ENTRANCE TEST-2019   609

SCHOOL OF APPLIED SCIENCES AND TECHNOLOGY
M.TECH. IN COMPUTER SCIENCES

Total Questions : 60   Question Booklet Series A

Time Allowed   : 70 Minutes   Roll No:

Instructions for Candidates:

1. Write your Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.

2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.

3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.

4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correct read by the OMR Scanner and no complaint to this effect shall be entertained.

5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.

6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.

7. There will be 'Negative Marking' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.

8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.

9. Do not make any stray mark on the OMR sheet.

10. Calculators and mobiles shall not be permitted inside the examination hall.

11. Rough work, if any, should be done on the blank sheets provided with the question booklet.

12. OMR Answer sheet must be handled carefully and it should not be folded or mutilated in such case it will not be evaluated.

13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.

14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

Q1. Synonym of abdicate is
(A) Join
(B) Search
(C) Abandon
(D) Advance

Q2. Oneword substitution for agnostic is
(A) one who is not sure about God's existence.
(B) one who believes in God's existence.
(C) one having different style of living.
(D) none of above.

Q3. In a chess tournament each of six players will play every other player exactly once. How many matches will be played during the tournament?
(A) 12
(B) 15
(C) 30
(D) 36

Q4. P. Q. R and S play a game of cards. P says to Q. "If I give you 8 cards, you will have as many as R has and I shall have 3 less than what R has. Also if I take 6 cards from R. I shall have twice as many as S has." If Q and S together have 50 cards, how many cards have P got?
(A) 35
(B) 37
(C) 38
(D) 40

Q5.Find the HCF of 55×35×180, 2×36×7
(A) 128
(B) 252
(C) 146
(D) 434

Q6. How many terms are there in 2.4.8.16......1024
(A) 7
(B) 8
(C) 9
(D) 10

Q7. Find the number, when 15 is subtracted from 7 times the number, the result is 10 more than twice of the number
(A) 5
(B) 15
(C) 7.5
(D) 4

Q8. Sum of a rational number and its reciprocal is 13/6. Find the number
(A) 2
(B) 3/2
(C) 4/2
(D) 5/2

Q9. Which of the following is tautology:
(A) $(a \lor b) \to (b \land c)$
(B) $(a \land b) \to (b \lor c)$
(C) $(a \lor b) \to (b \to c)$
(D) $(a \to b) \to (b \to c)$

Q10. The proposition $p \land (\sim p \lor q)$ is
(A) a tautology
(B) $\Leftrightarrow (p \land q)$
(C) $\Leftrightarrow (p \lor q)$
(D) a contradiction

Q11. Which one of the following is false? Read $\land$ as AND, $\lor$ as OR, $\sim$ as NOT, $\to$ as one way implication and $\leftrightarrow$ as two way implication.
(A) $((x \to y) \land x) \to y$
(B) $((\sim x \to y) \land (\sim x \to \sim y)) \to x$
(C) $(x \to (x \lor y))$
(D) $((x \lor y) \leftrightarrow (\sim x \to \sim y))$

Q12. What is the logical translation of the following statements?
"None of my friends are perfect"
(A) $\exists x (F(x) \land \neg P(x))$
(B) $\exists x (\neg F(x) \land P(x))$
(C) $\exists x (\neg F(x) \land \neg P(x))$
(D) $\neg \exists x (F(x) \land P(x))$

Q13. If a, b and c are constants, which of the following is a linear inequality?
(A) $ax + bcy = 0$
(B) $ax^2 + cy = 21$
(C) $abx + a^2 y >= 15$
(D) $xy + ax >= 20$

Q14. A square matrix is singular whenever:
(A) The rows are linearly independent
(B) The columns are linearly independent
(C) The rows are linearly dependent
(D) None of the above

Q15. If A and B are real symmetric matrices of size n x n. Then, which one of the following is true?
(A) $AA^T = I$
(B) $A = A^{-1}$
(C) $AB = BA$
(D) $(AB)^T = BA$

Q16. The determinant of the following matrix is:
$$\begin{bmatrix} 6 & -8 & 1 & 1 \\ 0 & 2 & 4 & 6 \\ 0 & 0 & 4 & 8 \\ 0 & 0 & 0 & -1 \end{bmatrix}$$

(A) 11
(B) -48
(C) 0
(D) -24

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Q17. If at every point of a certain curve. the slope of the tangent equals (-2x/y) the curve is
(A) A straight line
(B) A parabola
(C) A circle
(D) An ellipse

Q18. The formula used to compute an approximation for the second derivative of a function f at a point x_0 is
(A) $\frac{f(x_0+h)+f(x_0-h)}{2}$
(B) $\frac{f(x_0+h)-f(x_0-h)}{2h}$
(C) $\frac{f(x_0+h)+2f(x_0)+f(x_0-h)}{h^2}$
(D) $\frac{f(x_0+h)-2f(x_0)+f(x_0-h)}{h^2}$

Q19. What is the maximum value of the function $f(x) = 2x^2 -2x + 6$ in the interval [0. 2]?
(A) 6
(B) 10
(C) 12
(D) 5.5

Q20. Consider the function $y = |x|$ in the interval (-1, 1). In this interval, the function is
(A) continuous and differentiable
(B) continuous but not differentiable
(C) differentiable but not continuous
(D) neither continuous nor differentiable

Q21.A bag contains 10 white balls and 15 black balls. Two balls are drawn in succession. The probability that one of them is black and the other is white is
(A) 2/3
(B) 4/5
(C) 1/2
(D) 1/3

Q22. Two dice are thrown simultaneously. The probability that at least one of them will have 6 facing up is
(A) 1/36
(B) 1/3
(C) 25/36
(D) 11/36

Q23. The probability that top and bottom cards of a randomly shuffled deck are both aces is
(A) (4x4)/(52x52)
(B) (4x3)/(52x52)
(C) (4x3)/(52x51)
(D) (4x4)/(52x51)

Q24. The probability that it will rain today is 0.5. The probability that it will rain tomorrow is 0.6. The probability that it will rain either today or tomorrow is 0.7. What is the probability that it will rain today or tomorrow?
(A) 0.3
(B) 0.25
(C) 0.35
(D) 0.4

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Q25.Let * be defined as $x * y = \bar{x} + y$. Let z=x*y, value of z*x is
(A) $\bar{x} + y$
(B) x
(C) 0
(D) 1

Q26.Let $f(x, y, z) = \bar{x} + \bar{y}z + xz$ be a switching function. Which one of the following is valid?
(A) $\bar{y}x$ is a prime implicant of f
(B)xz is a minterm of f
(C)xz is an implicant of f
(D) y is a prime implicant of f

Q27.The simultaneous equations on the Boolean variables x, y, z and w,
$$x + y + z = 1$$
$$xy = 0$$
$$xz + w = 1$$
$$xy + \bar{z}\bar{w} = 0$$
have the following solution for x, y, z and w, respectively
(A) 0100
(B) 1101
(C) 1011
(D) 1000

Q28.Given the following Karnaugh map, which one of the following represents the minimal Sum-of-Products of the map?

WX\nYZ	00	01	11	10
00	0	x	0	x
01	x	1	x	1
11	0	x	1	0
10	0	1	x	0

(A)xy + y'z
(B)wx'y' +xz + xz
(C)w'x + y'z + xy
(D)xz + y

Q29. When an interrupt occurs, an operating system
(A) ignores the interrupt
(B) always changes state of interrupted process after processing the interrupt
(C) always resumes execution of interrupted process after processing the interrupt
(D) may change state of interrupted process to 'blocked' and schedule another process

Q30. RAID configuration of disks are used to provide
(A) fault-tolerance
(B)low speed
(C) high data density
(D) None of these

Q31.Arrange the following configuration for CPU in decreasing order of operating speeds: Hard wired control, vertical micro-programming, horizontal micro-programming
(A) Hard wired control, vertical micro-programming, horizontal micro-programming
(B) Hard wired control, horizontal micro-programming, vertical micro-programming

(C) Horizontal micro-programming, vertical micro-programming, hard wired control
(D) Vertical micro-programming, horizontal micro-programming, hard wired control

Q32. A processor needs software interrupt to
(A) test the interrupt system of the processor
(B) implement co-routines
(C) obtain system services which need execution of privileged instructions
(D) return from subroutine

Q33. In which of the following case is it possible to obtain different results for call-by-reference and call-by-name parameter passing?
(A) Passing an expression as a parameter
(B) Passing an array as a parameter
(C) Passing a pointer as a parameter
(D) Passing an array element as a parameter

Q34. What does the following code do?
```
int a, b;
  :
a = a+b;
b = a-b;
a = a-b;
```
(A) exchanges (a) and (b)
(B) doubles (a) and stores in (b)
(C) doubles (b) and stores in (a)
(D) leaves (a) and (b) unchanged

Q35. An unrestricted use of the "goto" statement is harmful because
(A) it makes it more difficult to verify programs
(B) it increases the running time of the programs
(C) it increases the memory required for the programs
(D) it results in the compiler generating longer machine code

Q36. In which of the following cases is it possible to obtain different results for call-by reference and call-by-name parameter passing methods?
(A) passing a constant value as a parameter
(B) passing the address of an array as a parameter
(C) passing an array element as a parameter
(D) passing an array

Q37. Let P be a quicksort program to sort numbers in ascending order. Let t1 ad t2 be the time taken by the program for the inputs [1 2 3 4] and [5 4 3 2 1], respectively. Which of the following holds?
(A) t1 = t2
(B) t1 > t2
(C) t1 < t2
(D) t1 = t2 + 5log5

Q38. Kruskal's algorithm for finding a minimum spanning tree of a weighted graph G with n vertices and m edges has the time complexity of
(A) O(n2)
(B) O(mn)
(C) O(m+n)
(D) O(mlogn)

Q39. A binary search tree is generated by inserting in order the following integers: 50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24. The number of nodes in the left subtree and right subtree of the root respectively is
(A) (4, 7)
(B) (7, 4)
(C) (8, 3)
(D) (3, 8)

Q40. A problem in NP is NP-complete if
(A) it can be reduced to the 3-SAT problem in polynomial time
(B) the 3-SAT problem can be reduced to it in polynomial time
(C) it can be reduced to any other problem in NP in polynomial time
(D) some problem in NP can be reduced to it in polynomial time

Q41. Let R1 and R2 be regular sets defined over the alphabet then
(A) R1 ∩ R2 is not regular
(B) R1 ∪ R2 is not regular
(C) Σ* - R1 is regular
(D) R1 * is not regular

Q42. Let r=1 (1 + 0)*, s = 11*0 and t=1*0 be three regular expressions. Which one of the following is true?
(A) L(s) ⊆ L(r) and L(s) ⊆ L(t)
(B) L(r) ⊆ L(s) and L(s)·⊆ L(t)
(C) L(s) ⊆ L(t) and L(r) ⊆ L(s)
(D) L(t) ⊆ L(s) and L(s) ⊆ L(r)

Q43. Which of the following regular expression identifies are true?
(A) r(*) = r*
(B) (r * s *) = (r + s) *
(C) (r + s) * = r * + s *
(D) r * s * = r * + s *

Q44. The number of substrings (of all lengths inclusive) that can be formed from a character string of length n is
(A) n
(B) n^2
(C) n(n-1)/2
(D) n(n+1)/2 +1

Q45. In a compiler the module that checks every character of the source text is called
(A) the code generator
(B) the code optimizer
(C) the lexical analyzer
(D) the syntax analyzer

Q46. In some programming languages an identifier is permitted to be a letter followed by any number of letters or digits. If L and D denotes the sets of letters and digits respectively, which of the following expression defines an identifier?
(A) (L + D)*
(B) L(L + D)*
(C) (LD)*
(D) L(LD)*

Q47. Consider the SLR(1) and LALR(1) parsing tables for a context free grammar. Which of the following statements is not true?
(A) The goto part of both tables may be different.
(B) the shift entries are identical in both the tables.
(C) the reduce entries in the tables may be different
(D) the error entries in the tables may be different

Q48. A shift reduce parser carries out the actions specified within braces immediately after reducing with the corresponding rule of grammar
    S → xx W {print "1"}
    S →y {print "2"}
    W →Sz {print "3"}
What is the translation of xxxxyzz using the syntax directed translation scheme described by the above rules?
(A) 23131
(B) 11233
(C) 11231
(D) 33211

Q49. Assume that the following jobs are to be executed on a single processor system

Job Id	CPU Burst time
p	4
q	1
r	8
s	1
t	2

The jobs are assumed to have arrived at time 0+ and in the order p, q, r, s, t. Calculate the departure time (completion time) for job p if scheduling is round robin with time slice 1.
(A) 4
(B) 10
(C) 11
(D) 12

Q50. Which scheduling policy is most suitable for a time-shared operating system ?
(A) Shortest Job First
(B) Round Robin
(C) First come first serve
(D) Elevator

Q51. The sequence ...... is an optimal non-preemtivescheduling sequence for the following jobs which leaves the CPU idle for ..... unit(s) of time.

Job	Arrival time	Burst time
1	0.0	9
2	0.6	5
3	1.0	1

(A) {3, 2, 1}, 1
(B) {2, 1, 3}, 0
(C) {3, 2, 1}, 0
(D) {1, 2, 3}, 5

Q52. Which of the following is an example of spooled device?
(A) a line printer used to print the output of a number of jobs
(B) a terminal used to enter input data to a running program
(C) a secondary storage device in a virtual memory system
(D) a graphic display device

Q53. The following table has two attributes A and C where A is the primary key and C is the foreign key referencing A with on-delete cascade.

A	C
2	4
3	4
4	3
5	2
7	2
9	5
6	4

The set of all tuples that must be additionally deleted to preserve referential integrity when the tuple (2, 4) is deleted is:
(A) (3, 4) and (6, 4)
(B) (5, 2) and (7, 2)
(C) (5, 2), (7, 2) and (9,5)
(D) 1

Q54. Given the basic ER and relational models, which of the following is incorrect?
(A) an attribute of an entity can have more than one value
(B) an attribute of an entity can be composite
(C) in a row of a relational table, an attribute can have more than one value
(D) in a row of a relational table, an attribute can have exactly one value or a NULL value

Q55. Which normal form is considered adequate for normal relational database design?
(A) 2 NF
(B) 5 NF
(C) 4 NF
(D) 3 NF

Q56. Let R = (A, B, C, D, E, F) be a relation scheme with the following dependencies C F, E A, EC D, A B. Which of the following is a key for R?
(A) CD
(B) EC
(C) AE
(D) AC

Q57. Which of the following assertion is false about the Internet Protocol (IP)?
(A) it is possible for a computer to have multiple IP addresses
(B) IP packets from the same source to the same destination can take different routes in the network
(C) IP ensures that a packet is forwarded if it is unable to reach its destination within a given number of hops
(D) the packet source cannot set the route of an outgoing packets, the route is determined only by the routing tables in the routers on the way

Q58. The subnet mask for a particular network is 255.255.31.0, which of the following pairs of IP addresses could belong to this network?
(A) 172.57.88.62 and 172.56.87.23.2

(B) 10.35.28.2 and 10.35.29.4
(C) 191.203.31.87 and 191.234.31.88
(D) 128.8.129.43 and 128.8.161.55

Q59. A subnet has been assigned a subnet mask of 255.255.255.192. which is the maximum number of hosts that can belong to this subnet?
(A) 14
(B) 30
(C) 62
(D) 126

Q60. In TCP, a unique sequence number assigned to each
(A) byte
(B) word
(C) segment
(D) message

Space for Rough.