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PhD ENTRANCE EXAM RESULT , VMSBUTU

Answer Key for Computer Science Engineering / Computer Science Branch

Question	Options
1 : A statement of the quantitative research question should:	1) Extend the statement of purpose by specifying exactly the question (the researcher will address 2) Help the research in selecting appropriate participants, research methods, measures, and materials 3) Specify the variables of interest **4) All the above**
2 : In the process of conducting research ‘Formulation of Hypothesis” is followed by	1) Statement of Objectives 2) Analysis of Data **3) Selection of Research Tools** 4) Collection of Data
3 : In order to pursue the research, which of the following is priorly required?	1) Developing a research design **2) Formulating a research question** 3) Deciding about the data analysis procedure 4) Formulating a research hypothesis

Question	Options
4 : What are the core elements of a Research Process?	1) Introduction; Data Collection; Data Analysis; Conclusions and Recommendations 2) Executive Summary; Literature Review; Data Gathered; Conclusions, Bibliography 3) Research Plan; Research Data; Analysis; References **4) Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions**
5 : What does the term 'longitudinal design' mean?	1) A study completed far away from where the researcher lives 2) A study which is very long to read. 3) A study with two contrasting cases. **4) A study completed over a distinct period of time to map changes in social phenomena**
6 : Which institution approved the ‘6G Vision Framework’	1) NASSCOM 2) NITI Aayog **3) ITU** 4) IMF
7 : Which company has launched ChatGPT rival Bard in European Union, Brazil and other nations?	**1) Google** 2) Microsoft 3) Apple 4) Infosis

Question	Options
8 : What is AIRAWAT ?	1) Submarine **2) AI supercomputer** 3) 5G-enabled drone 4) Recently discovered exoplanet
9 : The Union Government has exempted which institution from the purview of the Right to Information Act, 2005?	1) RBI 2) SEBI **3) CERT-In** 4) Election Commission of India
10 : What is ‘PSiFI system’	1) A primary method of waste disposal **2) A system for recognizing human emotions** 3) A wearable device for monitoring blood pressure 4) A voice recognition AI tool
11 : In a mixture of 60 litres, the ratio of milk to water is 2 : 1. If this ratio is to be 1 : 2, then the quantity of water (in litres) to be further added is ?	1) 20 2) 30 3) 40 **4) 60**
12 : The cost of Type 1 rice is Rs. 15 per kg and Type 2 rice is Rs.20 per kg. If both Type 1 and Type 2 are mixed in the ratio of 2 : 3, then the price per kg of the mixed variety of rice is ?	1) 19.5 2) 19 **3) 18** 4) 18.5
13 : A cistern is normally filled in 8 hours but takes two hours longer to fill because of a leak in its bottom. If the cistern is full, the leak will empty it in ?	**1) 20** 2) 28 3) 36 4) 40

Question	Options
14 : A starts business with Rs. 3500 and after 5 months, B joins with A as his partner. After a year, the profit is divided in the ratio 2 : 3. What is B's contribution in the capital ?	1) 8000 2) 8500 **3) 9000** 4) 7500
15 : A tank is 25 m long, 12 m wide and 6 m deep. The cost of plastering its walls and bottom at 75 paise per sq. m, is ?	1) 456 2) 458 **3) 558** 4) 568
16 : If MADE is coded as 12236 and BAD is coded as 123, then how will DECK be coded as ?	**1) 36212** 2) 34312 3) 36201 4) 44412
17 : Five balls L1, L2, L3, L4 and L5 are kept one above the other (not necessarily in the same order). L1 is just above L5 and just below L4. L2 is just above L3 and just below L5. How many balls are above L2 ?	1) 2 **2) 3** 3) 4 4) 4
18 : Mayank is the son of Chhaya. Chhaya and Deepa are sisters. Gayatri is the mother of Deepa. If Naman is the son of Gayatri , How is Mayank related to Naman ?	**1) Nephew** 2) Brother 3) Father 4) Son
19 : Which number will replace the question mark(?) in the following series? 98, 95, 86, 82, 66, ?, 36 ?	1) 58 2) 60 **3) 61** 4) 63
20 : If 5 November 2019 was Tuesday, then what was the day of the week on 5 December 2011 ?	1) Tuesday **2) Monday** 3) Sunday 4) Saturday
21 : The following postfix expression with single-digit operands is evaluated using a stack: 8 2 3 ^ / 2 3 * + 5 1 * - Note that ^ is the exponentiation operator. The top two elements of the stack after the first * is evaluated are:	**1) 6, 1** 2) 5, 7 3) 3, 2 4) 1, 5

Question	Options
22 : Which of the following is true about Binary Trees?	1) Every binary tree is either complete or full. 2) Every complete binary tree is also a full binary tree. 3) Every full binary tree is also a complete binary tree. **4) None of the option**
23 : Consider a directed graph with n vertices and m edges such that all edges have same edge weights. Find the complexity of the best known algorithm to compute the minimum spanning tree of the graph?	**1) O(m+n)** 2) O(m logn) 3) O(mn) 4) O(n logm)
24 : The grammar S ? aSa | bS | c is	1) LL(1) but not LR(1) 2) LR(1) but not LR(1) **3) Both LL(1)and LR(1)** 4) Neither LL(1)nor LR(1)
25 : The number of tokens in the following C statement is printf("HELLO WORLD")	1) 3 **2) 5** 3) 9 4) 8
26 : Let w be any string of length n is {0,1}*. Let L be the set of all substrings of w. What is the minimum number of states in a non-deterministic finite automaton that accepts L?	1) N-1 2) N **3) N+1** 4) 2n-1
27 : Consider the following code segment. x = u - t; y = x * v; x = y + w; y = t - z; y = x * y; The minimum number of total variables required to convert the above code segment to static single assignment form is	1) 6 2) 8 3) 9 **4) 10**

Question	Options
28 : Which of the following problems is undecidable?	**1) Deciding if a given context-free grammar is ambiguous.** 2) Deciding if a given string is generated by a given context-free grammar 3) Deciding if the language generated by a given context-free grammar is empty. 4) Deciding if the language generated by a given context-free grammar is finite.
29 : Which one of the following languages over the alphabet {0,1} is described by the regular expression: (0+1)*0(0+1)*0(0+1)* ?	1) The set of all strings containing the substring 00. 2) The set of all strings containing at most two 0's. **3) The set of all strings containing at least two 0's.** 4) The set of all strings that begin and end with either 0 or 1.
30 : Consider three processes (process id 0, 1, 2 respectively) with compute time bursts 2, 4 and 8 time units. All processes arrive at time zero. Consider the longest remaining time first (LRTF) scheduling algorithm. In LRTF ties are broken by giving priority to the process with the lowest process id. The average turn around time is:	**1) 13 units** 2) 14 units 3) 15 units 4) 16 units

Question	Options
31 : Three concurrent processes X, Y, and Z execute three different code segments that access and update certain shared variables. Process X executes the P operation (i.e., wait) on semaphores a, b and c; process Y executes the P operation on semaphores b, c and d; process Z executes the P operation on semaphores c, d, and a before entering the respective code segments. After completing the execution of its code segment, each process invokes the V operation (i.e., signal) on its three semaphores. All semaphores are binary semaphores initialized to one. Which one of the following represents a deadlock-free order of invoking the P operations by the processes?	1) X: P(a)P(b)P(c) Y: P(b)P(c)P(d) Z: P(c)P(d)P(a) **2) X: P(b)P(a)P(c) Y: P(b)P(c)P(d) Z: P(a)P(c)P(d)** 3) X: P(b)P(a)P(c) Y: P(c)P(b)P(d) Z: P(a)P(c)P(d) 4) X: P(a)P(b)P(c) Y: P(c)P(b)P(d) Z: P(c)P(d)P(a)
32 : Which of the following page replacement algorithms suffers from Belady's anomaly?	**1) FIFO** 2) LRU 3) Optimal Page Replacement 4) Both LRU and FIFO
33 : A CPU generally handles an interrupt by executing an interrupt service routine	1) As soon as an interrupt is raised 2) By checking the interrupt register at the end of fetch cycle. **3) By checking the interrupt register after finishing the execution of the current instruction** 4) By checking the interrupt register at fixed time intervals.
34 : The statement (~p) ? (~q) is logically equivalent to which of the statements below? I. P ? q II. Q ? p III. (~q) ? p IV. (~p) ? q	1) I only 2) I and IV only 3) II only **4) II and III only**

Question	Options
35 : Consider the following processor design characteristics. I. Register-to-register arithmetic operations only II. Fixed-length instruction format III. Hardwired control unit which of the characteristics above are used in the design of a RISC processor?	1) I and II only 2) II and III only 3) I and III only **4) I, II and III**
36 : Consider Z = X-Y, where X, Y and Z are all sign-magnitude form. X and Y are each represented in n-bits. To avoid overflow, the representation of Z would require a minimum of:	1) n bits 2) n - 1 bits **3) n + 1 bits** 4) n + 2 bits
37 : A computer system with cache access time of 100 ns, a main memory access time of 1100 ns, and a hit ratio of.9, then the average access time would be:	**1) 100 ns** 2) 190 ns 3) 210 ns 4) 120 ns
38 : The protocol data unit (PDU) for the application layer in the Internet stack is	1) Segment 2) Datagram **3) Message** 4) Frame
39 : The recurrence relation capturing the optimal execution time of the Towers of Hanoi problem with n discs is	1) T(n) = 2T(n ? 2) + 2 2) T(n) = 2T(n ? 1) + n 3) T(n) = 2T(n/2) + 1 **4) T(n) = 2T(n ? 1) + 1**
40 : Register renaming is done in pipelined processors	1) As an alternative to register allocation at compile time 2) For efficient access to function parameters and local variables **3) To handle certain kinds of hazards** 4) As part of address translation

Question	Options
41 : Which of the following transport layer protocols is used to support electronic mail?	**1) TCP** 2) IP 3) SMTP 4) UDP
42 : Consider the transactions T1, T2, and T3 and the schedules S1 and S2 given below. T1: r1(X); r1(Z); w1(X); w1(Z) T2: r2(Y); r2(Z); w2(Z) T3: r3(Y); r3(X); w3(Y) S1: r1(X); r3(Y); r3(X); r2(Y); r2(Z); w3(Y); w2(Z); r1(Z); w1(X); w1(Z) S2: r1(X); r3(Y); r2(Y); r3(X); r1(Z); r2(Z); w3(Y); w1(X); w2(Z); w1(Z) Which one of the following statements about the schedules is TRUE?	**1) Only S1 is conflict-serializable.** 2) Only S2 is conflict-serializable. 3) Both S1 and S2 are conflict-serializable. 4) Neither S1 nor S2 is conflict-serializable.
43 : Assume that the algorithms considered here sort the input sequences in ascending order. If the input is already in ascending order, which of the following are TRUE? I. Quicksort runs in ?(n 2) time II. Bubblesort runs in ?(n 2) time III. Mergesort runs in ?(n) time IV. Insertion sort runs in ?(n) time	1) I and II only 2) I and III only 3) II and IV only **4) I and IV only**
44 : The Floyd-Warshall algorithm for all-pair shortest paths computation is based on	1) Greedy paradigm. 2) Divide-and-Conquer paradigm. **3) Dynamic Programming paradigm.** 4) Neither Greedy nor Divide-and-Conquer nor Dynamic Programming paradigm.
45 : Suppose a database schedule S involves transactions T1, ..., Tn. Construct the precedence graph of S with vertices representing the transactions and edges representing the conflicts. If S is serializable, which one of the following orderings of the vertices of the precedence graph is guaranteed to yield a serial schedule?	**1) Topological order** 2) Depth-first order 3) Breadth-first order 4) Ascending order of transaction indices

Question	Options
46 : The width of the physical address on a machine is 40 bits. The width of the tag field in a 512 KB 8-way set associative cache is …….. bits.	1) 22 **2) 24** 3) 26 4) 20
47 : N items are stored in a sorted doubly linked list. For a delete operation, a pointer is provided to the record to be deleted. For a decrease-key operation, a pointer is provided to the record on which the operation is to be performed. An algorithm performs the following operations on the list in this order: ?(N) delete, O(logN) insert, O(logN) find, and ?(N) decrease-key. What is the time complexity of all these operations put together?	1) O(logN) 2) O(N) **3) O(N^2)** 4) ?(N^2 logN)
48 : Let X be a Gaussian random variable with mean 0 and variance ?^2 . Let Y = max(X, 0) where max(a, b) is the maximum of a and b. The median of Y is __?	**1) 0** 2) 1 3) -1 4) None of the option
49 : Consider the following processors (ns stands for nanoseconds). Assume that the pipeline registers have zero latency. P1: Four-stage pipeline with stage latencies 1 ns, 2 ns, 2 ns, 1 ns. P2: Four-stage pipeline with stage latencies 1 ns, 1.5 ns, 1.5 ns, 1.5 ns. P3: Five-stage pipeline with stage latencies 0.5 ns, 1 ns, 1 ns, 0.6 ns, 1 ns. P4: Five-stage pipeline with stage latencies 0.5 ns, 0.5 ns, 1 ns, 1 ns, 1.1 ns. Which processor has the highest peak clock frequency?	1) P1 **2) P3** 3) P2 4) P4
50 : Let A and B be two n x n matrices over real numbers. Let rank(M) and det(M) denote the rank and determinant of a matrix M, respectively. Consider the following statements. I. Rank (AB) = rank(A) rank(B) II. det(AB) = det(A) det(B) III. rank(A + B) <= rank(A) + rank(B) IV. det(A + B) <= det(A) + det(B) Which of the above statements are TRUE?	1) I and II only 2) I and IV only **3) II and III only** 4) III and IV only

Best of luck for the future!