphertext for a plain text 5 ?
(a) 13 (b) 21 (c) 26 (d) 33

26. A virtual memory has a page size of 1K words. There are eight pages and four blocks. The associative memory page table contains the following entries:

Page	Block
0	3
2	1
5	2
7	0

Which of the following list of virtual addresses (in decimal) will not cause any page fault if referenced by the CPU ?

(a) 1024, 3072, 4096, 6144 (b) 1234, 4012, 5000, 6200
(c) 1020, 3012, 6120, 8100 (d) 2021, 4050, 5112, 7100

27. Suppose that the number of instructions excuted between page fault is directly proportional to the number of page frames allocated to a program. If the available memory is doubled, the mean interval between page faults is also doubled. Further, consider that a normal instruction takes one microsecond, but if a page fault occurs, it takes 2001 microseconds. If a program takes 60 sec to run, during which time it gets 15,000 page faults, how long would it take to run it twice as much memory were available ?

(a) 60 sec (b) 30 sec (c) 45 sec (d) 10 sec

28. Consider a disk with 16384 bytes per track having a rotation time of 16 msec and average seek time of 40 msec. What is the time in msec to read a block of 1024 bytes from this disk ?

(a) 57 msec (b) 49 msec (c) 48 msec (d) 17 msec

29. A system has four processes and five allocatable resources. The current allocation and maximum needs are as follows :

	Allocated	Maximum	Available
Process A	1 0 2 1 1	1 1 2 1 3	0 0 *x* 1 1
Process B	2 0 1 1 0	2 2 2 1 0	
Process C	1 1 0 1 0	2 1 3 1 0	
Process D	1 1 1 1 0	1 1 2 2 1	

The smallest value of *x* for which the above system in safe state is_____.

(a) 1 (b) 3 (c) 2 (d) 0

30. In Unix, the login prompt can be changed by changing the contents of the file_____.

(a) contrab (b) init (c) gettydefs (d) inittab

31. A data cube C, has n dimensions, and each dimension has exactly p distinct values in the base cuboid. Assume that there are no concept hierarchies associated with the dimensions. What is the maximum number of cells possible in the data cube, C ?

(a) pn (b) p (c) $(2^n - 1)\, p + 1$ (d) $(p + 1)^n$

32. Suppose that from given statistics, it is known that meningitis causes stiff neck 50% of the time, that the proportion of persons having meningitis is 1/50000, and that the proportion of people having stiff neck is 1/20. Then the percentage of people who had meningitis and complain about stiff neck is :

(a) 0.01% (b) 0.02% (c) 0.04% (d) 0.05%

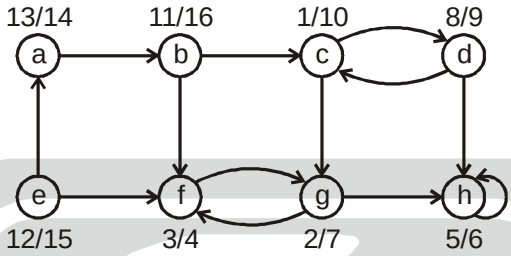
33. _____ system is market oriented and is used for data analysis by knowledge workers including Managers, Executives and Analysts.

(a) OLTP (b) OLAP (c) Data System (d) Market System

34. _____ allows selection of the relevant information necessary for the data warehouse.
(a) The Top-Down View (b) Data Warehouse View
(c) Datasource View (d) Business Query View

35. The hash function used in double hashing is of the form :
(a) $h(k, i) = (h_1(k) + h_2(k) + i) \bmod m$ (b) $h(k, i) = (h_1(k) + h_2(k) - i) \bmod m$
(c) $h(k, i) = (h_1(k) + i\, h_2(k)) \bmod m$ (d) $h(k, i) = (h_1(k) - i\, h_2(k)) \bmod m$

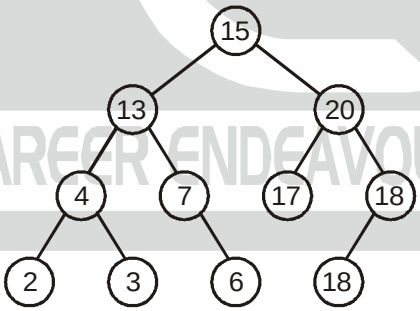
36. In the following graph, discovery time stamps and finishing time stamps of Depth First Search (DFS) are shown as *x*/*y*, where *x* is discovery time stamp and *y* is finishing time stamp.



It shows which of the following depth first forest ?
(a) {a, b, e} {c, d, f, g, h} (b) {a, b, e} {c, d, h} {f, g}
(c) {a, b, e} {f, g} {c, d} {h} (d) {a, b, c, d} {e, f, g} {h}

37. The number of disk pages access in B-tree search, where h is height, n is the number of keys, and t is the minimum degree, is :
(a) $\theta(\log_n h * t)$ (b) $\theta(\log_t n * h)$ (c) $\theta(\log_h n)$ (d) $\theta(\log_t n)$

38. The inorder traversal of the following tree is :



(a) 2 3 4 6 7 13 15 17 18 18 20
(b) 20 18 18 17 15 13 7 6 4 3 2
(c) 15 13 20 4 7 17 18 2 3 6 18
(d) 2 4 3 13 7 6 15 17 20 18 18

39. An ideal sort is an in-place-sort whose additional space requirement is_____.
(a) $O(\log_2 n)$ (b) $O(n \log_2 n)$ (c) $O(1)$ (d) $O(n)$

40. Which of the following is not a congestion policy at network layer ?
(a) Flow Control Policy (b) Packet Discard Policy
(c) Packet Lifetime Management Policy (d) Routing Algorithm

41. Loop unrolling is a code optimization technique :
(a) that avoids tests at every iteration of the loop
(b) that improves performances by decreasing the number of instructions in a basic block
(c) that exchanges inner with outer loops
(d) that reorders operations to allow multiple computations to happen in parallel

42. What will be the hexadecimal value in the register a*x* (32-bit) after executing the following instructions ?
mov al, 15
mov ah, 15
*x*or al, al
mov cl, 3
shr a*x*, cl
Codes:
(a) 0F00 h (b) 0F0F h (c) 01E0 h (d) FFFF h

43. Which of the following statements is false ?
(a) Top-down parsers are LL parsers where first L stands for left-to-right scan and second L stands for a leftmost derivation.
(b) (000)* is a regular expression that matches only strings containing an odd number of zeroes, including the empty string.
(c) Bottom-up parsers are in the LR family, where L stands for left-to-right scan and R stands for rightmost derivation.
(d) The class of context-free languages is closed under reversal. That is, if L is any context-free languages, then the language $L^R = \{w^R : w \in L\}$ is context-free.

44. System calls are usually invoked by using :
(a) A privileged instruction (b) An indirect jump
(c) A software interrupt (d) Polling

45. The _____ transfers the executable image of a C++ program from hard disk to main memory.
(a) Compiler (b) Linker (c) Debugger (d) Loader

46. In software testing, how the error, fault and failure are related to each other ?
(a) Error leads to failure but fault is not related to error and failure.
(b) Fault leads to failure but error is not related to fault and failure.
(c) Error leads to fault and fault leads to failure.
(d) Fault leads to error and error leads to failure.

47. Which of the following is not a software process model ?
(a) Prototyping (b) Iterative (c) Timeboxing (d) Glassboxing

48. How many solutions are there for the equation $x + y + z + u = 29$ subject to the constraints that $x \geq 1, y \geq 2, z \geq 3$ and $u \geq 0$?
(a) 4960 (b) 2600 (c) 23751 (d) 8855

49. A unix file system has 1-KB blocks and 4-byte disk addresses. What is the maximum file size if i-nodes contain 10 direct entries and one single, double and triple indirect entry each ?
(a) 32 GB (b) 64 GB (c) 16 GB (d) 1 GB

50. _____ uses electronic means to transfer funds directly from one account to another rather than by cheque or cash.
(a) M-Banking (b) E-Banking (c) O-Banking (d) C-Banking

PAPER : DEC. 2015

UGC-NET COMPUTER SCIENCE & APPLICATIONS (87)

PAPER-III

Note : This paper contains **seventy five (75)** objective type questions of **two (2)** marks each. All questions are compulsory.

1. The three outputs $x_1x_2x_3$ from the 8 × 3 priority encoder are used to provide a vector address of the form $101\,x_1x_2x_3\,00$. What is the second highest priority vector address in hexadecimal if the vector addresses are starting from the one with the highest priority?
   (a) BC (b) A4 (c) BD (d) AC

2. What will be the output at PORT1 if the following program is executed ?
   MVI B, 82H
   MOV A, B
   MOV C, A
   MVI D, 37H
   OUT PORT1
   HLT
   (a) 37H (b) 82H (c) B9H (d) 00H

3. Which of the following 8085 microprocessor hardware interrupts has the lowest priority ?
   (a) RST 6.5 (b) RST 7.5 (c) TRAP (d) INTR

4. A dynamic RAM has refresh cycle of 32 times per msec. Each refresh operation requires 100 nsec and a memory cycle requires 250 nsec. What percentage of memory's total operating time is required for refreshes?
   (a) 0.64 (b) 0.96 (c) 2.00 (d) 0.32

5. A DMA controller transfers 32-bit words to memory using cycle Stealing. The words are assembled from a device that transmits character at a rate of 4800 characters per second. The CPU is fetcing and executing instructions at an average rate of one million instructions per second. By how much will the CPU be slowed down because of the DMA transfer ?
   (a) 0.06% (b) 0.12% (c) 1.2% (d) 2.5%

6. A CPU handles interrupt by executing interrupt service subroutine_____.
   (a) By checking interrupt register after execution of each instruction
   (b) By checking interrupt register at the end of the fetch cycle
   (c) Whenever an interrupt is registered
   (d) By checking interrupt register at regular time interval

7. Given the following set of prolog clauses:
   father(X, Y):
   parent(X, Y),
   male(X),
   parent(Salley, Bob),
   parent(Jim, Bob),
   parent(Thomas, Jane),
   male(Bob),
   male(Jim),
   female(Salley),

female(Alice).
How many atoms are matched to the variable 'X' before the query father (X, Jane) reports a Results?
(a) 1 (b) 2 (c) 3 (d) 4

8. Forward chaining system are_____where as backward chaining systems are_____.
(a) Data driven, Data driven (b) Goal driven, Data driven
(c) Data driven, Goal driven (d) Goal driven, Goal driven

9. Match the following w.r.t. programming languages:

List-I	**List-II**
A. JAVA	i. Dynamically object oriented
B. Python	ii. Statically Non-object oriented
C. Prolog	iii. Statically object oriented
D. ADA	iv. Dynamically non-object oriented

Codes:

	A	B	C	D
(a)	iii	i	ii	iv
(b)	i	iii	ii	iv
(c)	i	iii	iv	ii
(d)	ii	iv	i	iii

10. The combination of an IP address and a port number is known as_____.
(a) network number (b) socket address
(c) subnet mask number (d) MAC address

11. A network with bandwidth of 10 Mbps can pass only an average of 15,000 frames per minute with each frame carrying an average of 8,000 bits. What is the throughput of this network?
(a) 2 Mbps (b) 60 Mbps (c) 120 Mbps (d) 10 Mbps

12. Consider a subnet with 720 routers. If a three-level hierarchy is choosen with eight clusters, each containing 9 regions of 10 routers, then total number of entries in the entries in the routing table is_____.
(a) 25 (b) 27 (c) 53 (d) 72

13. In a classful addressing, the IP addresses with 0 (zero) as network number:
(a) refers to the current network (b) refers to broadcast on the local network
(c) refers to broadcast on a distant network (d) refers to loopback testing

14. In electronic mail, which of the following protocols allows the transfer of multimedia messages?
(a) IMAP (b) SMTP (c) POP 3 (d) MIME

15. A device is sending out data at the rate of 2000 bps. How long does it take to send a file of 1,00,000 characters?
(a) 50 (b) 200 (c) 400 (d) 800

16. In Activity Selection problem, each activity *i* has a start time s_i and a finish time f_i where $s_i \le f_i$. Activities *i* and *j* are compatible if:
(a) $s_i \ge f_j$ (b) $s_j \ge f_i$ (c) $s_i \ge f_j$ or $s_j \ge f_i$ (d) $s_i \ge f_j$ and $s_j \ge f_i$

17. Given two sequence X and Y:
$X = \langle a, b, c, b, d, a, b \rangle$
$Y = \langle b, d, c, a, b, a \rangle$
The longest common subsequence of X and Y is :
(a) $\langle b, c, a \rangle$ (b) $\langle c, a, b \rangle$ (c) $\langle b, c, a, a \rangle$ (d) $\langle b, c, b, a \rangle$

18. If there are n integers to sort, each integer has d digits and each digit is in the set {1, 2,..., k}, radix sort can sort the numbers in:
(a) O(d n k) (b) O(d n^k) (c) O((d + n)k) (d) O(d(n + k))

19. The solution of the recurrence relation

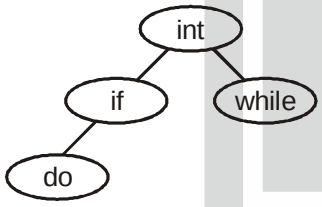
$$T(n) \le \begin{cases} \theta(\ell) & \text{if} \quad n \le 80 \\ T\left(\frac{n}{s}\right) + T\left(\frac{7n}{10} + 6\right) + O(n) & \text{if} \quad n > 80 \end{cases} \text{ is :}$$

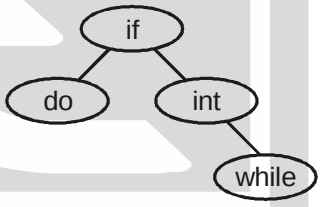
(a) O(lg n) (b) O(n) (c) O(n lg n) (d) None of these

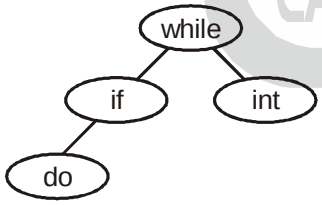
20. Floyd-Warshall algorithm utilizes_____to solve the all-pairs shortest paths problem on a directed graph in_____time.
(a) Greedy algorithm, $\theta(V^3)$ (b) Greedy algorithm, $\theta(V^2 \log n)$
(b) Dynamic programming, $\theta(V^3)$ (d) Dynamic programming, $\theta(V^2 \log n)$

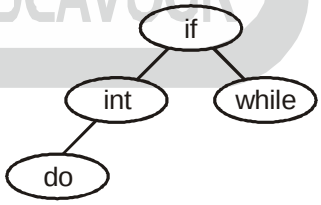
21. Let n = 4 and $(a_1, a_2, a_3, a_4) = (\text{do}, \text{if}, \text{int}, \text{while})$.

Let $p(1:4) = \left(\frac{3}{8}, \frac{3}{8}, \frac{1}{8}, \frac{1}{8}\right)$ and $q(1:4) = \left(\frac{2}{8}, \frac{3}{8}, \frac{1}{8}, \frac{1}{8}, \frac{1}{8}\right)$ where p(i) and q(i) denotes the probability with which we search a_i and the identifier *x* being searched satisfy $a_i < x < a_{i+1}$ respectively. The optimal search tree is given by:

(a)


(b)


(c)


(d)


22. The family of context sensitive languages is_____under union and_____under reversal.
(a) closed, not closed (b) not closed, not closed
(c) closed, closed (d) not closed, closed

23. Match the following:

List-I	List-II
A. $\{a^n b^n \mid n > 0\}$ is a deterministic context free language	i. but not recursive language
B. The complement of $\{a^n b^n a^n \mid n > 0\}$ is a context free language	ii. but not context free language
C. $\{a^n b^n a^n\}$ is context sensitive language	iii. but can not be accepted by a deterministic push down automation
D. L is a recursive language	iv. but not regular

Codes:

	A	B	C	D
(a)	i	ii	iii	iv
(b)	i	ii	iv	iii
(c)	iv	iii	ii	i
(d)	iv	iii	i	ii

24. The language of all non-null strings of a's can be defined by a context free grammer as follow:
$S \rightarrow a\,S \mid S\,a \mid a$
The word a^3 can be generated by_____different trees.
(a) Two (b) Three (c) Four (d) Five

25. Which one of the following non-functional quality attributes is not highly affected by the architecture of the software ?
(a) Performance (b) Reliability (c) Usability (d) Portability

26. The context free grammer given by
$S \rightarrow XYX$
$X \rightarrow aX \mid bX \mid \lambda$
$Y \rightarrow bbb$
generates the languages which is defined by regular expression:
(a) (a + b)*bbb (b) abbb(a + b)*
(c) (a + b)*(bbb) (a + b)* (d) (a + b) (bbb) (a + b)*

27. There are exactly_____different finite automata with three states *x*, *y* and *z* over the alphabet {a, b} where *x* is always the start state.
(a) 64 (b) 256 (c) 1024 (d) 5832

28. Given the following two languages:
$L_1 = \{a^n\, b\, a^n \mid n > 0\}$
$L_2 = \{a^n\, b\, a^n\, b^{n+1} \mid n > 0\}$
Which of the following is correct?
(a) L_1 is context free language and L_2 is not context free language
(b) L_1 is not context free language and L_2 is context free language
(c) Both L_1 and L_2 are context free languages
(d) Both L_1 and L_2 are not context free languages

29. Which of the following is used to make an Abstract class?
(a) Making atleast one member function as pure virtual function
(b) Making atleast one member function as virtual function
(c) Declaring as Abstract class using virtual keyword
(d) Declaring as Abstract class using static keyword

30. Match the following with reference to object oriented modelling:

List-I	**List-II**
A. Polymorphism	i. Picking both operator and attributes with operations appropriate to model an object
B. Inheritance	ii. Hiding implementation details of methods from users of objects
C. Encapsulation	iii. Using similar operations to do similar things
D. Abstraction	iv. Create new classes from existing class

Codes:

	A	B	C	D
(a)	iv	iii	i	ii
(b)	iii	iv	i	ii
(c)	iii	i	ii	iv
(d)	iv	iii	ii	i

31. In CRC based design, a CRC Team consists of :
(A) one or two users representatives (B) several programmers
(C) project co-ordinators (D) one or two system analysts
Codes:
(a) (A) and (C) (b) (A), (B), (C) and (D)
(c) (A), (C) and (D) (d) (A), (B) and (D)

32. The end points of a given line are (0, 0) and (6, 18). Compute each value of y as x steps from 0 to 3, by using equation of straight line:
(a) For $x = 0, y = 0;\ x = 1, y = 3;\ x = 2,\ y = 6;\ x = 3, y = 9$
(b) For $x = 0, y = 1;\ x = 1, y = 3;\ x = 2, y = 4;\ x = 3, y = 9$
(c) For $x = 0, y = 2;\ x = 1, y = 3;\ x = 2, y = 6;\ x = 3, y = 9$
(d) For $x = 0, y = 0;\ x = 1, y = 3;\ x = 2, y = 4;\ x = 3, y = 6$

33. Which of the following graphic primitives are considered as the basic building blocks of computer graphics?
(A) Points (B) Lines (C) Polylines (D) Polygons
Codes:
(a) (A) only (b) (A) and (B) (c) (A), (B) and (C) (d) (A), (B), (C) and (D)

34. Javascript and Java has similar name because_____is/are true.
(A) Javascripts syntax is loosely based on Java's syntax
(B) Javascript is stripped down version of Java
(C) Java and Javascript are originated from Island of Java
Codes:
(a) (A) only (b) (A), (B) and (C) (c) (A) and (B) (d) (A) and (C)

35. Which of the following statements are true with reference to the way of describing XML data ?
(A) XML uses DTD to describe the data
(B) XML uses XSL to describe the data
(C) XML uses a description node to describe the data
Codes:
(a) (A) only (b) (B) only (c) (A) and (B) (d) (A) and (C)

36. Which of the following is/are correct with reference to Abstract class and interface?
(A) A class can inherit only one Abstract class but may inherit several interfaces
(B) An Abstract class can provide complete and default code but an interface has no code
Codes:
(a) (A) is true (b) (B) is true
(c) Both (A) and (B) are true (d) Neither (A) nor (B) is true

37. Match the following with respect to various memory management algorithms:

List-I	List-II
A. Demand	i. degree of multiprogramming
B. Segmentation	ii. working set
C. Dynamic partitions	iii. supports user view of memory
D. Fixed partitions	iv. compaction

Codes:

	A	B	C	D
(a)	iii	iv	ii	i
(b)	ii	iii	i	iv
(c)	iv	iii	ii	i
(d)	ii	iii	iv	i

38. Function of memory management unit is :
(a) Address translation (b) Memory allocation
(c) Cache management (d) All of the above

39. Consider a system with twelve magnetic tape drives and three processes P_1, P_2 and P_3. Process P_1 requires maximum ten tape drives, process P_2 may need as many as four tape drives and P_3 may need upto nine tape drives. Suppose that at time t_1, process P_1 is holding five tape drives, process P_2 is holding two tape drives and process P_3 is holding three tape drives. At time t_1, system is in:
(a) safe state (b) unsafe state (c) deadlocked state (d) starvation state

40. In Unix operating system, special files are used to:
(a) buffer data received in its input from where a process reads
(b) provide a mechanism to map physical device to file names
(c) store list of file names plus pointers associated with i-nodes
(d) store information entered by a user application program or utility program

41. Match the following in Unix file system:

List-I	List-II
A. Boot block	i. Information about file system
B. Super block	ii. Information about file
C. Inode table	iii. Storage space
D. Data block	iv. Code for making OS ready

Codes:

	A	B	C	D
(a)	iv	i	ii	iii
(b)	i	iii	ii	iv
(c)	iii	i	ii	iv
(d)	iv	ii	i	iii

42. In an operating system, indivisibility of operation means:
(a) Operation is interruptable (b) Race - condition may occur
(c) Processor can not be pre-empted (d) All of the above

43. A horn clause is_____.
(a) A clause in which no variables occur in the expression
(b) A clause that has at least one negative literal
(c) A disjunction of a number of literals
(d) A clause that has at most one positive literal

44. In proportional Logic, given P and $P \rightarrow Q$, we can infer_____.
(a) $\sim Q$ (b) Q (c) $P \wedge Q$ (d) $\sim P \wedge Q$

45. Reasoning strategies used in expert system include_____.
(a) Forward chaining, backward chaining and problem reduction
(b) Forward chaining, backward chaining and boundary mutation
(c) Forward chaining, backward chaining and back propagation
(d) Backward chaining, problem reduction and boundary mutation

46. Language model used in LISP is_____.
(a) Functional programming (b) Logic programming
(c) Object oriented programming (d) All of the above

47. In constraint satisfaction problem, constraints can be stated as _____.
(a) Arithmatic equation and inequalities that bind the values of variables
(b) Arithmatic equation and inequalities that doesn't bind any restriction over variables
(c) Arithmatic equation that impose restrictions over variables
(d) Arithmatic equation that discard constraints over the given variables

48. As compared to rental and leasing methods to acquire computer systems for a Management Information System (MIS), purchase method has following advantage:
(a) It has high level of flexibility (b) It doesn't require cash up front
(c) It is a business investment (d) Little risk of obsolescence

49. Consider the conditional entropy and mutual information for the binary symmetric channel. The input source has alphabet X = {0, 1} and associated probabilities {1/2, 1/2}. The channel matrix is $\begin{pmatrix} 1-p & p \\ p & 1-p \end{pmatrix}$ where p is the translation probability. Then the condition entropy is given by :
(a) 1 (b) $-p \log (p) - (1-p) \log (1-p)$
(c) $1 + p \log (p) + (1-p) \log (1-p)$ (d) 0

50. Which of the following is not a lossy compression technique ?
(a) JPEG (b) MPEG (c) FFT (d) Arithmetic coding

51. Blind image deconvolution is_____.
(a) Combination of blur identification and image restoration
(b) Combination of segmentation and classification
(c) Combination of blur and non-blur image
(d) None of the above

52. A basic feasible solution of a linear programming problem is said to be_____if at least one of the basic variable is zero.
(a) degenerate (b) non-degenerate (c) infeasible (d) unbounded

53. Consider the following conditions:
(A) The solution must be feasible, i.e. it must satisfy all the supply and demand constraints.
(B) The number of positive allocations must be equal to m + n – 1, where m is the number of rows and n is the number of columns.
(C) All the positive allocations must be in independent positions.
The initial solution of a transportation problem is said to be non-degenerate basic feasible solution if it satisfies:
Codes:
(a) (A) and (B) only (b) (A) and (C) only (c) (B) and (C) only (d) (A), (B) and (C)

54. Consider the following transportation problem:

Factories	Stores					
		I	II	III	IV	Supply
	A	4	6	8	13	50
	B	13	11	10	8	70
	C	14	4	10	13	30
	D	9	11	13	8	50
	Demand	25	35	105	20	

The transportation cost in the basic feasible solution of the above transportation problem using Vogel's Approximation method is :

(a) 1450 (b) 1465 (c) 1480 (d) 1520

55. The character set used in Windows 2000 operating system is_____.

(a) 8 bits ASCII (b) Extended ASCII (c) 16 bit UNICODE (d) 12 bit UNICODE

56. In Unix, the command to enable permission for file "mylife" by all is_____.

(a) Chmod ugo + X myfile (b) Chmod a + X myfile
(c) Chmod + X myfile (d) All of the above

57. What will be the output of the following Unix command?

$rm chap0\[1 – 3\]

(a) Remove file chap0[1 – 3] (b) Remove file chap01, chap02, chap03
(c) Remove file chap\[1 – 3\] (d) None of the above

58. Which of the following statements regarding the features of the object-oriented approach to databases are true?

(A) The ability to develop more realistic models of the real world.
(B) The ability to represent the world in a non-geometric way.
(C) The ability to develop databases using natural language approaches.
(D) The need to split objects into their components parts
(E) The ability to develop database models based on location rather than state and behaviour.

Codes:

(a) (A), (B) and (C) (b) (B), (C) and (D) (c) (A), (D) and (E) (d) (C), (D) and (E)

59. Consider the following database table:

```
Create table test(
    one integer,
    two integer,
    primary key(one),
    unique(two),
    check(one > = 1 and < = 10),
    check(two > = 1 and < = 5)
    );
```

How many data records/tuples atmost can this table contain?

(a) 5 (b) 10 (c) 15 (d) 50

60. Suppose ORACLE relation R(A, B) currently has tuples {(1, 2), (1, 3), (3, 4)} and relation S(B, C) currently has {(2, 5), (4, 6), (7, 8)}. Consider the following two SQL queries SQ1 and SQ2:

SQ1 : Select *
From R Full Join S
On R.B = S.B;

SQ2 : Select *
From R Inner Join S
On R.B = S.B;

The numbers of tuples in the result of the SQL and SQ1 and the SQL query SQ2 are given by :

(a) 2 and 6 respectively (b) 6 and 2 respectively
(c) 2 and 4 respectively (d) 4 and 2 respectively

61. Consider the following three SQL queries (Assume the data in the people table):

(A) Select Name from people where Age>21;
(B) Select Name from people where Height>180;
(C) Select Name from people where (Age>21) or (Height>180);

If the SQL queries (A) and (B) above, return 10 rows and 7 rows in the result set respectively, then what is one possible number of two returned by the SQL query (C)?

(a) 3 (b) 7 (c) 10 (d) 21

62. The distributed system is a collection of (P) and communication is achieved in distributed system by (Q) , where (P) and (Q) are :

(a) Loosely coupled hardware on tightly coupled software and disk sharing, respectively.
(b) Tightly coupled hardware on loosely coupled software and shared memory, respectively.
(c) Tightly coupled software on loosely coupled hardware and message passing, respectively.
(d) Loosely coupled software on tightly coupled hardware and file sharing, respectively.

63. Consider the following three tables R, S and T. In this question, all the join operations are natural joins ($\rhd\lhd$) . (π) is the operation of a relation.

R

A	B
1	2
3	2
5	6
7	8
9	8

S

B	C
6	2
2	4
8	1
8	3
2	5

T

A	C
7	1
1	2
9	3
5	4
3	5

Possible answer tables for this question are also given as below:

A	B	C
1	2	4
1	2	5
3	2	4
3	2	5
5	6	2
7	8	1
7	8	3
9	8	1
9	8	3

(A)

A	B	C
1	2	2
3	2	5
5	6	4
7	8	1
9	8	3

(B)

A	B	C
1	6	2
3	2	5
5	2	4
7	8	1
9	8	3

(C)

A	B	C
3	2	5
7	8	1
9	8	3

(D)

What is the resulting table of $\pi_{A,B}(R \bowtie T) \bowtie \pi_{B,C}(S \bowtie T)$?

(a) (A) (b) (B) (c) (C) (d) (D)

64. Consider the two class classification task that consists of the following points:

Class C_1 : $[-1, -1]$, $[-1, 1]$, $[1, -1]$

Class C_2 : $[1, 1]$

The decision boundary between the two classes C_1 and C_2 using single perception is given by :

(a) $x_1 - x_2 - 0.5 = 0$ (b) $-x_1 + x_2 - 0.5 = 0$

(c) $0.5(x_1 + x_2) - 1.5 = 0$ (d) $x_1 + x_2 - 0.5 = 0$

65. Consider a standard additive model consisting of rules of the form of
If x is A_i AND y is B_i THEN z is C_i.
Given crisp inputs $x = x_0$, $y = y_0$, the outputs of the model is:

(a) $z = \sum_i \mu_{A_i}(x_0)\, \mu_{B_i}(y_0)\, \mu_{C_i}(z)$ (b) $z = \sum_i \mu_{A_i}(x_0)\, \mu_{B_i}(y_0)$

(c) $z = \text{centroid}\left(\sum_i \mu_{A_i}(x_0)\, \mu_{B_i}(y_0)\, \mu_{C_i}(z)\right)$ (d) $z = \text{centroid}\left(\sum_i \mu_{A_i}(x_0)\, \mu_{B_i}(y_0)\right)$

66. A bell-shaped membership function is specified by three parameters (a, b, c) as follows:

(a) $\dfrac{1}{1+\left(\dfrac{x-c}{a}\right)^b}$ (b) $\dfrac{1}{1+\left(\dfrac{x-c}{a}\right)^{2b}}$ (c) $1+\left(\dfrac{x-c}{a}\right)^b$ (d) $1-\left(\dfrac{x-c}{a}\right)^{2b}$

67. Which of the following is/are the principle components of a memory-tube display ?

(A) Flooding gun (B) Collector (C) Phosphorus grains (d) Ground

Codes:

(a) (A) and (B) (b) (C) only (c) (D) only (d) All of these

68. Which of the following steps is/are not required for analog to digital conversion ?

(A) Sensing (B) Conversion (C) Amplification
(D) Conducting (E) Quantization

Codes:

(a) (A) and (B) (b) (C) and (D) (c) (A), (B) and (E) (d) None of the above

69. Which raster locations would be chosen by Bresenham's algorithm when scan converting a line from (1, 1) to (8, 5)?

(a)

x	y
1	1
2	2
3	3
4	3
5	4
6	4
7	5
8	6

(b)

x	y
1	1
2	2
3	2
4	3
5	4
6	5
7	6
8	7

(c)

x	y
1	1
2	2
3	2
4	3
5	3
6	4
7	4
8	5

(d)

x	y
1	1
2	2
3	2
4	3
5	5
6	4
7	5
8	5

70. Consider a unit square centred at origin. The coordinates of the sqaure are translated by a factor $\left(\frac{1}{2}, 1\right)$ and rotated by an angle 90°. What shall be the coordinates of the new square ?

(a) $\left(\frac{-1}{2}, 0\right), \left(\frac{-1}{2}, 1\right), \left(\frac{-3}{2}, 1\right), \left(\frac{-3}{2}, 0\right)$ (b) $\left(\frac{-1}{2}, 0\right), \left(\frac{1}{2}, 1\right), \left(\frac{3}{2}, 1\right), \left(\frac{3}{2}, 0\right)$

(c) $\left(\frac{-1}{2}, 0\right), \left(\frac{1}{2}, 0\right), \left(\frac{-3}{2}, 1\right), \left(\frac{-3}{2}, 0\right)$ (d) $\left(\frac{-1}{2}, 0\right), \left(\frac{1}{2}, 1\right), \left(\frac{-3}{2}, 1\right), \left(\frac{-3}{2}, 0\right)$

71. Which of the following is/are the components of a CRT ?
(A) Electron Gun (B) Control Electrode (C) Focusing Electrode (D) Phosphor Coated Screen

Codes:

(a) (A) and (D) (b) (A), (B) and (D)
(c) (A), (B), (C) and (D) (d) (A), (C) and (D)

72. Which one of the following statements is incorrect?
(a) Pareto analysis is a statistical method used for analyzing causes, and is one of the primary tools for quality management.
(b) Reliability of a software specified the probability of failure-free operation of that software for a given time duration.
(c) The reliability of a system can also be specified as the Mean Time To Failure (MTTF).
(d) In white-box testing, the test cases are decided from the specifications or the requirements.

73. Consider a language A defined over the alphabet $\Sigma = \{0, 1\}$ as $A = \left\{0^{\lfloor n/2 \rfloor} 1^n : n >= 0\right\}$. The expression $\lfloor n/2 \rfloor$ means the floor of n/2 or what you get by rounding n/2 down to the nearest integer.
Which of the following is NOT an example of a string in A ?
(a) 011 (b) 0111 (c) 0011 (d) 001111

74. Which one of the following statements, related to the requirements phase in Software Engineering, is incorrect?
(a) "Requirement validation" is one of the activities in the requirements phase.
(b) "Prototyping" is one of the methods for requirement analysis.
(c) "Modelling-oriented approach" is one of the methods for specifying the functional specifications.
(d) "Function points" is one of the most commonly used size metric for requirements.

75. _____tag is an extension to HTML that can enclose any number of Javascript statements.
(a) <SCRIPT> (b) <BODY> (c) <HEAD> (d) <TITLE>