Admission Requirement

The student entering the M.Sc. CSIT Program must have completed B.Sc. CSIT degree offered by TU or its equivalent. Prospective students can apply for admission by submitting a completed form as required by the general rule of the university. The students for admission are selected based on the scores in the entrance test conducted by the admitting college. The program also admits students having Bachelor of Engineering (B.E.) degree in Computer, Electronics and Communication, and Electrical.

List of Courses for Entrance Examination

A. Computer Science and IT Related (Four questions from each subject)

1. Introduction to Information Technology
2. C-Programming
3. Discrete Structures
4. Data Structure and Algorithms
5. Digital Logic
6. Microprocessor
7. Computer Architecture
8. Operating Systems
9. Object Oriented Programming Language
10. Numerical Methods
11. Database Management System
12. Computer Graphics
13. Automata Theory
14. System Analysis and Design
15. Simulation and Modeling
16. Artificial Intelligence
17. Computer Networks
18. Design and Analysis of Algorithms
19. Compiler Design and Construction
20. Web Technology

B. Mathematics (Ten questions from each subject)

1. Linear Algebra
2. Calculus and Analytical Geometry

Roll. No.

Tribhuvan University

Institute of Science and Technology

Central Department of Computer Science and Information Technology

M.Sc. CSIT Entrance Examination, February 01, 2020

Full Marks: 100 **Time: 2 Hrs.**

Pass Marks: 35

Attempt all questions. Please Tick/Encircle the correct answer. Any omission or correction to the answers is not allowed.

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1. The values of h and k make the following system consistent is

   $2x_1 - x_2 = h$

   $-6x_1 + 3x_2 = k$

   a. $k + 3h \neq 0$
   c. $k - 3h = 0$
   b. $k + 3h > 0$
   d. $k + 3h = 0$

2. If $\vec{u} = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$ and $\vec{v} = \begin{bmatrix} 2 \\ -5 \end{bmatrix}$ then $3\vec{u} - 4\vec{v} =$

   a. $\begin{bmatrix} -5 \\ 11 \end{bmatrix}$
   c. $\begin{bmatrix} -5 \\ -11 \end{bmatrix}$
   b. $\begin{bmatrix} 5 \\ -11 \end{bmatrix}$
   d. $\begin{bmatrix} -5 \\ 29 \end{bmatrix}$

3. If $\vec{v}_1 = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$ and $\vec{v}_2 = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$, then $\{\vec{v}_1, \vec{v}_2\}$ is

   a. linearly dependent
   b. linearly independent
   c. both linearly independent and dependent
   d. None of the above

4. If $T(x_1, x_2) = (x_1 + x_2, x_1 + 2x_2, 3x_1 + x_2)$, then T

   a. is a linear transformation
   b. is a one-one linear transformation
   c. is not a linear transformation
   d. None of the above

5. If $A = \begin{bmatrix} 1 & -3 \\ -2 & 4 \end{bmatrix}$ and $x = \begin{bmatrix} 5 \\ 3 \end{bmatrix}$ then $x^T A^T =$

a. $\begin{bmatrix} -4 \\ 2 \end{bmatrix}$

b. $[4 \quad 2]$

c. $[-4 \quad 2]$

d. $[4 \quad -2]$

6. If W = col A, then A for given

$$W = \left\{ \begin{bmatrix} 3a - 2b \\ a + 2b \\ -7b \end{bmatrix} : a, b \in \Re \right\} \text{ is}$$

a. $\begin{bmatrix} 3 & -1 \\ 1 & 2 \\ 0 & -7 \end{bmatrix}$

b. $\begin{bmatrix} 3 & -1 \\ 1 & 2 \\ -7 & 0 \end{bmatrix}$

c. $\begin{bmatrix} -1 & 3 \\ 1 & 2 \\ -7 & 0 \end{bmatrix}$

d. $\begin{bmatrix} -1 & 3 \\ 1 & 2 \\ 0 & -7 \end{bmatrix}$

7. If $B = \{b_1, b_2\}$ for $\Re^2$, where $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ and $[x]_B = \begin{bmatrix} 2 \\ -3 \end{bmatrix}$, then x =

a. $\begin{bmatrix} 1 \\ 6 \end{bmatrix}$

b. $\begin{bmatrix} 1 \\ -6 \end{bmatrix}$

c. $\begin{bmatrix} -1 \\ 6 \end{bmatrix}$

d. $\begin{bmatrix} 0 \\ 2 \end{bmatrix}$

https://math.stackexchange.com/questions/1856346/find-x-in-mathbbr2-whose-coordinate-vector-relative-to-the-basis-b

8. The eigen value of $A = \begin{bmatrix} 1 & 6 \\ 5 & 2 \end{bmatrix}$ is

a. 0

b. 7

c. -7

d. 5

quadratic equn

9. The vectors $\begin{pmatrix} -1 \\ 4 \\ -3 \end{pmatrix}, \begin{pmatrix} 5 \\ 2 \\ 1 \end{pmatrix}, \begin{pmatrix} 3 \\ -4 \\ -7 \end{pmatrix}$

a. are orthogonal

b. are not orthogonal

c. are parallel

d. None of the above

u1.u2.u3 = 0 separately

10. The standard matrix of T: $\Re^2 \to \Re^4$, $T(e_1) = (1, 2, 0, 5)$ and $T(e_2) = (3, -6, 1, 0)$ is

a. $\begin{pmatrix} 1 & 2 & 0 & 5 \\ 3 & -6 & 1 & 0 \end{pmatrix}$

c. $\begin{pmatrix} 1 & 3 & 0 & 5 \\ 3 & -6 & 1 & 0 \end{pmatrix}$

b. $\begin{pmatrix} 1 & 3 \\ 2 & -6 \\ 0 & 1 \\ 5 & 0 \end{pmatrix}$

d. None of the above

11. If $f(x) = x^2 - 1$, $g(x) = \sin x$, $h(x) = x^2$, then fogoh =

a. $\sin^2 x^2 - 1$

c. $\sin^2 x^2$

b. $\sin^2 x^4$

d. $\sin^3 x^4$

12. $T\ x \xrightarrow{\lim} 0 \dfrac{\sqrt{x^2 + 9} - 3}{x^2} =$

a. 0/0

c. 6

b. 1/6

d. 0

13. The function $f(x) = \begin{cases} \frac{x^2 - x - 2}{x - 2}, x \neq 2 \\ 3, x = 2 \end{cases}$ is continuous at

a. x = 3

c. x = 2

b. x = 0

d. x = 1

14. The slope of the tangent line to the curve $y = 9 - 2x^2$ at (2, 1) is

a. 2

c. 4

derivatives and put value 2

b. 1

d. -8

15. If $f'(x) = 12x^2 + 6x - 4$ and $f(0) = 2$, then f(x) is

a. $4x^3 + 3x^2 - 4x + 2$

use antiderivative to find fx and put value tto find c

c. $12x^3 + 6x^2 - 4x + 2$

b. $x^3 + 3x^2 - 4x + 2$

d. $x^3 + 6x^2 - 4x + 2$

16. If the position (s, t) of a particle is given by the equation $s = t^3 - 3t^2 + 2t$, then the velocity after 2 second is

a. $-2ms^{-1}$

c. $2ms^{-1}$

b. $3ms^{-1}$

d. 0

17. The area of the region bounded by the parabola $y = x^2$ and $y = 2x - x^2$ is

find integration range and do integration of 2x-x^2-x^2

a. 3
b. -1/3
c. 1/3
d. Not defined

18. If $f(x, y) = x^3 + x^2y^2 - 2y^2$, then $f_x(1, 2)$ is

a. 11
b. 3
c. -3
d. -11

19. $\int_0^2 \int_1^2 (x - 3y^2)\,dy\,dx$ =

a. 12
b. -12
c. 0
d. 21

20. The power series expansion of e^t is

a. $1 - t + \frac{t^2}{2!} + \ldots..$
b. $t - \frac{t^2}{2!} + \ldots..$
c. $1 + \frac{t^2}{2!} + \frac{t^4}{2!} + \ldots$
d. $1 + t + \frac{t^2}{2!} + \ldots$

21. Which of the following statement is true?

a. A relation can have only one primary key
b. A relation can have only one foreign key
c. A relation can have only one super key
d. A relation can have only one candidate key

22. Which one of the following is the execution order of commands in SQL query?

a. SELECT, FROM, WHERE
b. SELECT, WHERE, FROM
c. FROM, SELECT, WHERE
d. FROM, WHERE, SELECT

23. Which of the following normal form is based on the concept multi-valued dependency?

a. 2NF
b. 3NF
c. 4NF
d. 5NF

24. After successful completion, a transaction is in _____ state.

a. Active
b. Committed
c. Partially committed
d. Failed

25. Which of the following system development approach is appropriate if in which user requirements are certain and precise?

a. Waterfall
b. Prototyping
c. Spiral
d. Agile

26. Which one of the following diagram is used for process modelling in structure development?

a. Use-case diagram
b. Entity relationship diagram
c. Data flow diagram
d. Class diagram

27. Single location installation is also called

a. Direct installation
b. Parallel installation
c. Phased installation
d. Pilot installation

28. A file organization in which the address for each row is determined using an algorithm is called

a. Sequential file organization
b. Indexed file organization
c. Hashed file organization
d. None of the above

29. Which one of the following was an early packet-switched network and the first network to implement TCP/IP protocol suite?

a. CSNET
b. ARPANET
c. ASAPNET
d. CNNET

30. Which of the following layer considers the functions that allows the data to move along different networks?

a. Network access layer
b. Internet layer
c. Transport layer
d. Physical layer

31. Which of the following subnet-mask is used if we divide a class C address into 8 subnets?

a. 255.255.255.0
b. 255.255.255.192
c. 255.255.255.224
d. 255.255.255.240

32. What is the header size of a UDP packet?

a. 8 bytes
b. 8 bits
c. 16 bytes
d. 124 bytes

33. Which feature was already introduced before HTML5?

a. Canvas/SVG
b. Video
c. Geolocation
d. Frames

34. DOM stands for

a. Domain object model
b. Document object model
c. Discrete object model
d. Disk object model

35. Which of the following symbol describes class selector in CSS?

a. #
b. >
c. ~
d. .

36. Number of incoming links (backlinks) is used for .....optimization.

a. Technical
b. On-site
c. Off-site
d. All of the above

37. Which one of the following is transitive rule?

a. $\dfrac{p \quad p \rightarrow q}{\therefore q}$
b. $\dfrac{p \rightarrow q \quad q \rightarrow r}{\therefore p \rightarrow r}$
c. $\dfrac{p \wedge q}{\therefore p}$
d. $\dfrac{p \quad q}{\therefore p \wedge q}$

38. Which one of the following is principle of inclusion and exclusion?

a. $|A_1 \cap A_2| = |A_1| + |A_2| - |A_1 \cup A_2|$
b. $|A_1 \cap A_2| = |A_1| + |A_2| - |A_1 \cap A_2|$
c. $|A_1 \cup A_2| = |A_1| + |A_2| - |A_1 \cup A_2|$
d. $|A_1 \cup A_2| = |A_1| + |A_2| - |A_1 \cap A_2|$

39. The number of colors required to color a complete graph, K_n, is

a. n – 1
b. n
c. n + 1
d. n + 2

40. Which one of the following statement is true?

a. Value of maximal flow is always less than the value of minimal cut
b. Value of maximal flow is always greater than the value of minimal cut
c. Value of maximal flow is always greater than or equal to the value of minimal cut
d. Value of maximal flow is always less than or equal to the value of minimal cut

41. A digital signature is

a. scanned signature
b. signature in binary form
c. encrypting information
d. handwritten signature

42. Which of the following register is loaded with the contents of the memory location pointed by PC?

a. Program Counter
b. Memory address register
c. Memory data register
d. Instruction register

43. A hexadecimal number A20 is equal to the octal number

a. 1040
b. 1020
c. 5040
d. A20

44. In MS Word, borders can be applied to

a. Cells
b. Paragraph
c. Text
d. All of above

45. Which of the following is executed by preprocessor?

a. void main (int argc, char **argv)
b. #include <stdio.h>
c. return (0)
d. None of the above

46. Output of the following code is

```
int main()
{
    int a,b,c;
    a=5;  b=10;  c=a+b;
    printf("%i",c);
    return(0);
}
```

a. 0
b. 15
c. Undefined i
d. Other compiler error

47. In the following code "Hello World!" is printed

```
int main()
{
    int a=0;
    while (a++)
    printf("Hello  World!");
    return(0);
}
```

a. 1 time
b. 0 times
c. 2 times
d. Infinite times

48. Which of the following ways are correct to comment out?

a. --printf("%d",i);
b. // printf("%d",i);
c. /*printf("%d",i);
d. ! printf("%d",i);

49. Can a DFA recognize palindromes?

a. Yes
b. No
c. Yes if given an input string from the alphabet of DFA
d. Cannot be determined

50. A.A* can be expressed in the form of

a. A^+
b. A^-
c. $A.A^+$
d. A

51. A CFG is ambiguous if

a. It has more than one leftmost derivations for a string produced by the grammar
b. It has more than one parse tree for a string produced by the grammar
c. a and b both
d. None of the above

52. A turing machine that can simulate other turing machines is called

a. Nested turing machine
b. Universal turing machine
c. Multitape turing machine
d. Turing machine with state as storage

53. Following are the ways to generate random numbers except8

a. Table of random numbers
b. Spinning a roulette wheel
c. Computer generated random numbers
d. Fibonacci series

54. _____ model follows the changes over time that results from the system activities.

a. Static
b. Dynamic
c. Analytical
d. Numerical

55. Monte Carlo Simulation method got its name from

a. Model formulation
b. Idea of random number assignment
c. Data collection method
d. Analysis method

56. Which of the following statistical method is commonly used to analyze simulation result?

a. Analysis of variance
b. T –test
c. Regression analysis
d. All of the above

57. LR parser is a

a. bottom up parser
b. top down parser
c. compiler
d. none of the above

58. Three address code involves

a. At most three addresses
b. At least three addresses
c. No unary operators
d. None of the above

59. Consider a grammar

S ::= bX | XYa
X::= bYY | ε
Y ::= cXYb

What is First(S)?

a. {b}
b. {a,b}
c. {b,c}
d. {a,b,c}

60. A "decorated parse tree" is the output of

a. Lexical analyser
b. Syntax analyser
c. Semantic analyser
d. Code optimizer

61. A binary search tree whose left sub tree and right sub tree differ in height by at most 1 unit is called

a. AVL tree
b. Red black tree
c. Lemma tree
d. None of the above

62. The postfix form of the expression (A+ B)*(C*D- E)*F / G is

a. AB+ CD*E - FG /**
b. AB + CD* E - F **G /
c. AB + CD* E - *F *G /
d. AB + CDE * - * F *G /

63. What's happen if base condition is not defined in recursion?

a. Stack underflow
b. Stack Overflow
c. Both a and b
d. None of these

64. Suppose we are sorting an array of eight integers using quicksort, and we have just finished the first partitioning with the array looking like this: 2,5,1,7,9,12,11,10. Which statement is correct?

a. The pivot could be either the 7 or the 9
b. The pivot could be the 7, but it is not the 9
c. The pivot is not the 7, but it could be the 9
d. Neither the 7 nor the 9 is the pivot

65. In which of the following method, we approximate the curve of solution by the tangent in each interval.

a. Picard's method
b. Euler's method
c. Newton's method
d. Runge Kutta method

66. In general the ratio of truncation error to that of round off error is

a. 2:1
b. 1:1
c. 1:2
d. 1:3

67. The convergence of which of the following method is sensitive to starting value?

a. Newton-Raphson method
b. False position
c. Gauss seidel method
d. All of these

68. A partial differential equation requires
    a. Exactly one independent variable
    b. More than one dependent variable
    c. Two or more independent variables
    d. Equal number of dependent and independent variables

69. The method which is based on the principle of checking the visibility point at each pixel position on the projection plane are called
    a. Object Space Method
    b. Image Space Method
    c. Both a and b
    d. None of the above

70. Reflection of a point about x-axis, followed by a counter-clockwise rotation of 900, is equivalent to reflection about the line?
    a. X = -Y
    b. Y = -X
    c. X + Y = 1
    d. X = Y

71. In Bresenham's algorithm, while generating a circle, it is easy to generate?
    a. One octant first and other by successive rotation
    b. One octant first and other by successive translation
    c. One octant first and other by successive reflection
    d. All octants

72. Which algorithm is a faster method for calculating pixel positions?
    a. Bresenham's line algorithm
    b. Parallel line algorithm
    c. Mid-point algorithm
    d. DDA line algorithm

73. Operation carried out by a NOT gate are also termed as
    a. inverting
    b. converting
    c. reverting
    d. reversing

74. Logic circuit with only one output and one or more inputs is said to be
    a. binary gate
    b. logic gate
    c. circuit gate
    d. system gate

75. The output of NOR gate is

a. High if all of its inputs are high
b. Low if all of its inputs are low
c. High if all of its inputs are low
d. High if only of its inputs is low

76. Which of the following adders can add three or more numbers at a time?

a. Parallel adder
b. Carry-look-ahead adder
c. Carry-save-adder
d. Full adder

77. INTR is a ……

a. software Interrupt
b. hardware Interrupt
c. inline Interrupt
d. none of the above

78. Which of the following instruction is not possible in 8085?

a. POP 30 H
b. POP B
c. POP D
d. POP PSW

79. Which of the following statement is correct?

a. address bus of microprocessor is bidirectional
b. address bus of microprocessor is omnidirectional
c. address bus of microprocessor is unidirectional
d. all of the above

80. 8085 consists of …….. total number of instruction

a. 8
b. 16
c. 232
d. 246

81. The pipelining process is also called as ……

a. superscalar operation
b. assembly line operation
c. Von Neumann cycle
d. none of the above

82. The addressing mode, where operand value is directly specified is ….

a. Immediate
b. Direct
c. Definite
d. Relative

83. The transformation between the Parallel and serial ports is done with the help of

a. flip flops
b. logic circuits
c. shift registers
d. none of the above

84. The sign followed by the string of digits is called as ……..

a. significant
c. exponent
b. determinant
d. mantissa

85. Which of the following sorting methods would be most suitable for sorting a list which is almost sorted?

a. quick sort
c. insertion sort
b. bubble sort
d. merge sort

86. Heap is defined to be a ……

a. binary tree
c. avl tree
b. complete binary tree
d. none of the above

87. Boolean satisfiability problem belongs to……class.

a. P
c. NP complete
b. NP
d. NP hard

88. Dynamic programming focuses on …….

a. approximation
c. dynamism
b. optimization
d. estimation

89. The copy constructors can be used to _____

a. Copy an object so that it can be passed to a class
b. Copy an object so that it can be passed to a function
c. Copy an object so that it can be passed to another primitive type variable
d. Copy an object for type casting

90. Class is _____ abstraction.

a. Object
c. Real
b. Logical
d. Hypothetical

91. If class A is derived from another derived class B which is derived from class C, which class will have maximum level of abstraction?

a. Class A
b. Class B
c. Class C
d. All have the same level of abstraction

92. Multiple catch blocks _____

a. Are mandatory for each try block
b. Can be combined into a single catch block
c. Are not possible for a try block
d. Can never be associated with a single try block

93. In operating system, when does round robin scheduling become FCFS

a. When the time for migration is infinite.
b. When the priority is same for all process.
c. When time quanta is same for all process.
d. When time quanta is large for all process.

94. If a system has 1 GB RAM with a page size of 8KB and operating system occupies 16 MB of RAM, how many page frames does the system have for user process.

a. 129024
b. 120924
c. 131072
d. 119864

95. Threshing problem in operating system can be solved by using

a. Increasing the degree of multiprogramming
b. Increasing the clock speed of processor
c. Decreasing the degree of multiprogramming
d. Both A and B.

96. Which of the following inter-process communication mechanism is most efficient in an operating system?

a. Shared memory
b. Semaphore
c. Massage Passing
d. Mutex

97. An admissible heuristic h(n) means:

a. H(n)=0
b. H(n) is the exact cost to reach the goal
c. H(n) never overestimate the cost to reach the goal
d. H(n)=g(n)

98. What is the assumption of Naïve Bayes Document classification model:

a. A document can be classified using few keywords
b. Words in the documents are independent from their neighboring words.
c. Common words such as “the”, “a” and “an” should be avoided.
d. Dictionary should be very large.

99. In the expression “Grade(Brother(Jane))”, what does “Brother( )” represents:

a. Function
b. Predicate
c. Binary relation
d. Unary relation

100. The morphological analysis in Natural Language Processing deals with

a. Word level processing
b. Sentence Level processing
c. Character level processing
d. Sentiment Level Processing