

PAPER – III
COMPUTER SCIENCE

Note : Attempt all the questions. Each question carries *two* (2) marks.

1. A combinational circuit is to be designed to implement a boolean function with 3 boolean variables which gives output 1 if all the inputs have same value, otherwise give 0. If only basic gates (AND, OR and NOT) are available and if complimented variable is not available, then determine the minimum number of gates to design the circuit ?

- | | |
|------|------|
| 1) 3 | 2) 4 |
| 3) 5 | 4) 6 |

2. What are the status of the Auxiliary Carry (AC) and Carry Flag (CY) after executing the following 8085 program?

MVI H, 5DH

MVI L, 6BH

MOV A, H

ADD L

- | |
|----------------------|
| 1) AC = 0 and CY = 0 |
| 2) AC = 1 and CY = 1 |
| 3) AC = 1 and CY = 0 |
| 4) AC = 0 and CY = 0 |
3. Assume the contents of registers HL are 20H and 50H, respectively. Memory location 2050H contains 9FH. Which of the following instruction is used to transfer the content of memory location to register B?
- | |
|----------------|
| 1) MOV M,B |
| 2) MOV M,2050H |
| 3) MOV B,M |
| 4) MOV B,9FH |
4. If each address space represents one byte of storage space, how many address lines are needed to access RAM chips arranged in a 4×6 array, where each chip is $8K \times 4$ bits?
- | |
|-------|
| 1) 13 |
| 2) 15 |
| 3) 16 |
| 4) 17 |

5. The architecture in which the hardware decides which instructions are to be issued concurrently at run time is
- 1) Multiple instruction issue
 - 2) Very long instruction word architecture
 - 3) Super scalar architecture
 - 4) Super pipelined architecture

6. How many times, the following program jump to LOOP?

```
LOOP MVI C, FFH
```

```
    DCR C
```

```
    JNZ LOOP
```

```
    HLT
```

- | | |
|--------|--------|
| 1) 256 | 2) 255 |
| 3) 155 | 4) 156 |
7. Consider the following schemes: Branch = (Branch-name, Assets, Branch-city)
 Customer = (Customer-name, Bank name, Customer-city) Borrow = (Branch-name, loan number, customer account-number) Deposit = (Branch-name, Account number, Customer-name, Balance) Using relational Algebra, the Query that finds customers who have balance more than 10, 000 is
- 1) π customer-name (σ balance > 10000 (Deposit))
 - 2) σ customer-name (σ balance > 10000 (Deposit))
 - 3) π customer-name (σ balance > 10000 (Borrow))
 - 4) σ customer-name (π balance > 10000 (Borrow))
8. Which one of the following statements is false?
- 1) The data dictionary is normally maintained by the database administrator
 - 2) Data elements in the database can be modified by changing the data dictionary
 - 3) The data dictionary contains the name and description of each data element
 - 4) The data dictionary is a tool used exclusively by the database administrator
9. Conceptual design
- 1) is a documentation technique
 - 2) needs data volume and processing frequencies to determine the size of the database
 - 3) involves modelling independent of the DBMS
 - 4) is designing the relational model

10. The student marks should not be greater than 100 and less than zero. This is

- 1) Integrity constraint
- 2) Referential constraint
- 3) Over-defined constraint
- 4) Feasible constraint

11. Consider the following database table having A, B, C and D as its four attributes and four possible candidate keys (I, II, III and IV) for this table:

A	B	C	D
a ₁	b ₁	c ₁	d ₁
a ₂	b ₃	c ₃	d ₁
a ₁	b ₂	c ₁	d ₂

- 1) I : {B}
- 2) II : {B, C}
- 3) III : {A, D}
- 4) IV : {C}

12. Which character function can be used to return a specified portion of a character string?

- 1) INSTR
- 2) SUBSTRING
- 3) SUBSTR
- 4) POS

13. The parametric form of 3D slope lines are

- 1) $X = f(t), y = g(t), z = h(t)$
- 2) $X = a_0, Y = b_0, Z = C_0$
- 3) $F(t) = 0, g(t) = 0, h(t) = 0$
- 4) $F(t) = 0, g(t) = 0, h(t) = 1$

14. Resolution is defined as

- 1) The number of pixels in the horizontal direction X the number pixels in the vertical direction.
- 2) The number of pixels in the vertical direction X the number pixels in the horizontal direction.
- 3) The number of pixels in the vertical direction + the number pixels in the horizontal direction.
- 4) The number of pixels in the vertical direction – the number pixels in the horizontal direction

15. A raster color display processor supports a resolution of 1024 x 800 with display of 16 million colors simultaneously. What will be the approximate size of frame buffer used in the display processor?

- 1) 1.2×10^6
- 2) 2.4×10^6
- 3) 16×10^6
- 4) 1×10^5

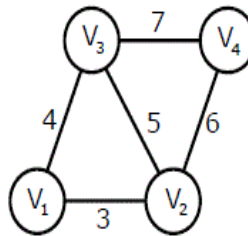
16. In Bresenham's algorithm, while generating a circle, it is easy to generate
- 1) One octant first and other by successive reflection
 - 2) One octant first and other by successive rotation
 - 3) One octant first and other by successive translation
 - 4) All octants
17. Color depth that can be displayed on a display unit can be defined by
- 1) Bits per pixel
 - 2) Bytes per pixel
 - 3) Megabyte per pixel
 - 4) Pixel
18. The origin of computer graphics was developed in
- 1) 1950
 - 2) 1960
 - 3) 1970
 - 4) 1990
19. CISC stand for
- 1) Complete Instruction Set Computer
 - 2) Complex Instruction Set Computer
 - 3) Combined Instruction Set Computer
 - 4) Compiled Instruction Set Computer
20. The constructor which needs parameters with the objects is called
- 1) default constructor
 - 2) parameterized constructor
 - 3) copy constructor
 - 4) Self constructor
21. Any syntactic construct that can be described by a regular expression can also be described by a
- 1) Context sensitive grammar
 - 2) Non-context free grammar
 - 3) Context-free grammar
 - 4) Both 1) and 2)
22. Type checking is normally done during
- 1) Lexical Analysis
 - 2) Syntax Analysis
 - 3) Syntax Directed Translation
 - 4) Code Optimization

- 23.** LR parsers are attractive because
- 1) They can be constructed to recognize CFG corresponding to all programming construct
 - 2) There is no need of backtracking
 - 3) Both 1) and 2)
 - 4) None of these
- 24.** The evaluation strategy which delay the evaluation of an expression until its value is needed and which avoids repeated evaluation is
- 1) Early evaluation
 - 2) Late evaluation
 - 3) Lazy evaluation
 - 4) Critical evaluation
- 25.** If the band rate is 400 for a QPSK signal, the bit rate is _____bit/s.
- 1) 100
 - 2) 400
 - 3) 800
 - 4) 1600
- 26.** In Ethernet, when Manchester encoding is used, the bit rate is
- 1) Half the baud rate
 - 2) Twice the baud rate
 - 3) Same as the baud rate
 - 4) Thrice the baud rate
- 27.** An organization has a class B network and wishes to form subnets for 64 departments. The subnet mask would be
- 1) 255.255.0.0
 - 2) 255.255.64.0
 - 3) 255.255.128.0
 - 4) 255.255.252.0
- 28.** Amplitude modulation of a carrier wave is represented by
- 1) a longer or shorter wavelength
 - 2) an increased or decreased wave height
 - 3) a shift or departure from the normal continuous pattern
 - 4) a square wave
- 29.** Most local loops physically connected to the PSTN supply switched, dial-up service over which of the following?
- 1) four-wire circuits
 - 2) eight-wire circuits
 - 3) leased lines
 - 4) two-wire circuits

30. IEEE 1394 supports speeds of up to

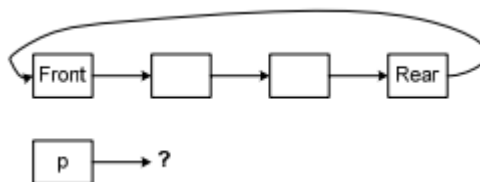
- | | |
|---------------|------------|
| 1) 1.5 Mbps | 2) 12 Mbps |
| 3) 1.544 Gpbs | 4) 3.2 Gps |

31. An undirected graph $G(V, E)$ contains $n(n > 2)$ nodes named v_1, v_2, \dots, v_n . Two nodes v_i, v_j are connected if and only if $0 < |i - j| \leq 2$. Each edge (v_i, v_j) is assigned a weight $i + j$. A sample graph with $n = 4$ is shown below. What will be the cost of the minimum spanning tree?



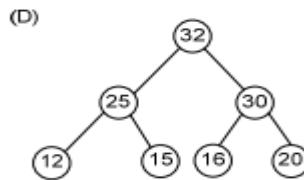
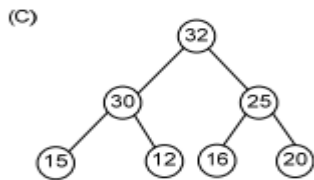
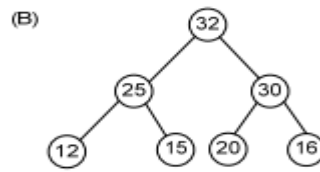
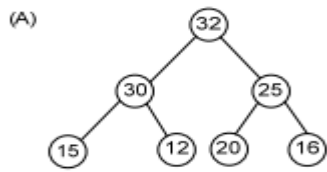
- | | |
|------------------------|------------------|
| 1) $1/12 (11n^2 - 5n)$ | 2) $n^2 - n + 1$ |
| 3) $6n - 11$ | 4) $2n - 1$ |

32. Circularly linked list is used to represent a Queue. A single variable p is used to access the Queue. To which node should p point such that both the operations $enQueue$ and $deQueue$ can be performed in constant time?



- 1) Rear node
- 2) Front node
- 3) Not possible with a single pointer
- 4) Node next to front

33. The elements 32, 15, 20, 30, 12, 25, 16 are inserted one by one in the given order into a maxheap. The resultant max heap is



- 1) A
- 3) C

- 2) B
- 4) D

34. B+ Trees are considered BALANCED because

- 1) The lengths of the paths from the root to all leaf nodes are all equal
- 2) The lengths of the paths from the root to all leaf nodes differ from each other by at most 1.
- 3) The number of children of any two non-leaf sibling nodes differ by at most 1
- 4) The number of records in any two leaf nodes differs by at most 1

35. Which of the following infix expression is obtained on converting the postfix expression $ABC+ -$?

- | | |
|------------|------------|
| 1) $A-B+C$ | 2) $B+C-A$ |
| 3) $A+B-C$ | 4) $C-A+B$ |

36. The characters 'D','C','B','A' are placed in a queue(in that order) and then removed one at a time, in what order will they be removed?

- | | |
|---------|---------|
| 1) ABCD | 2) ABDC |
| 3) DCAB | 4) DCBA |

37. Preventing direct access of data-members of the class from outside world is known as
- 1) Polymorphism
 - 2) Encapsulation
 - 3) Data Hiding
 - 4) Scope resolution
38. The _____ includes hundred of classes and methods grouped into several function packages.
- 1) API
 - 2) JVM
 - 3) JAVAC
 - 4) JRE
39. The paint method accepts _____ type of argument.
- 1) Graphics
 - 2) Graphic
 - 3) Drawing
 - 4) Pixel
40. Which tag allows programs and other binary objects to be directly embedded in webpage?
- 1) <base>
 - 2) <link>
 - 3) <object>
 - 4) <script>
41. Which is also called as abstract class?
- 1) virtual function
 - 2) pure virtual function
 - 3) derived class
 - 4) function
42. The main purpose of using Javascript is
- 1) To design HTML page
 - 2) To perform server side script
 - 3) To add interactivity to HTML
 - 4) To execute database query
43. In a software project, COCOMO (Constructive Cost Model) is used to estimate
- 1) effort and duration based on the size of the software
 - 2) size and duration based on the effort of the software
 - 3) effort and cost based on the duration of the software
 - 4) size, effort and duration based on the cost of the software

44. What is the appropriate pairing of items in the two columns listing various activities encountered in a software life cycle?

- | | |
|-------------------------|--|
| P. Requirements Capture | a. Module Development and Integration |
| Q. Design | b. Domain Analysis |
| R. Implementation | c. Structural and Behavioural Modeling |
| S. Maintenance | d. Performance Tuning |

- 1) P-c, Q-b, R-d, S-a
- 2) P-b, Q-c, R-a, S-d
- 3) P-c, Q-b, R-a, S-d
- 4) P-b, Q-c, R-d, S-a

45. A software project was estimated at 352 Function Points (FP). A four person team will be assigned to this project consisting of an architect, two programmers, and a tester. The salary of the architect is Rs.80,000 per month, the programmer Rs.60,000 per month and the tester Rs.50,000 per month. The average productivity for the team is 8 FP per person month. Which of the following represents the projected cost of the project?

- | | |
|------------------|------------------|
| 1) Rs. 28,16,000 | 2) Rs. 20,90,000 |
| 3) Rs. 26,95,000 | 4) Rs. 27,50,000 |

46. Consider the following statements about the cyclomatic complexity of the control flow graph of a program module. Which of these are TRUE?

- I. The cyclomatic complexity of a module is equal to the maximum number of linearly independent circuits in the graph
- II. The cyclomatic complexity of a module is the number of decisions in the module plus one, where a decision is effectively any conditional statement in the module
- III. The cyclomatic complexity can also be used as a number of linearly independent paths that should be tested during path coverage testing

- | | |
|--------------|------------------|
| 1) I and II | 2) II and III |
| 3) I and III | 4) I, II and III |

47. Match the following

- | List – I | List II |
|-----------------------------|-------------------------|
| a. Condition coverage | i. Black-box testing |
| b. Equivalence partitioning | ii. System testing |
| c. Volume testing | iii. White box testing |
| d. Alpha testing | iv. Performance testing |

Codes :

	a	b	c	d
1)	ii	iii	i	iv
2)	iii	iv	ii	i
3)	iii	i	iv	ii
4)	iii	i	ii	iv

48. The purpose of earned value analysis is to

- 1) Determine how to compensate developers based on their productivity
- 2) Provide a quantitative means of assessing software project progress
- 3) Provide a qualitative means of assessing software project progress
- 4) Set the price point for a software product based on development effort

49. A system has 4 processes sharing 6 resources. If each process needs a maximum of 2 units, then

- | | |
|--------------------------|---------------------------|
| 1) Deadlock may occur | 2) Deadlock never occur |
| 3) Deadlock has to occur | 4) Deadlock may not occur |

50. Consider a system with a two-level paging scheme in which a regular memory access takes 150 nanoseconds, and servicing a page fault takes 8 milliseconds. An average instruction takes 100 nanoseconds of CPU time, and two memory accesses. The TLB hit ratio is 90%, and the page fault rate is one in every 10,000 instructions. What is the effective average instruction execution time?

- | | |
|------------|------------|
| 1) 645 ns | 2) 1050 ns |
| 3) 1215 ns | 4) 1230 ns |

51. Consider a system with 4 types of resources R1 (3 units), R2 (2 units), R3 (3 units), R4 (2 units). A non-preemptive resource allocation policy is used. At any given instance, a request is not entertained if it cannot be completely satisfied. Three processes P1, P2, P3 request the sources as follows if executed independently.

Process P1:	Process P2:	Process P3:
t=0: requests 2 units of R2	t=0: requests 1 unit of R4	t=0: requests 2 units of R3
t=1: requests 1 unit of R3	t=2: requests 2 units of R1	t=2: requests 1 unit of R4
t=3: requests 2 units of R1	t=5: releases 2 units of R1	t=4: requests 1 unit of R1
t=5: releases 1 unit of R2 and 1 unit of R1.	t=7: requests 1 unit of R2	t=6: releases 1 unit of R3
t=7: releases 1 unit of R3	t=8: requests 1 unit of R3	t=8: Finishes
t=8: requests 2 units of R4	t=9: Finishes	
t=10: Finishes		

Which one of the following statements is TRUE if all three processes run concurrently starting at time t=0?

- 1) Only P1 and P2 will be in deadlock.
 - 2) Only P2 and P3 will be in a deadlock.
 - 3) P1, P2 and P3 will be in deadlock
 - 4) All processes will finish without any deadlock
52. Which technique is based on compile-time program transformation for accessing remote data in a distributed-memory parallel system.
- 1) cache coherence scheme
 - 2) computation migration
 - 3) remote procedure call
 - 4) message passing

53. A large number of disks in a system improves the rate at which data can be read or written
- 1) if the disks are operated on sequentially
 - 2) if the disks are operated on selectively
 - 3) if the disks are operated in random
 - 4) if the disks are operated in parallel
54. Routine is not loaded until it is called. All routines are kept on disk in a relocatable load format. The main program is loaded into memory & is executed. This type of loading is called
- 1) Dynamic Processing
 - 2) Dynamic loading
 - 3) Dynamic linking
 - 4) Overlays
55. Consider $f(N) = g(N) + h(N)$ Where function g is a measure of the cost of getting from the start node to the current node N and h is an estimate of additional cost of getting from the current node N to the goal node. Then $f(N) = h(N)$ is used in which one of the following algorithms ?
- 1) A* algorithm
 - 2) AO* algorithm
 - 3) Greedy best first search algorithm
 - 4) Iterative A* algorithm
56. What was originally called the "imitation game" by its creator?
- 1) The Turing Test
 - 2) LISP
 - 3) The Logic Theorist
 - 4) Cybernetics

57. The First Order Logic (FOL) statement $((R \vee Q) \wedge (P \vee \neg Q))$ is equivalent to which of the following?

- 1) $((R \vee \neg Q) \wedge (P \vee \neg Q) \wedge (R \vee P))$
- 2) $((R \vee Q) \wedge (P \vee \neg Q) \wedge (R \vee P))$
- 3) $((R \vee Q) \wedge (P \vee \neg Q) \wedge (R \vee \neg P))$
- 4) $((R \vee Q) \wedge (P \vee \neg Q) \wedge (\neg R \vee P))$

58. The most important reason for failure of MIS is

- 1) Use of improper tools for design
- 2) Non involvement of end-user
- 3) Improper Specification
- 4) Timeliness

59. The major function of the language system is

- 1) to perform various processing tasks
- 2) to provide artificial-intelligence capabilities to the DSS
- 3) to provide data to the DSS
- 4) to enable the users to interact with the DSS

60. The cost associated with a node in A* algorithm with $g(n)$ represents the cost of the path from the initial state to node n and $h(n)$ is the heuristic estimate or the cost of a path from node n to a goal is

- 1) $f(n) = g(n) + h(n)$
- 2) $f(n) = g(n) * h(n)$
- 3) $f(n) = g(n) / h(n)$
- 4) $f(n) = g(n) \% h(n)$

- 61.** The major difference between a moore and mealy machine is that
- 1) The output of the former depends only on the present input
 - 2) The output of the former depends on the input of the present state and present input
 - 3) The output of the former depends on the input of the present state
 - 4) None of the above
- 62.** The intersection of a CFL and a regular Language
- 1) Need not be a regular
 - 2) Need not be a context free
 - 3) Is always regular
 - 4) Is always context Free
- 63.** A PDM behaves like a TM when the number of auxiliary memory has
- 1) Zero
 - 2) 1 or more
 - 3) 2 or more
 - 4) None of the above
- 64.** In digital communication system, smaller the code rate,_____ are the redundant bits.
- 1) less
 - 2) more
 - 3) equal
 - 4) unpredictable
- 65.** A image is considered to be a function of $a(x,y)$ where 'a' represent
- 1) height of image
 - 2) width
 - 3) amplitude
 - 4) resolution

66. If $L(a_{A_i})$ is the codeword length of symbol a_i , then the average codeword length is given by,

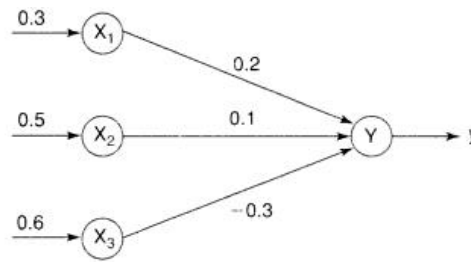
Symbol	Probability	Assigned Code
a_4	0.6	0
a_1	0.2	10
a_2	0.1	110
a_3	0.05	1110
a_5	0.05	1111

The average code word length is,

- | | |
|-------------|-------------|
| 1) 1.7 bits | 2) 2.5 bits |
| 3) 1 bit | 4) 2.3 bits |
67. When there is no feasible region formed by the constraints in conjunction with non-negativity conditions, then the solution is
- | | |
|---------------------|-----------------------|
| 1) No Solution | 2) Unbounded Solution |
| 3) Optimum Solution | 4) Feasible Solution |
68. In LPP Dual of the dual is
- | | |
|-----------|----------------|
| 1) Dual | 2) Alternative |
| 3) Primal | 4) Optimal |
69. The expected duration in PERT is estimated
- | |
|--------------------------------|
| 1) $te = 1/3[2m + 1/2(a + b)]$ |
| 2) $te = 1/6[2m + 1/2(a + b)]$ |
| 3) $te = 1/3[m + a + b]$ |
| 4) $te = 1/6[m + a + b]$ |
70. Consider a fuzzy set A defined on the interval $x=[0,10]$ of integers by the membership function $\mu_A(x) = x/x + 2$
- α cut corresponding to $\alpha = 0.5$ will be
- | |
|---------------------------------------|
| 1) {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10} |
| 2) {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} |
| 3) {2, 3, 4, 5, 6, 7, 8, 9, 10} |
| 4) {} |

71. Let $A=\{0/0, 0.2/10, 0.35/20, 0.65/30, 0.85/40, 1/50\}$ and $B=\{0/0, 0.35/10, 0.25/20, 0.8/30, 0.95/40, 1/50\}$ be the two fuzzy sets. Apply max operator on A and B. Which of the following is the correct result.
- 1) $\{0/0, 0.35/10, 0.35/20, 0.8/30, 0.95/40, 1/50\}$
 - 2) $\{0/0, 0.2/10, 0.25/20, 0.65/30, 0.85/40, 1/50\}$
 - 3) $\{1/0, 0.8/10, 0.65/20, 0.35/30, 0.15/40, 0/50\}$
 - 4) $\{0/0, 0.2/10, 0.35/20, 0.65/30, 0.85/40, 1/50\}$

72. Find the net input to the output neuron of the following neural net.



- 1) 0.07
 - 2) -0.07
 - 3) 0.29
 - 4) -0.29
73. dev directory contain files for controlling
- 1) input/output
 - 2) CPU
 - 3) OS
 - 4) Both 1) and 2)
74. Which one of the option is used to turn debugging with set command?
- 1) -vx
 - 2) -dx
 - 3) +vx
 - 4) +dx
75. To allow only one user to work with a particular file at a particular time, one has to use
- 1) Semaphore
 - 2) Critical region
 - 3) Locking
 - 4) Dedicated mode

ROUGH WORK

ROUGH WORK