

Ph. D. Entrance Test – 2015
Subject: Computer Science and Engineering
Paper – I

Important: Please consult your Admit Card/Roll No. slip before filling your Roll Number on the Test Booklet and Answer Sheet.

Roll No. *In Figure* *In Words*

--	--	--	--	--	--

O.M.R. Answer Sheet Serial No.

--	--	--	--	--	--

Signature of Candidate: _____ Signature of Invigilator: _____

Time: 60 Minutes Number of Questions: 50 Maximum Marks: 50

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO.

INSTRUCTIONS:

1. Write your Roll No. on the Questions Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Question Booklet Serial No. on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point/Black Gel Pen**.
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. Please check that this Question Booklet contains **50** Questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of Test.
5. Each question has four alternative answer (A,B,C,D) of which only one is correct. For each question, **darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with Black Ball Point/Black Gel Pen. There shall be no negative marking for wrong answers.**
6. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Booklet. No marks will be deducted in such cases.
7. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
8. If you want to change an already marked answer, erase the shade in the darkened bubble completely.
9. For rough work only the blank sheet at the end of the Question Booklet be used.
10. The Answer Sheet is designed for computer evaluation. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e. not following the instructions completely, shall be of the candidate only.**
11. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
12. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so would be expelled from the examination.
13. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistant or found giving or receiving assistant or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
14. **Communication equipment such as mobile phones, pager, wireless set, scanner, camera or any electronic/digital gadget etc., is not permitted inside the examination hall. Use of calculators is not allowed.**
15. The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

1	<p>If $(0.34)_8 = (x)_{10}$, then x is</p> <p>A) 0.3750 B) 0.4375 C) 0.4025 D) 0.3650</p>
2	<p>If the roots of the quadratic equation $x^2 - 12x + 37 = 0$ are 5 and 8, then the base in which equation is written is</p> <p>A) 11 B) 12 C) 13 D) 14</p>
3	<p>The expression $x'y'z' + x'yz' + xy'z' + xyz'$ is equal to</p> <p>A) x' B) $y' + z'$ C) z' D) $x' + y'$</p>
4	<p>The simplified form of $F(x, y, z) = \Sigma(2, 3, 6, 7)$ contains</p> <p>A) one variable B) two variables C) three variables D) no variable as the expression reduces to 1</p>
5	<p>Which of the following is true</p> <p>A) The characteristic equation of D flip-flop is $Q_{n+1} = D_n \oplus Q_n$ B) The characteristic equation of T flip-flop is $Q_{n+1} = T_n Q_n + T_n' Q_n'$ C) The characteristic equation of SR flip-flop is $Q_{n+1} = S Q_n' + R Q_n$ D) The characteristic equation of JK flip-flop is $Q_{n+1} = J Q_n' + K Q_n$</p>
6	<p>A computer has 32-bit instructions and 12-bit addresses. If there are 250 two-address instructions, how many one-address instructions can be formulated?</p> <p>A) 2^6 B) 6×2^5 C) 2^{12} D) 6×2^{12}</p>
7	<p>Which of the following statement is false</p> <p>A) CISC architecture makes use of variable-length instruction formats B) RISC architecture has single-cycle instruction execution C) CISC architecture supports relatively few addressing modes D) RISC architecture has fixed-length, easily decoded instruction format</p>
8	<p>A non-pipeline system takes 50 ns to process a task. The same task can be processed in a six-segment pipeline with a clock cycle of 10 ns. What is the speedup ratio of the pipeline for 100 tasks?</p> <p>A) 4.50 B) 4.76 C) 4.80 D) 4.84</p>

9	<p>A memory system contains a cache, a main memory, and a virtual memory. The access time of the cache is 5 ns and it has an 80 percent hit rate. The access time of the main memory is 100 ns, and it has a 99.5 percent hit rate. The access time of virtual memory is 10 ms. What is the average access time of the hierarchy?</p> <p>A) 10024 ns B) 50099.5 ns C) 4000 ns D) 20099.5 ns</p>
10	<p>In C, which of the following operation can be applied on two pointer variables</p> <p>A) addition B) subtraction C) multiplication D) division</p>
11	<p>A binary search tree is generated by inserting in order the following elements: 49, 15, 62, 5, 20, 58, 98, 3, 8, 37, 60, 25, 100 The number of nodes in the left and right sub-tree of the root respectively are</p> <p>A) 7, 5 B) 5, 7 C) 8, 4 D) 4, 8</p>
12	<p>Worst case time complexity of Quicksort is</p> <p>A) $O(n \log n)$ B) $O(\log n)$ C) $O(n)$ D) $O(n^2)$</p>
13	<p>Data is stored in a circular array with N memory cells. If $Rear < Front$ then number of elements in terms of rear and front are</p> <p>A) $N + Front - Rear - 1$ B) $N + Front + Rear + 1$ C) $N - Front - Rear - 1$ D) $N - Front + Rear + 1$</p>
14	<p>Which of the following is generally considered the biggest open and unresolved question in theoretical computer science, where P and NP are complexity classes</p> <p>A) Is $P = NP$? B) Is $P \subseteq NP$? C) Is $NP \subseteq P$? D) Is $P + NP = \phi$</p>
15	<p>Consider $T(n) = 9T(n/3) + n$</p> <p>A) $T(n) = O(n^3)$ B) $T(n) = O(n^2)$ C) $T(n) = O(n^4)$ D) $T(n) = O(n)$</p>

16	The way a card game player arranges his cards as he picks them up one by one is an example of A) Merge sort B) Selection sort C) Insertion sort D) Bubble sort
17	Which of the following algorithm design technique is used in quick sort algorithm A) Greedy Approach B) Backtracking C) Dynamic Programming D) Divide and Conquer
18	DNS service is available at which of the following port? A) 51 B) 53 C) 57 D) 59
19	Which of the following is responsible for retrieving mails from remote mail server. A) DNS B) SMTP C) POP3 D) HTTP
20	Which of the following represents a valid comment in XML. A) <!--This is a comment --> B) <?-This is a comment --> C) <#-This is a comment --> D) <@-This is a comment -->
21	 ... tag is used to A) display the numbered list B) underline the text C) underline and bold the text D) display the bulleted list
22	Cross compiler is a compiler capable of A) creating executable code for multiple platforms simultaneously B) creating executable code for a platform other than the one on which the compiler is running C) creating executable code that can be used for all platforms D) creating machine dependent as well as machine independent executable code
23	Lexical analysis is also called A) Scanning B) Parsing C) Syntax analysis D) Semantic analysis
24	Which of the following phase manipulates parse tree to verify symbol and type information A) Intermediate Code Generation B) Optimization C) Semantic analysis D) Syntax analysis

25	Which of the following is true A) LR parsers are a type of bottom-up parsers B) LR parsers are a type of top-down parsers C) LR parsers are a type of middle-out parsers D) LR parsers can be of both types i.e. top-down as well as bottom-up
26	Which of the following is concerned with handling digital data A) ADM B) FDM C) WDM D) TDM
27	If there are N routers from source to destination, which of the following closely represents total end to end delay in sending packet P (L → number of bits in the packet R → transmission rate) A) $(2*N+L)/R$ B) $(N*L)/R$ C) $(N*L)/2*R$ D) L/R
28	How many characters per seconds (7 bits + 1 parity) can be transmitted over a 2400 bps line if the transfer is asynchronous (1 start and 1 stop bit)? A) 240 B) 480 C) 120 D) 300
29	Error detection at data link level is achieved by A) Bit stuffing B) Hamming Codes C) CRC D) Equalization
30	HTTPS service is usually available at which port A) 53 B) 80 C) 110 D) 443
31	Which of the following situation happens if a non-recursive mutex is locked more than once? A) Deadlock B) Starvation C) Aging D) Abnormal Termination
32	At a particular time of computation the value of a counting semaphore is 7. Then 20 P operations and 15 V operations were completed on this semaphore. The resulting value of the semaphore is A) 12 B) 7 C) 2 D) 1

33	Determine the number of page faults when references to pages occur in the following order: 1, 2, 4, 5, 2, 1, 2, 4. Assume that the main memory can accommodate 3 pages and the main memory already has the pages 1 and 2, with page 1 having been brought earlier than page 2. (Assume LRU algorithm is used) A) 3 B) 4 C) 5 D) 6
34	Minimum average waiting time is given by which of the following scheduling algorithm A) Priority B) FCFS C) Round-Robin D) SJF
35	In which of the following algorithm, the disk head moves from one end to the other, servicing requests along the way. When the head reaches the other end, it immediately returns to the beginning of the disk without servicing any requests on the return trip. A) C-SCAN B) SCAN C) LOOK D) C-LOOK
36	Which of the following relational algebraic operator can be used to display a subset of the tuples from a relation. A) Omega B) Sigma C) Pi D) Lambda
37	Which of the following is minimal key for relation R (A, B, C, D) having following functional dependencies: $A \rightarrow B, B \rightarrow C, AC \rightarrow D$ A) A B) B C) C D) D
38	Which of the following ensures the durability property of a transaction A) Transaction Management B) Application Programmer C) Recovery Management D) Concurrency Control
39	Which of the following rule is not true for B ⁺ -tree: A) If the root is not a leaf node, it must have at least two children B) Leaf nodes are linked in order of key values C) The tree must always be balanced D) The number of key values contained in a non-leaf node are always more than the number of pointers

40	<p>What is the RDBMS terminology for the number of attributes in a relation?</p> <p>A) multiplicity B) domain C) cardinality D) degree</p>
41	<p>In Moore machine, the output depends on</p> <p>A) present state only B) present input only C) present state and present input D) neither present state nor input</p>
42	<p>Which of the following statement is not true</p> <p>A) Every language that is defined by regular expression can also be defined by finite automata B) Context-sensitive grammars are type-1 grammars C) Linear bounded automation recognizes type-0 grammar D) For every nondeterministic finite automaton, a deterministic finite automaton can be found</p>
43	<p>Which of the following type of production is not allowed in Greibach Normal Form:</p> <p>A) $A \rightarrow aB$ B) $A \rightarrow BC$ C) $A \rightarrow aBC$ D) $A \rightarrow a$</p>
44	<p>A PDA can recognize</p> <p>A) context-free language B) context-sensitive language C) type 0 language D) any language</p>
45	<p>A TM can't solve halting problem is</p> <p>A) true B) false C) still an open question D) tautology</p>
46	<p>A program P calls two subprograms P1 and P2. P1 can fail 50% times and P2 can fail 40% times. The program P can fail:</p> <p>A) 50 % B) 70% C) 60 % D) 45%</p>
47	<p>Configuration Management is not concerned with</p> <p>A) managing changes to the source code B) handling documentation changes C) choice of hardware configuration for an application D) maintaining versions of software</p>

48	Which of the following is normally considered as an adjunct to the coding step A) regression testing B) system testing C) integration testing D) unit testing
49	Cohesion is a qualitative indication of the degree to which a module A) can be written more compactly B) focuses on just one thing C) is connected to other modules D) is able to complete its function in a timely manner
50	Basis Path Testing is A) White Box testing technique B) Black Box testing technique C) Grey Box testing technique D) Integration testing approach

x - x - x