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PHD-EE-2013



Sr. No. 10008

(Subject : Computer Sc. Engineering)

Time : 1 1/4 Hours

Max. Marks : 100

Total Questions : 100

Candidate's Name Date of Birth

Father's Name Mother's Name

Roll No.(In Figure) in words)

Date of Examination :

(Signature of the Candidate)

(Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. All questions are compulsory and carry equal marks.
2. All the candidates **MUST** return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him/her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations **in writing within two hours** after the test is over. No such complaint(s) will be entertained thereafter.
4. The candidate **MUST NOT** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers **SHOULD NOT** be ticked in the Question book-let.
5. Use **Black or Blue BALL POINT PEN** only in the OMR Answer-Sheet.
6. For each correct answer, the candidate will get full credit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer. There will be no negative marking
7. **BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOKLET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.**

1. Which one of the following is not decidable ?
 - (1) Given a Turing machine M , a string s , and an integer k , M accepts s with k steps
 - (2) Equivalence of two given Turing machines
 - (3) Language accepted by a given DFSA is nonempty
 - (4) Language generated by a CFG is non empty
2. A language L is defined in the alphabet $\{0, 1\}$ by $L = \{010, 0110, 01110, \dots\}$. Which regular expression generates L ?
 - (1) (01^*1) (2) $(011+0)$
 - (3) $(0^*1^*0^*)$ (4) (011^*0)
3. The following CFG is in

$S \rightarrow AB$
 $B \rightarrow CD$
 $B \rightarrow AD$
 $B \rightarrow b$
 $D \rightarrow AD$
 $D \rightarrow d$
 $A \rightarrow a$
 $C \rightarrow a$

 - (1) Chomsky normal form but not strong Chomsky normal form
 - (2) Weak Chomsky normal form but not Chomsky normal form
 - (3) Strong Chomsky normal form
 - (4) Greibach normal form
4. Consider the following language $L = \{a^n b^n c^n d^n \mid n \geq 1\}$. L is
 - (1) CFL but not regular
 - (2) CSL but not CFL
 - (3) Regular
 - (4) Type 0 language but not type 1
5. The concept of FSA is much used in this part of the compiler
 - (1) Lexical analysis
 - (2) Parser
 - (3) Code generation
 - (4) Code optimization
6. Palindromes can't be recognized by any FSA because
 - (1) FSA cannot remember arbitrarily large amount of information
 - (2) FSA cannot deterministically fix the midpoint
 - (3) Even if the mid-point is known an FSA cannot find whether the second half of the string matches the first half
 - (4) All of the above
7. Which of the following regular expressions denotes a language comprising of all possible string over $\Sigma = \{a, b\}$ of length n where n is a multiple of 3.
 - (1) $(a + b + aa + bb + aba + bba)^*$
 - (2) $(aaa + bbb)^*$
 - (3) $((a + b)(a + b)(a + b))^*$
 - (4) $(aaa + ab + a) + (bbb + bb + a)$
8. Consider a language L for which there exists a Turing machine (TM), T , that accepts every word in L and either rejects or loops for every word that is not in L . The language L is
 - (1) NP hard
 - (2) NP complete
 - (3) Recursive
 - (4) Recursively enumerable

9. Which of the following conversion is not possible (algorithmically) ?
- (1) Regular grammar to context-free grammar
 - (2) Nondeterministic FSA to deterministic FSA
 - (3) Nondeterministic PDA to deterministic PDA
 - (4) Nondeterministic TM to deterministic TM
10. Which one of the following regular expressions over $\{0, 1\}$ denotes the set of all strings not containing 100 as a substring ?
- (1) $0^*(11^*0)^*$
 - (2) 0^*1010^*
 - (3) 0^*1^*01
 - (4) $0^*(10 + 1)^*$
11. Which of the following is not a level of the SEI CMM ?
- (1) Initial
 - (2) Optimizing
 - (3) Managed
 - (4) Final
12. The analysis phase of software development involves
- (1) Collecting the requirements about what the program will accomplish
 - (2) Creating a detailed plan on how the program will accomplish the requirements
 - (3) Writing the software with a program such as VB.NET.
 - (4) Both (1) and (2)
13. ROOM stands for
- (1) Real Time Object Oriented Methodology
 - (2) Redundant Object Oriented Modeling
 - (3) Real Time Object Oriented Modeling
 - (4) Rapid Object Oriented Modeling
14. Which of the following is not a process metric ?
- (1) Productivity
 - (2) Functionality
 - (3) Quality
 - (4) Efficiency
15. During software development which factor is most crucial ?
- (1) People
 - (2) Process
 - (3) Product
 - (4) Project
16. Spiral Model was developed by
- (1) Bev Littlewood
 - (2) Berry Bohem
 - (3) Roger Pressman
 - (4) Victor Bisili
17. is a black box testing method.
- (1) Boundary value analysis
 - (2) Basic path testing
 - (3) Code path analysis
 - (4) None of above

- 18.** Given a source code with 10 operators includes 6 unique operators, and 6 operand including 2 unique operands. The program volume is
- (1) 48
 - (2) 120
 - (3) 720
 - (4) Insufficient data
- 19.** developed a set of software quality factors that has been given the acronym FURPS - Functionality, Usability, Reliability, Performance, Supportability ?
- (1) Hewlett-Packard
 - (2) Rambaugh
 - (3) Booch
 - (4) Jacobson
- 20.** A quantitative measure of the degree to which a system, component, or process possesses a given attribute ?
- (1) Measure
 - (2) Measurement
 - (3) Metric
 - (4) None of these
- 21.** Which of the following is a focus of today's evolving network ?
- (1) Geography
 - (2) Route miles
 - (3) Transmission technology
 - (4) Flexible bandwidth
- 22.** What is the real intelligence of the network ?
- (1) ATM
 - (2) Protocols
 - (3) Software
 - (4) None of the above
- 23.** Program sends a message to a remote computer and reports whether the computer responds.
- (1) Ping
 - (2) Traceroute
 - (3) ICMP
 - (4) None of the given
- 24.** A CDMA call starts with a standard rate of bits per second.
- | | |
|----------|----------|
| (1) 9500 | (2) 9200 |
| (3) 9300 | (4) 9600 |
- 25.** The bandwidth is typically over a length of one kilometer of fibre expressed as 'MHz-Km'.
- (1) 10 to 20
 - (2) 20 to 30
 - (3) 30 to 40
 - (4) 40 to 50
- 26.** In the 1970s, Xerox developed, which continues to be a popular networking architecture.
- (1) Wi-Fi
 - (2) Instant messaging
 - (3) Extranet
 - (4) Ethernet

- 27.** A port is a
- (1) Socket that enables information to move in and out
 - (2) hardware device that allows connection to the Internet
 - (3) Peripheral device attached to a computer
 - (4) Virtual memory location
- 28.** Hardware that calculates a CRC uses two simple components
- (1) AND unit and XOR unit
 - (2) Shift register and XOR unit
 - (3) Shift register and AND unit
 - (4) None of the given
- 29.** The encryption scheme improves the security of wireless networks.
- (1) Ethernet (2) Phishing
 - (3) VPN (4) WEP
- 30.** uses distance vector approach to define routing.
- (1) BGP
 - (2) OSPF
 - (3) RIP
 - (4) None of the given
- 31.** If the expression $((2 + 3) * 4 + 5 * (6 + 7) * 8) + 9$ is evaluated with $*$ having precedence over $+$, then the value obtained is the same as the value of which of the following prefix expressions ?
- (1) $++ 2 3 4 ** 5 + 6 7 8 9$
 - (2) $* ++ 2 3 4 ** 5 ++ 6 7 8 9$
 - (3) $* + + + 2 3 4 ** 5 + 6 7 8 9$
 - (4) $+ + * + 2 3 4 ** 5 + 6 7 8 9$
- 32.** Heaps can be stored in arrays without using any pointers; this is due to the nature of the binary tree, Select correct option :
- (1) Left-complete
 - (2) Right-complete
 - (3) Tree nodes
 - (4) Tree leave
- 33.** What is the time complexity to extract a vertex from the priority queue in Prim's algorithm ?
- (1) $\log(v)$ (2) $v.v$
 - (3) $e.e$ (4) $\log(e)$
- 34.** The depth of a complete binary tree is given by
- (1) $D_n = n \log_2 n$
 - (2) $D_n = n \log_2 n + 1$
 - (3) $D_n = \log_2 n$
 - (4) $D_n = \log_2 n + 1$
- 35.** Suppose that a graph $G = (V, E)$ is implemented using adjacency lists. What is the complexity of a breadth-first traversal of G ?
- (1) $O(|V|^2)$
 - (2) $O(|V| |E|)$
 - (3) $O(|V|^2 |E|)$
 - (4) $O(|V| + |E|)$
- 36.** The most appropriate matching for the following pairs
- | | |
|--------------------------|----------|
| X : depth first search | A: heap |
| Y : breadth-first search | B: queue |
| Z : sorting | C: stack |
- is :
- (1) X-A, Y-B, Z-C
 - (2) X-C, Y-A, Z-B
 - (3) X-C, Y-B, Z-A
 - (4) X-B, Y-C, Z-A

37. Complexity of Kruskal's algorithm for finding the minimum spanning tree of an undirected graph containing n vertices and m edges if the edges are sorted is

- (1) $O(mn)$ (2) $O(m+n)$
- (3) $O(m)$ (4) $O(n)$

38. The operation of processing each element in the list is known as

- (1) Sorting
- (2) Merging
- (3) Inserting
- (4) Traversal

39. Which sorting algorithm is faster ?

- (1) $O(n^2)$ (2) $O(n \log n)$
- (3) $O(n+k)$ (4) $O(n^3)$

40. The running time of quick sort depends heavily on the selection of

- (1) No. of inputs
- (2) Arrangement of elements in array
- (3) Size of elements
- (4) Pivot element

41. The host repeatedly checks if the controller is busy until it is not. It is in a loop that status register's busy bit becomes clear. This is called and a mechanism for the hardware controller to notify the CPU that it is ready is called

- (1) Interrupt and Polling
- (2) Polling and Spooling
- (3) Polling and Interrupt
- (4) Deadlock and Starvation

42. The effective access time (EAT) of demand paging is given by the formula

- (1) $EAT = (1-p)*mt + p*page\text{-}fault\text{ type}$
- (2) $EAT = (1+p)*mt - p*page\text{-}fault\text{ type}$
- (3) $EAT = (1*p*mt)*p*page\text{-}fault\text{ type}$
- (4) $EAT = (1*p*mt)/p*page\text{-}fault\text{ type}$

43. Using Priority Scheduling algorithm, find the average waiting time for the following set of processes given with their priorities in the order : Process : Burst Time : Priority respectively

$P1 : 10 : 3, P2 : 1 : 1, P3 : 2 : 4, P4 : 1 : 5, P5 : 5 : 2$

- (1) 8 milliseconds
- (2) 8.2 milliseconds
- (3) 17.75 milliseconds
- (4) 30 milliseconds

44. Which is a unary operation

- (1) Selection operation
- (2) Primitive operation
- (3) Projection operation
- (4) Generalized selection

45. The lookup page table shown below is for a job in a page virtual storage system with a page size of 1024 locations. Each virtual address is in the form $[p; d]$ where p and d are the page number and the displacement in that page, respectively. A virtual address of $[0, 514]$ maps to an actual address of

Virtual Page	Actual Page
0	3
1	-
2	4
3	0

- (1) 514
- (2) 1024
- (3) 3586
- (4) 4514

46. Which of the following information bits used by the various page replacement policies indicates if the page has been called lately?

- (1) Locality bit
- (2) Status bit
- (3) Referenced bit
- (4) Modified bit

47. For multiprogramming systems, most UNIX operating systems use

- (1) Swapping
- (2) Demand paging
- (3) Either (1) or (2)
- (4) Neither (1) nor (2)

48. On repetitive jobs, rather than coding the same Multiple Virtual Storage/Job Control Language (MVS/JCL) statements over and over, a programmer can define a

- (1) Cataloged procedure
- (2) Batch file
- (3) Shell script
- (4) Job Stream

49. The simplest way to break a deadlock is to

- (1) Preempt a resource
- (2) Rollback
- (3) Kill one of the processes
- (4) Lock one of the processes

50. On a disk with 8 records per track, where the records are numbered from 0 to 7, and where the file is stored starting at track 0, record 14 is found on track

- (1) 0 (2) 1
- (3) 2 (4) 3

51. Which two files are used during operation of the DBMS?

- (1) Query languages and utilities
- (2) DML and query language
- (3) Data dictionary and transaction log
- (4) Data dictionary and query language

52. Which refers to independent events of the main program flow of the systems that lacks concurrency ?

- (1) RDBMS
- (2) Portable
- (3) Asynchronously
- (4) None of these

53. Which of the following is true for the relational model ?

- (1) Degree of a relation is the number of rows in a relation
- (2) Null value is a blank or zero value given to an attribute value when its value is inapplicable or its value is unknown
- (3) Complex key is a key consisting of more than one attribute
- (4) Constraint is a rule that restricts the values in a database

54. Which of the following is NOT a feature of Context DFD ?

- (1) One process (which represents the entire system)
- (2) All sources/sinks (external entities)
- (3) Data flows linking the process to the sources and sinks (external entities)
- (4) Sub-processes

55. Which of the following constraints enforces entity integrity ?

- (1) Primary Key
- (2) Foreign Key
- (3) Check
- (4) Not Null

56. Which object contains the Position property of the current record in a dataset ?

- (1) Binding Context
- (2) Binding Data
- (3) Data Binding
- (4) Data Bound

57. 'AS' clause is used in SQL for

- (1) Selection operation
- (2) Rename operation
- (3) Join operation
- (4) Projection operation

58. Which of the following operation is used if we are interested in only certain columns of a table ?

- (1) Projection
- (2) Selection
- (3) Union
- (4) Join

59. 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

60. Transaction processing is associated with everything below except

- (1) Producing detail, summary, or exception reports
- (2) Recording a business activity
- (3) Confirming an action or triggering a response
- (4) Maintaining data

61. Consider the following Algorithm;

```
Factorial (n){  
  if (n = 1)  
    return 1  
  else  
    return (n * Factorial (n-))  
}
```

Recurrence for the following algorithm is :

- (1) $T(n) = T(n-1) + 1$
- (2) $T(n) = nT(n-1) + 1$
- (3) $T(n) = T(n-1) + n$
- (4) $T(n) = T(n(n-1)) + 1$

62. A dense undirected graph is :

- (1) A graph in which $E = O(V^2)$
- (2) A graph in which $E = O(V)$
- (3) A graph in which $E = O(\log V)$
- (4) All items above may be used to characterize a dense undirected graph

63. If B is a Boolean Algebra, then which of the following is true

- (1) B is a finite but not complemented lattice
- (2) B is a finite, complemented and distributive lattice
- (3) B is finite, distributive but not complemented lattice
- (4) B is not distributive lattice

64. The number of distinguishable permutations of the letters in the word BANANA are :

- (1) 60 (2) 36
- (3) 20 (4) 10

65. How many words can be formed out of the letters of the word 'PECULIAR' beginning with P and ending with R ?

- (1) 100 (2) 120
- (3) 720 (4) 150

66. If x and y are real numbers then $\max(x, y) + \min(x, y)$ is equal to

- (1) 2x (2) 2y
- (3) $(x+y)/2$ (4) x+y

- 67.** The length of Hamiltonian Path in a connected graph of n vertices is
 (1) $n-1$ (2) n
 (3) $n+1$ (4) $n/2$
- 68.** The relation $\{(1,2), (1,3), (3,1), (1,1), (3,3), (3,2), (1,4), (4,2), (3,4)\}$ is
 (1) Reflexive (2) Transitive
 (3) Symmetric (4) Asymmetric
- 69.** A graph with one vertex and no edges is :
 (1) multigraph
 (2) digraph
 (3) isolated graph
 (4) trivial graph
- 70.** A graph in which all nodes are of equal degrees is known as
 (1) Multigraph
 (2) Regular graph
 (3) Complete lattice
 (4) none regular graph
- 71.** Which is a reserved word in the Java programming language ?
 (1) Method
 (2) Subclasses
 (3) Native
 (4) Reference
- 72.** For an applications program, program documentation external to the program (as opposed to comments embedded in the code) should :
 (1) by belief, be written in telegraphic style, use ample diagrams, and be designed for use by the original programmer only
 (2) be comprehensive, including information for users as well as technical information, to facilitate future revisions
 (3) be discarded once the program is finished, in order to protect the copyrighted, be written only if required by the job supervisor
 (4) never be written by the original programmer
- 73.** Which is not a valid Exit statement ?
 (1) Exit Do (2) Exit For
 (3) Exit Form (4) Exit Select
- 74.** Which language is designed specially for embedded computer system ?
 (1) FORTRAN
 (2) Ada
 (3) SNOBOL
 (4) LISP

- 75.** Which of the following parameter passing mechanisms is being used to retrieve the value of "result" from function Calc?

```
void Calc (int a, int b, int &c) :
int main( )
{
int s = 9; t = 99; result;
Calc(s, t, result);
return 1;
}
void Calc (int a, int b, int &c)
{
c = a + b
}
```

- (1) Call by value
- (2) Call by reference
- (3) Call by name
- (4) Call by value-result

- 76.** The methodology where code is broken into small, logical procedures is called :

- (1) event-driven programming
- (2) functional programming
- (3) granular programming
- (4) modular programming

- 77.** The indirect change of the values of a variable in one module by another module is called

- (1) Internal change
- (2) Inter-module change
- (3) Side effect
- (4) Side-module update

- 78.** What would the output of the following program be, if it is executed using dynamic scoping?

```
PROGRAM S;
VAR X : INTEGER;
PROCEDURE P;
BEGIN
X := 3;
WRITE (X)
END;
PROCEDURE q;
VAR X : INTEGER;
BEGIN
X := 15;
P;
WRITE (X);
END;
BEGIN
X := 10;
Q;
WRITE (X);
END;
```

- (1) 10 15 3
- (2) 3 3 10
- (3) 3 15 10
- (4) 3 3 15

- 79.** Suppose we have
int s[6][6];
int j, k;
for (j = 0; j < 6; j++)
for (k = 0; k < 6; k++)
s[j][k] = (j + k) % 6
What is the value of s[s[5][3], s[1][3]]?

- (1) 1
- (2) 2
- (3) 3
- (4) 4

80.

```
int F (int a, int b)
{
    return (a + b + 1);
}
```

 What is the value of $f(f(10, 7), f(5, 3))$?
 (1) 27 (2) 34
 (3) 33 (4) 35

81. A particular parallel program computation requires 100 seconds when executed on a single processor. If 40 percent of this computation is "inherently sequential" (i.e., will not benefit from addition processors), then the theoretically best possible elapsed times for this program running with 2 and 4 processors, respectively, are

- (1) 20 and 10 seconds
- (2) 30 and 15 seconds
- (3) 50 and 25 seconds
- (4) 70 and 55 seconds

82. Which language is termed as the symbolic depiction used for indicating the series :

- (1) Random transfer language
- (2) Register transfer language
- (3) Arithmetic transfer language
- (4) All of these

83. Suppose that a bus has 16 data lines and required 4 cycles of 250 nsecs each of transfer data. The bandwidth of this bus would be 2 Megabytes/sec. If the cycle time of the bus was reduced to 125 nsecs and the number of cycles required for transfer stayed the same, what would be the bandwidth of the bus ?

- (1) 1 Megabyte/sec
- (2) 4 Megabytes/sec
- (3) 8 Megabytes/sec
- (4) 2 Megabytes/sec

84. Parallel programs : Which speedup could be achieved according to Amdahl's law for infinite number of processors if 5% of a program is sequential and the remaining part is ideally parallel ?

- (1) Infinite speedup
- (2) 5
- (3) 20
- (4) 50

85. Standard CISC processor, no pipelining (around 1970): A vector operation $vc = va + vb$ with 5 elements per vector shall be performed. How many cycles are required within the loop below for the vector operation above (neglect the branch operation *br.less*) if the load instructions take two cycles and the remaining operations take 1 cycle?

Standard Scalar CISC processor

load r2=addr(va)

load r3=addr(vb)

load r4=addr(vc)

load r1=0

loop:

load f1=[r1+r2]

load f2=[r1+r3]

add f3=f1+f2

store [r1+r4]=f3

add r1=r1+8

cmp r1, (n*8)

br.less loop

Cycles = ?

(1) 30

(2) 35

(3) 40

(4) 45

86. Standard RISC processor, with pipelining: A vector operation $vc = va + vb$ with 5 elements per vector shall be performed. How many cycles are required within the loop below for the vector operation above (neglect the branch operation *br.less*) if the load instructions take two cycles and the remaining operations take 1 cycle?

Standard RISC processor

load r2=addr(va)

load r3=addr(vb)

load r4=addr(vc)

load r1=0

loop:

load f1=[r1+r2]

load f2=[r1+r3]

add f3=f1+f2

store [r1+r4]=f3

add r1=r1+8

cmp r1, (n*8)

br.less loop

Cycles = ?

(1) 20 (2) 25

(3) 30 (4) 35

87. Itanium processor: Which hazard can be circumvented by register rotation?

(1) Control hazards

(2) Data hazards

(3) Structural hazards

(4) None

88. Workload driven evaluation of parallel systems, memory constrained scaling: A matrix factorization with complexity n^3 takes 2 hours for a square matrix which requires 8×10^8 bytes on the processor (8 bytes per element). Which time would it need on 100 processors (ideal speedup) ?
- 1 hour
 - 2 hours
 - 10 hours
 - 20 hours
89. Interconnection networks, topology: Which is the height of a binary tree with 32 nodes ?
- 4
 - 5
 - 8
 - 16
90. Interconnection networks, topology: What is the difference between a 2-D torus and a hypercube with 16 nodes ?
- None
 - Node degree of 2-D torus is lower
 - Bisection bandwidth of hypercube is higher
 - Average distance of hypercube is significantly lower
91. The time factor when determining the efficiency of algorithm is measured by
- Counting microseconds
 - Counting the number of key operations
 - Counting the number of statements
 - Counting the kilobytes of algorithm
92. The complexity of the average case of an algorithm is
- Much more complicated to analyze than that of worst case
 - Much more simpler to analyze than that of worst case
 - Sometimes more complicated and some other times simpler than that of worst case
 - None of the above
93. Suppose we have three items as shown in the following table, and suppose the capacity of the knapsack is 50 i.e. $W = 50$.
- | Item | Value | Weight |
|------|-------|--------|
| 1 | 60 | 10 |
| 2 | 100 | 20 |
| 3 | 120 | 30 |
- The optimal solution is to pick
- Items 1 and 2
 - Items 1 and 3
 - Items 2 and 3
 - None of these
94. Which of the following case does not exist in complexity theory
- Best case
 - Worst case
 - Average case
 - Null case

95. Which statement is true ?

- (1) If a dynamic-programming problem satisfies the optimal-substructure property, then a locally optimal solution is globally optimal
- (2) If a greedy choice property satisfies the optimal-substructure property, then a locally optimal solution is globally optimal
- (3) Both of above
- (4) None of the above

96. The appropriate big theta classification of the given function. $f(n) = 4n^2 + 97n + 1000$ is

- (1) $O(n)$ (2) $O(2^n)$
- (3) $O(n^2)$ (4) $O(n^2 \log n)$

97. If algorithm A has running time $7n^2 + 2n + 3$ and algorithm B has running time $2n^2$, then

- (1) Both have same asymptotic time complexity
- (2) A is asymptotically greater
- (3) B is asymptotically greater
- (4) None of the above

98. What is the solution to the recurrence $T(n) = T(n/2) + n$?

- (1) $O(\log n)$ (2) $O(n)$
- (3) $O(n \log n)$ (4) $O(n^2)$

99. How many elements do we eliminate in each time for the Analysis of Selection algorithm ?

- (1) $n/2$ elements
- (2) $(n/2) + n$ elements
- (3) $n/4$ elements
- (4) n elements

100. The Knapsack problem belongs to the domain of problems.

- (1) Optimization
- (2) NP Complete
- (3) Linear Solution
- (4) Sorting