

Visvesvaraya Technological University, Belagavi

VRAT August – 2016

Ph.D./M.Sc. Engg. (by Research)

Computer Science and Engineering

Time: 2 hrs.]

Max. Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. Write Name and Seat Number in the OMR Sheet.
2. Question paper consists of Part I, II and III and each question carries one mark.
3. All questions are multiple – choice questions and there shall be no negative marking for wrong answers.
4. Mark the answers only on the OMR sheet provided.
5. Use BLACK SKETCH PEN to darken the circle for marking the answer.
6. Missing data, if any, may be suitably assumed.
7. Scientific Calculator is permitted. However, programmable calculators are not allowed.
8. Return the OMR sheet to the Room Invigilator, before leaving the examination hall.

23. The numerical method to find roots of $f(x) = 0$ that consists of replacing the part of the curve between a point A and the x axis by means of the tangent to the curve at A is
 a) Exact method b) Regula falsi method c) Newton's method d) Runge Kutta method
24. The missing values in the following table:

$x:$	45	50	55	60	65
$y:$	3.0		2.0		2.4

 a) 2.925 and 0.225 b) 3.5 and 0.75 c) 2.5 and -2.0 d) 1.75 and -2.2
25. Using $e = 2.72$, $e^2 = 7.39$, $e^3 = 20.09$, $e^4 = 54.6$, $\int_0^4 e^x dx$ by Simpson's rule has the value
 a) 53.45 b) 53.87 c) 53.67 d) 53.55
26. If the two regression equations of the variables x and y are $x = 19.13 - 0.87y$ and $y = 11.64 - 0.50x$ the correlation co-efficient between x and y is
 a) -0.66 b) 0.66 c) 0.45 d) -0.45
27. A numerical method of solving first order ordinary differential equation that is more accurate and easy to program is
 a) Euler's method b) Modified Euler's method c) Picard's method d) Runge-Kutta method
28. A problem in mechanics is given to three students A, B, C whose chances of solving it are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$ respectively. The probability that the problem will be solved is
 a) $\frac{2}{3}$ b) $\frac{2}{5}$ c) $\frac{3}{4}$ d) $\frac{4}{5}$
29. The inter quartile range is the difference between
 a) upper quartile and lower quartile b) upper quartile and middle quartile
 c) middle quartile and lower quartile d) None of the above
30. If two screws are drawn at random (without replacement) from a box containing 10 screws three of which are defective the probability that none of the two screws is defective is
 a) 0.49 b) 0.47 c) 0.55 d) 0.75

PART - II
Discipline Oriented Section
(Computer Science and Engineering)

[50 MARKS]

31. If integer needs two bytes of storage, then maximum value of an unsigned integer is
a) $2^{16}-1$ b) $2^{15}-1$ c) 2^{16} d) 2^{15}
32. Print f ("%d", printf("tim"));
a) Results in a syntax error b) outputs tim3
c) outputs garbage d) prints tim and terminates abruptly
33. Let a, b be two positive integers. Which of the following options correctly relates/and % ?
a) $b = (a/b)*b + a\%b$ b) $a = (a/b)*b + a\%b$
c) $b = (a\%b)*b + a/b$ d) $a = (a\%b)*b + a/b$
34. If n has the value 3, then the output of the statement printf ("%d %d", n++, ++n);
a) is 3 5 b) is 4 5
c) is 4 4 d) is implementation dependent
35. calloc(m,n); is equivalent to
a) malloc(m*n,0); b) memst(0,m*n);
c) ptr= malloc(m*n); memset(p, 0, m*n); d) ptr = malloc(m*n); strcpy(p,0);
36. Fragmentation is
a) Dividing the secondary memory into equal sized fragments
b) Dividing the main memory into equal-sized fragments
c) Fragments of memory words used in a page
d) Fragments of memory words unused in a page
37. An operating system contains 3 user processes each requiring 2 units of resource R. the minimum number of units of R such that no deadlock will ever occur is
a) 3 b) 4 c) 5 d) 6
38. In a paged memory, the page hit ratio is 0.35. The time required to access a page in secondary memory is equal to 100ns. The time required to access a page in primary memory is 10ns. The average time required to access a page is
a) 3.0ns b) 68.0ns c) 68.5ns d) 78.5ns
39. For implementing a multiprogramming operating system
a) Special support from processor is essential
b) Special support from processor is not essential
c) Cache memory must be available
d) More than one processor must be available

40. "Aging" is
- Keeping track of cache contents
 - Keeping track of what pages are currently residing in the memory
 - Keeping track of how many times a given page is referenced
 - Increasing the priority of jobs to ensure termination in a finite time
41. Which of the following scheduling policy is well suited for a time shared operating system?
- Shortest job first
 - Round robin
 - First-come-first-serve
 - Shortest remaining time first
42. Which of the following codes needs 7 bits to represent a character?
- ASCII
 - BCD
 - EBCDIC
 - GRAY
43. The sequence of events that happen during a typical fetch operation is
- PC→MAR→Memory→MDR→IR
 - PC→Memory→MDR→IR
 - PC→Memory→IR
 - PC→MAR→Memory→IR
44. Which of the following are typical characteristics of a RISC machine?
- instruction taking multiple cycles
 - non pipelined
 - instruction interrupted by microprograms
 - Multiple register sets
45. Micro program is
- the name of a source program in micro computers
 - the set of instructions indicating the primitive operations in a system
 - A primitive form of macros used in assembly language programming
 - A program of very small size
46. FFFF will be that last memory location in a memory of size
- 1k
 - 16k
 - 32k
 - 64k
47. Von Neumann architecture is
- SISD
 - SIMD
 - MIMD
 - MISD
48. Stacks cannot be used to
- Evaluate an arithmetic expression in postfix form
 - implement recursion
 - convert a given arithmetic expression in infix form to its equivalent postfix form
 - Allocate resources (like CPU) by the operating system
49. The postfix expression for the infix expression $A+B*(C+D)/F+D*E$ is
- $AB+CD+*F/D+E*$
 - $ABCD+*F/+DE**$
 - $A*B+CD/F*DE++$
 - $A+*BCD/F*DE++$
50. Which of the following sorting algorithm has the worst time complexity of $n\log(n)$?
- Heap sort
 - Quick sort
 - Insertion sort
 - Selection sort

51. Which of the following algorithms solves the all-pair shortest path problem?
 a) Dijkstra's algorithm
 b) Floyd's algorithm
 c) Prim's algorithm
 d) Warshall's algorithm
52. Which of the following is useful in traversing a given graph by breadth first search?
 a) Stack b) Set c) List d) Queue
53. Which of the following is/are no assembler directive(s)?
 a) START b) LOAD c) END d) BYTE
54. Which of the following techniques is preferable for transferring large amount of data to and from a memory in a short time?
 a) Programmed I/O
 b) Interrupt-driven I/O
 c) DMA
 d) None of the above
55. Which normal form is considered adequate for relational database design?
 a) 2NF b) 3NF c) 4NF d) BCNF
56. A functional dependency of the form $X \rightarrow Y$ is trivial if
 a) $Y \subseteq X$ b) $Y \subset X$ c) $X \subseteq Y$ d) $X \subset Y$ and $Y \subset X$
57. An attribute of one table matching the primary key of another table, is called as
 a) Foreign key b) Secondary key c) Candidate key d) Composite key
58. For a method to be an interface between the outside world and a class, it has to be declared
 a) Private b) Protected c) Public d) External
59. Overloading is otherwise called as
 a) Virtual polymorphism b) Transient polymorphism
 c) Pseudo polymorphism d) ad-hoc polymorphism
60. Which of the following cannot be declared static?
 a) Class b) Methods c) Functions d) Member Variables
61. The data flow model of an application mainly shows
 a) The underlying data and the relationship among them
 b) Processing requirement and the flow of data
 c) Decision and control information
 d) communication network structure
62. Which of the following graph theoretic concept will be useful in software testing?
 a) Cyclomatic number
 b) Hamiltonian circuit
 c) Eulerian cycle
 d) None of the above

63. Which of the following testing methods is normally used as the acceptance test for a software system?
- Regression testing
 - Integration Testing
 - Unit Testing
 - Functional Testing
64. Software testing techniques are most effective if applied immediately after
- Requirement specification
 - Design
 - Coding
 - Integration
65. Time complexity analysis of TSP using dynamic programming is
- $\Theta(n^2 2^n)$
 - $O(n^2 2^n)$
 - $\Theta((n-1) 2^n)$
 - $\Omega(n^2 2^n)$
66. Let there be three items with their weights and profits as shown below

Item	Weight	Profit
1	14	24
2	18	24
3	10	16

- The optimal order of items after applying Knapsack greedy algorithm with capacity 20 is
- (1,1/3,0)
 - (0,5/9,1)
 - (1,0,3/5)
 - (1/5,1,0)
67. A Graph $G(V,E)$ cannot be represented using
- Adjacency matrix
 - Adjacency list
 - Incidence matrix
 - Inverse matrix
68. The maximum number of nodes in a binary tree of depth k is
- 2^{k-1}
 - $2^{(k+1)} - 1$
 - $2^k - 1$
 - $2^{(k+1)-1}$
69. Inorder traversal of BST for the input sequence: 5,2,1,8,4
- 1 4 2 8 5
 - 5 2 1 4 8
 - 1 2 4 5 8
 - 1 5 2 4 8
70. Object Oriented means
- Organizing software as a collection of discrete objects that incorporate both data structure and behavior
 - Data structure and behavior are loosely connected
 - Orientation of Objects
 - Analysis of objects with different orientations
71. Analysis, System design, Object Design, and Implementation are the stages in
- Object Modeling Technique
 - Object Analysis & Design
 - Object oriented programming
 - None of the above

72. Remove the odd one
 a) Object model b) Class model c) Dynamic model d) Functional model
73. Which of the following are inherently bidirectional
 a) Associations b) Links c) Generalizations d) Aggregations
74. Which of the following are not correct
 a) State diagram relates events and states
 b) State diagram does not specify the state sequence caused by an event sequence
 c) State diagram can represent one-shot life cycle or continuous loops
 d) None
75. A Class is same as _____ in ER diagram
 a) Entity
 b) Relation
 c) Entity Set
 d) Attribute set
76. The number of elements in the power set of the set $\{\{\{\}\}, 1, \{2,3\}\}$ is
 a) 2 b) 4 c) 8 d) 3
77. Out of 100 students, 10 students to drink milk(M), coffee(C) and tea (T); 20 M and C; 30 C and T; 25 M and T; 12M only; 5C only ; and 8 T only; the number of students who did not drink any of these is
 a) 18 b) 24 c) 20 d) 16
78. Let $S = \{1,2,3,4\}$. A relation R defined in S as, $R = \{(1,2), (4,3), (2,2), (2,1), (3,1)\}$ is
 a) Transitive
 b) Symmetric
 c) Anti-symmetric
 d) None of the above
79. $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$ is equivalent to
 a) $S \wedge R$
 b) $S \rightarrow R$
 c) $S \vee R$
 d) None of the above
80. If the proposition $P \Rightarrow Q$ is true, then the truth value of the proposition $P \vee (P \Rightarrow Q)$, is
 a) true
 b) multi-valued
 c) false
 d) cannot be determined

PART - III
(Aptitude Section)

[20 MARKS]

81. If white is called blue, blue is called red, red is called yellow, yellow is called green, green is called black, black is called violet and violet is called orange, what would be the color of human blood?
a) Red b) Yellow c) Green d) Violet
82. A can finish a work in 18 days and B can do the same work in 15 days. B worked for 10 days and left the job. In how many days, A alone can finish the remaining work?
a) 5 b) 4 c) 6 d) 8
83. Excluding stoppages, the speed of a bus is 54 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?
a) 9 b) 12 c) 10 d) 20
84. Pumps, working 8 hours a day, can empty a tank in 2 days. How many hours a day must 4 pumps work to empty the tank in 1 day?
a) 9 b) 10 c) 11 d) 12
85. Which one will replace the question mark?

A ₂	C ₄	E ₆
G ₃	I ₅	?
M ₅	O ₉	Q ₁₄

- a) L₁₀
b) I₁₅
c) K₁₅
d) K₈
86. In following alphabet series, one term missing as shown by question mark : Y, W, U, S, Q, ?, ?
a) N, J b) O, M c) M, L d) L, M
87. Daya has a brother Anil ; Daya is the son of Chandra. Bimal is Chandra's father. In term of relationship, what is Anil of Bimal
a) Son
b) Grandson
c) Brother
d) Grand father
88. If DELHI is coded as 73541 and CALCUTTA as 82589662, how can CALICUT be coded?
a) 5279431 b) 5978213 c) 8251896 d) 8543691
89. Which measure does NOT belong to the family concerned?
a) Inch b) Ounce c) Centimeter d) Yard

90. The ratio between the length and the breadth of a rectangular park is 3:2. If a man cycling along the boundary of the park at the speed of 12 km/hr completes one round in 8 minutes, then the area of the park (in sq.m) is
- 15360
 - 153600
 - 30720
 - 307200
91. In the first 10 overs of a cricket game, the run rate was only 3.2. What should be the run rate in the remaining 40 overs to reach the target of 282 runs?
- 6.25
 - 6.5
 - 6.75
 - 7
92. Two trains of equal length are running on parallel lines in the same direction at 46km/hr and 36 km/hr. The faster train passes the slower train in 36 seconds. The length of each train is
- 50m
 - 72m
 - 80m
 - 82m
93. A, B and C jointly thought of engaging themselves in a business venture. It was agreed that A would invest Rs 6500 for 6 months, B Rs 8400 for 5 months and C Rs 10,000 for 3 months. A wants to be the working member for which, he was to receive 5% of the profits. The profit earned was Rs 7400. Calculate the share of B in the profit.
- Rs 1900
 - Rs 2660
 - Rs 2800
 - Rs 2840
94. The cost price of 20 articles is the same as the selling price of X articles. If the profit is 25%, then the value of X is
- 15
 - 16
 - 18
 - 25
95. Today is Monday. After 61 days, it will be
- Wednesday
 - Saturday
 - Tuesday
 - Thursday
96. Alfred buys an old scooter for Rs 4700 and spends Rs 800 on its repairs. If he sells the scooter for Rs 5800, his gain percent is
- $4\frac{4}{7}\%$
 - $5\frac{5}{11}\%$
 - 10%
 - 12%
97. Mrs Jansen recently moved to Arizona. She wants to fill her new backyard with flowering plants. Although she is an experienced gardener, she isn't very well – versed in what plants will do well in the Arizona climate. Also, there is a big tree in her backyard making for shady conditions and she isn't sure what plants will thrive without much direct sunlight. Her favorite gardening catalog offers several backyard seed packages. Which one should Mrs. Jansen choose?
- The Tree house collection will provide lush green plants with delicate colorful flowers that thrive in shady and partially shady locations.
 - The Rainbow collection is ideal for North-east gardens. It includes a variety of colourful perennials that thrive in cool, moist conditions.
 - The Greenhouse collection will blossom year after year if planted in brightly lit locations and watered regularly.
 - The Oasis collection includes a variety of perennials that thrive in dry climates and bright sunlight.

98. Dr. Miller has a busy pediatric dentistry practice and she needs a skilled, reliable hygienist to keep things running smoothly. The last two people she hired were recommended by top dentists in the area, but they each lasted less than one month. She is now in desperate need of a hygienist who can competently handle the specific challenges of her practice. Which one of the following candidates should Dr. Miller consider most seriously
- Marilyn has been a hygienist for fifteen years and her current employer, who is about to retire, says she is the best in the business. The clientele she has worked with consists of some of the wealthiest and most powerful citizens in the country.
 - Lindy recently graduated at the top of her class from one of the best dental hygiene programs in the state. Prior to becoming a dental hygienist, Lindy spent two years working in a day care center.
 - James has worked as a dental hygienist for three years in a public health clinic. He is very interested in securing a position in a private dental office.
 - Kathy is an experienced and highly recommended dental hygienist who is also finishing up a degree in early childhood education, which she hopes will get her a job as a preschool teacher. She is eager to find a job in a pediatric practice, since she has always wanted to work with children.
99. Rita an accomplished pastry chef who is well known for her artistic and exquisite wedding cakes, opened a bakery one year ago and is surprised that business has been so slow. A consultant she hired to conduct market research has reported that the local population doesn't think of her shop as one they would visit on a daily basis but rather a place they'd visit if they were celebrating a special occasion. Which of the following strategies should Rita employ to increase her daily business?
- Making coupons available that entitle the coupon holder to receive a 25% discount on wedding, anniversary, or birthday cakes.
 - Exhibiting at the next Bridal Expo and having pieces of one of her wedding cakes available for tasting.
 - Placing a series of ads in the local newspaper that advertise the wide array of breads.
 - Moving the bakery to the other side of town.
100. Mark is working with a realtor to find a location for the toy store he plans to open in his town. He is looking for a place that is either in, or not too far from, the center of town and one that would attract the right kind of foot traffic. Which of the following locations should Mark's realtor call to his attention?
- A storefront in a new high-rise building near the train station in the center of town whose occupants are mainly young, childless professionals who use the train to commute to their offices each day.
 - A stand - alone store front on a quiet residential street ten blocks away from the town's center.
 - A storefront in a small strip mall located on the outskirts of town that is also occupied by a pharmacy and a dry cleaner.
 - A little shop three blocks away from the town's main street. Located across the street from an elementary school and next door to an ice cream store.