(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

A

SET-Y

M.Phil./Ph.D./URS-EE-Nov.-2018

SUBJECT : Computer Science

100017

Sr. No. ....

Time : 1¼ Hours　　　　　Max. Marks : **100**　　　　　Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

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(Signature of the Candidate)

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(Signature of the Invigilator)

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2. The candidates *must return* the question booklet 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.

4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University. Website. Thereafter, no complaint in any case, will be considered.

5. 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 booklet itself. Answers *must not* be ticked in the question booklet.

6. *There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.*

7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.

8. 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.

M.Phil./Ph.D./URS-EE-Nov.-2018/(Computer Sci.)(SET-Y)/(A)

1. Let P, Q and R be three atomic prepositional assertions. Let X denote $(P \vee Q) \to R$ and Y denote $(P \to R) \vee (Q \to R)$. Which one of the following is a tautology ?

   (1) $X \leftrightarrow Y$ (2) $Y \to X$ (3) $X \to Y$ (4) $\sim Y \to X$

2. Which one of the following well-formed formulae in predicate calculus is *not* valid ?
   (1) $(\forall x \, p(x) \Rightarrow \forall x \, q(x)) \Rightarrow (\exists x \sim p(x) \vee \forall x \, q(x))$
   (2) $(\exists x \, p(x) \vee \exists x \, q(x)) \Rightarrow \exists x \, (p(x) \vee q(x)))$
   (3) $\exists x \, (p(x) \wedge q(x)) \Rightarrow (\exists x \, p(x) \wedge \exists x \, q(x))$
   (4) $\forall x \, (p(x) \vee q(x)) \Rightarrow (\forall x \, p(x) \vee \forall x \, q(x))$

3. Akshay speaks the truth in 45% of the cases. In a rainy season, on each day there is a 75% chance of raining. On a certain day in the rainy season, Akshay tells his mother that it is raining outside. What is the probability that it is actually raining ?

   (1) $\dfrac{27}{38}$ (2) $\dfrac{25}{35}$ (3) $\dfrac{31}{36}$ (4) $\dfrac{52}{128}$

4. Two n bit binary strings S_1 and S_2 are chosen randomly with uniform probability. The probability that Hamming distance between these strings (the number of bit positions where the two strings differ) is equal to d is :

   (1) $\dfrac{{}^nC_d}{2^n}$ (2) $\dfrac{{}^nC_d}{2^d}$ (3) $\dfrac{d}{2^n}$ (4) $\dfrac{1}{2^d}$

5. $f(x)$ and $g(x)$ are two functions differentiable in $[0, 1]$ such that $f(0) = 2$; $g(0) = 0$; $f(1) = 6$; and $g(1) = 2$. Then these must exist a constant C in :
   (1) $(0, 1)$ such that $f'(c) = 2g'(c)$ (2) $[0, 1]$ such that $f'(c) = 2g'(c)$
   (3) $(0, 1)$ such that $2f'(c) = g'(c)$ (4) $[0, 1]$ such that $2f'(c) = g'(c)$

6. $(G, *)$ is an abelian group. Then :
   (1) $x = x^{-1}$, for any x belonging to G
   (2) $x = x^2$, for any x belonging to G
   (3) $(x * y)^2 = x^2 * y^2$, for any x, y belonging to G
   (4) G is of finite order

7. The number of equivalence relations of the set $[1, 2, 3, 4]$ is :
   (1) 15   (2) 16   (3) 24   (4) 4

8. In a set of integers, a relation R is defined as aRb, if and only if $b = |a|$. This relation is :
   (1) Reflexive   (2) Irreflexive   (3) Symmetric   (4) Anti-symmetric

9. Which of the following statements is true ?

P : All totally ordered sets have least elements.

Q : The Hasse diagram of a totally ordered set is a line.

(1) P alone   (2) Q alone   (3) Both P and Q   (4) Neither P nor Q

10. Let M be a 3×3 adjacency matrix corresponding to a given graph of three nodes labeled 1, 2, 3. If entry (1, 3) in M^3 is 2, then the graph could be :
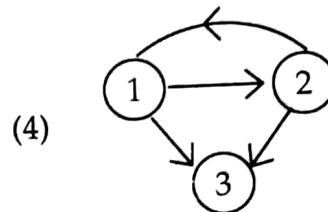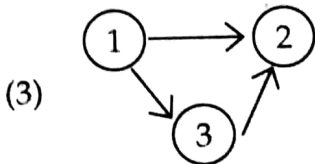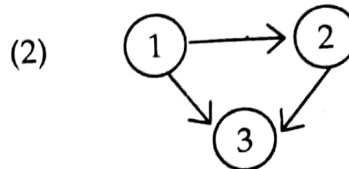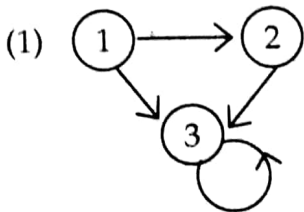
11. A wheel graph with eleven vertices has a chromatic number of :

(1) 3   (2) 4   (3) 2   (4) None of these

12. Which of the following is a correct match ?

List-I	List-II
(i) Circuit	(a) There exists a path between every distinct pair of vertices
(ii) Connected graph	(b) A path that contains every edge of a graph exactly once
(iii) Euler Path	(c) A graph that can be drawn in a plane with no crossing
(iv) Planar Graph	(d) A path that begins and ends at the same vertex

(1) (i) - (b), (ii) - (c), (iii) - (d), (iv) - (a)   (2) (i) - (d), (ii) - (b), (iii) - (a), (iv) - (c)

(3) (i) - (d), (ii) - (a), (iii) - (b), (iv) - (c)   (4) None of these

13. Which one of the following is the minimum error code ?

(1) Octal code   (2) Gray code   (3) Binary code   (4) Excess-3 code

14. The minimum number of NAND gates required to implement $A \oplus B \oplus C$ is :

(1) 8   (2) 10   (3) 9   (4) 6

15. How many 2-input multiplexes are required to construct a 2^{10}-input multiplexer ?

(1) 31   (2) 10   (3) 127   (4) 1023

16. How many 3-to-8 line decoders with an enable input are needed to construct a 6-to-64 line decoder without using any other logic gates ?

(1) 7   (2) 8   (3) 9   (4) 10

17. The values of x and y, if $(x567)_8 + (2yx5)_8 = (71yx)_8$ is :

(1) 4, 3   (2) 3, 3   (3) 4, 4   (4) 4, 5

18. A computer uses a floating-point representation comprising a signed magnitude fractional mantissa and an excess-16 base-8 exponent. What decimal number is represented by a floating-point number whose exponent is 10011, mantissa 101000, and the sign bit set ?

(1) -6250 (2) -20480 (3) -320 (4) -0.00122

19. The following program fragment in C

```
for (i = 3); i < 15; i + =3);
    printf("%d", i);
```

results in :

(1) a syntax error   (2) an execution error

(3) printing of 12   (4) printing of 15

20. The body of the following for loop

```
for (putchar ('a'); putchar(0); putchar('c'))
putchar ('b');
```

will be executed :

(1) 0 times

(2) 1 times

(3) Infinitely many times

(4) will not be executed because of syntax error

21.

```
main( )
{
    int a = 5, b = 2;
    printf("%d", a+++b);
}
```

(1) results in syntax error   (2) prints 7

(3) prints 8   (4) prints 5

4

22. The following program

```
main( )
{
    int abc ( );
    abc ( );
    (*abc) ( );
}
    int abc ( )
    { print f ("come"); }
```

(1) results in a completion error   (2) prints come

(3) prints come come   (4) results in a run time error

23. What does the following program print ?

```
# include <stdio.h>
main( )
{
    inc ( ); inc ( ); inc ( );
}
    inc ( )
{
    static int x;
    printf("%d", ++x);
}
```

(1) 012

(2) 123

(3) prints 3 consecutive, but unpredictable numbers

(4) prints 111

24. The expression 4 + 6 / 3 * 2 − 2 + 7 % 3 evalutes to :

(1) 3   (2) 4   (3) 6   (4) 7

25. The following program fragment :

```
int i = 10;

void main ( )

{
    int i = 20;

    {
        int i = 30;

        cont << i << :: i;
    }
}
```

(1) prints 3010

(2) prints 3020

(3) will result in a run time error

(4) None of the above

26. The statements

```
int a = 5;

cont << "FIRST" >> (a << 2) << "SECOND";
```

outputs :

(1) FIRST 52 SECOND

(2) FIRST 20 SECOND

(3) SECOND 25 FIRST

(4) an error message

27. Which of the following is not a storage class supported by C++ ?

(1) Register   (2) Auto   (3) Mutable   (4) Dynamic
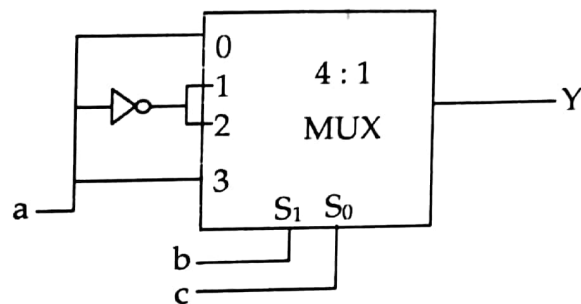
28. C front :

(1) is the front end of a C compiler

(2) is the preprocessor of a C compiler

(3) is a tool that translates a C++ code to its equivalent C code

(4) none of the above

29. The circuit is used to convert one code to another. Identify it :
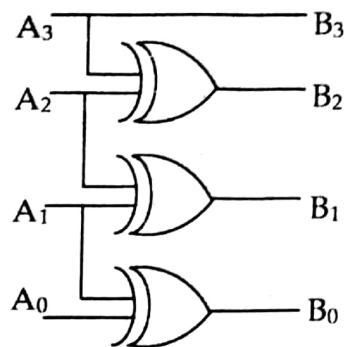
(1) Binary to Gray

(2) Gray to Binary

(3) Gray to XS-3

(4) Gray to 8421

**30.** the following multiplexer circuit is equal to :

(1) Implementation of sum equation of full adder

(2) Implementation of carry equation of full adder

(3) Implementation of borrow equation of full subtractor

(4) All of the above

the output f of the multiplexer shown below is :

32. A 4-bit MOD-16 ripple counter uses JK flip-flops. If the propagation delay of each flip-flop is 50 ns sec, the maximum clock frequency that can be used is equal to :

    (1) 2 MHz   (2) 3 MHz   (3) 5 MHz   (4) 20 MHz

33. For a given counter identify its behaviour :
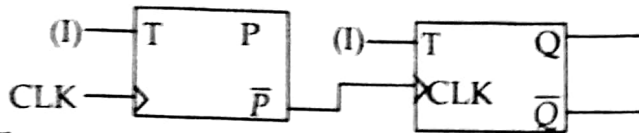
The output is taken from PQ

    (1) MOD-4 up counter   (2) MOD-2 down counter

    (3) MOD-4 down counter   (4) MOD-2 up counter

34. Consider the following two tables T_1 and T_2

T_1

P	Q	R
11	a	6
16	b	9
26	a	7

T_2

A	B	C
11	b	7
26	c	4
11	b	6

What is the number of tuples present in the result of algebraic expression ?

$$T_1 \bowtie_{(T1.P = T2.A)} T_2$$

    (1) 2   (2) 3   (3) 4   (4) 5

35. Suppose $R_1(A, B)$ and $R_2(C, D)$ are two relation schemas. Let R_1 and R_2 be the corresponding relation instances. B is a foreign key that refers to C in R_2. If data in R_1 and R_2 satisfy referential integrity constraints, which of the following is true ?

    (1) $\prod_B (R_1) - \prod_C (R_2) = \phi$ (2) $\prod_C (R_2) - \prod_B (R_1) = \phi$

    (3) $\prod_B (R_1) - \prod_C (R_2) \neq \phi$ (4) Both (1) and (2)

36. The number of entities participating in the relationship is known as :

    (1) Maximum cardinality   (2) Composite identifiers

    (3) Degree   (4) None

37. Which one is correct ?

    (1) Primary Key $\subset$ Super Key $\subset$ Candidate Key

    (2) Candidate Key $\subset$ Super Key $\subset$ Primary Key

    (3) Super Key $\subset$ Primary Key $\subset$ Candidate Key

    (4) Primary Key $\subset$ Candidate Key $\subset$ Super Key

38. For the given tables

A

X	Y
a_1	b_1
a_2	b_1
a_2	b_2
a_1	b_2

B

Y
b_1
b_2

$A \div B$ will return :

    (1) a_1, a_2 (2) a_1 (3) a_2 (4) None of these

39. Consider the join of a relation A with a relation B. If A has m tuples and B has n tuples, then the maximum and minimum sizes of the join respectively are :

    (1) mn and $m + n$ (2) $(m + n)$ and $(m - n)$

    (3) mn and m (4) mn and 0

40. Which one is *not* a query language ?

    (1) SQL   (2) QBE   (3) My SQL   (4) Data log

41. Consider the given relation and functional dependencies $R(ABC)$

$FD = (AB \rightarrow C, \ C \rightarrow A)$

The relation is in which normal form ?

    (1) 1 NF   (2) 2 NF   (3) 3 NF   (4) BCNF

42. Consider the given functional dependencies :

$AB \rightarrow CD$

$AF \rightarrow D$

$DE \rightarrow F$

$C \rightarrow G$

$F \rightarrow E$

$G \rightarrow A$

Which one of the following is false ?

    (1) $\{CF\}^+ = \{ACDFEG\}$ (2) $\{BG\}^+ = \{ABCDG\}$

    (3) $\{AB\}^+ = \{ABCDG\}$ (4) $\{AF\}^+ = \{ACDEFG\}$

43. The maximum number of superkeys for the relation schema $R(E, F, G, H)$ with E as the key is :

(1) 6 (2) 7 (3) 8 (4) 9

44. A hash function f defined as f (key) = key mod 7, with linear probing, is used to insert the keys 37, 38, 72, 48, 98, 11, 56 into a table indexed from 0 to 6. What will be the location of key 11 ?

(1) 5 (2) 6 (3) 4 (4) 3

45. Consider the following :

Block size = 1025 bytes

Record length in data file = 100 bytes

Total number of records = 30000

Search key = 9 bytes

Pointer = 6 bytes

What is the number of index blocks ?

(1) 44 (2) 45 (3) 46 (4) None

46. A file is organized so that the ordering of data records is the same as or close to the ordering of data entries in some index. Then that index is called ?

(1) Dense (2) Sparse (3) Clustered (4) Unclustered

47. B^+ trees are considered BALANCED because :

(1) The lengths of the paths from the root to all leaf nodes are all equal

(2) The lengths of the paths from the root to all leaf nodes differ from each other by at most 1

(3) The number of children of any two non-leaf sibling nodes differ by at most 1

(4) The number of records in any two leaf nodes differ by at most 1

48. For merging two sorted lists of sizes m and n into a sorted list of size $m + n$, we require comparisons of :

(1) $0(m)$ (2) $0(n)$ (3) $0(m + n)$ (4) $0(\log(m) + \log(n))$

49. A binary tree has n leaf nodes. The number of nodes of degree 2 in this tree is :

(1) $\log_2 n$ (2) $n - 1$ (3) n (4) 2^n

50. A binary search tree contains the values 1, 2, 3, 4, 5, 6, 7 and 8. The tree is traversed in preorder and the values are printed out. Which of the following sequences is a valid output ?

(1) 53124786   (2) 53126487   (3) 53241678   (4) 53124768

51. Consider the grammar

$S \rightarrow a$

$S \rightarrow ab$

The given grammar is :

(1) LR (1) only   (2) LL (1) only

(3) Both LR (1) and LL (1)   (4) LR (1) but not LL (1)

52. The FIRST and FOLLOW sets for the grammar :

$S \rightarrow SS + \mid SS^* \mid a$

(1) FIRST(S) = {a}   (2) FIRST(S) = {+}

     FOLLOW(S) = {+, *, $}   FOLLOW(S) = {+, *, $}

(3) FIRST(S) = {a}   (4) FIRST(S) = {+, *}

     FOLLOW(S) = {+, *}   FOLLOW(S) = {+, *, $}

53. YACC builds up :

(1) SLR passing table

(2) Canonical LR passing table

(3) LALR passing table

(4) None of these

54. Resolution of externally defined symbols is performed by a :

(1) Linker   (2) Loader   (3) Compiler   (4) Interpreter

55. Consider the grammar :

$S \rightarrow (S) \mid a$

Let the number of states in SLR(1), LR(1) and LALR(1) passess for the grammar be n_1, n_2 and n_3 respectively. The following relationship holds good :

(1) $n_1 < n_2 < n_3$ (2) $n_1 = n_3 < n_2$ (3) $n_1 = n_2 = n_3$ (4) $n_1 \geq n_3 \geq n_2$

56. Consider the following Syntax Directed Translation Scheme (SDTS) with non-terminals {S, A} and terminals {a, b}

$S \to aA$ {print 1]

$S \to a$ {print 2]

$A \to Sb$ {print 3]

Using the above SDTS, the output printed by a bottom-up parser, for the input *aab* is :

(1) 132   (2) 223   (3) 231   (4) Syntax error

57. Replacing the expression 2 * 3.14 by 6.28 is :

(1) Constant folding   (2) Induction variable

(3) Strength reduction   (4) Code reduction

58. The evaluation strategy which delays the evaluation of an expression until its value is needed and which avoids repeated evaluations is :

(1) Early evaluation   (2) Late evaluation

(3) Lazy evaluation   (4) Critical evaluation

59. In a two pass assembler the pseudo-code EQU is to be evaluated during :

(1) pass 1   (2) pass 2

(3) not evaluated by the assembler   (4) None of the above

60. A compiler-compiler is a :

(1) compiler which compiles a compiler program

(2) software tool used in automatic generation of a compiler

(3) compiler written in the same language it compiles

(4) another name for cross compiler

61. Which of the following system software resides in main memory always ?

(1) Text editor   (2) Assembler   (3) Linker   (4) Loader

62. Which of the following UNIX tools receives input only from the standard input ?

(1) awk   (2) grep   (3) sed   (4) tr

63. The CC command makes a total of :

(1) 1 pass   (2) 2 passes   (3) 4 passes   (4) 5 passes

64. The following C program

main( )

{

    fork ( ); fork ( ); printf ("yes");

}

prints yes :

(1) only once   (2) twice   (3) 4 times   (4) 8 times

65. Which of the following calls never returns an error ?

(1) getpid   (2) fork   (3) ioctl   (4) open

66. The following sequence of commands grep x * . c > mn &

wc – 1 mn&

rm mn&

produces the same result as the single command :

(1) grep x * . c | wc – 1   (2) wc – 1 < grep x * .c

(3) grep x *.c > wc – 1   (4) None of the above

67. A process refers to 5 pages A, B, C, D and E in the order A; B; C; D; A; B; E; A; B; C; D; E. If the page replacement is FIFO, the number of pages which transfer with an empty internal store of 3 frames is :

(1) 8   (2) 10   (3) 9   (4) 7

68. Which of the following is FALSE ?

(1) User level threads are not scheduled by the Kernel

(2) When a user level thread is blocked, all other threads of its processes are blocked

(3) Context switching between user level threads is faster than context switching between Kernel level threads

(4) Kernel level threads cannot share the code segment

69. A shared variable x, initialized to 0, is operated one by four concurrent processes W, X, Y, Z as follows :

Each of the processes W and X reads x from memory, increments by one, stores it to memory, and the then terminates. Each of the processes Y and Z reads x from memory, decrements by two, stores it to memory, and the then terminates. Each process before reading x invokes the P operation (i.e. wait) on a counting semaphore S and invokes the V operation (i.e. signal) on the semaphore S after storing x to memory. Semaphore S is initialized to 2.

What is the maximum possible value of x after all processes complete execution ?

(1) –2   (2) –1   (3) 1   (4) 2

70. To avoid the race condition, the number of processes allowed in critical section is :

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

71. Semaphore operations are atomic because they are implemented within the .... :
(1) Kernel   (2) Shell
(3) User process   (4) Normal process space

72. Which of the following scheduling algorithms could result in saturation ?
(1) First Come First Served   (2) Shortest Job First
(3) Round Robin   (4) Highest Response Ratio Next

73. The maximum number of processes that can be in ready state for a computer system with n CPUs is :
(1) n (2) n^2 (3) 2^n (4) Independent of n

74. In which of the following page replacement policies, Belady's anomaly may occur ?
(1) FIFO   (2) Optimal   (3) LRU   (4) MRU

75. Maximum data rate of channel for a noiseless 3-KHz binary channel is :
(1) 3000 bps   (2) 6000 bps   (3) 1500 bps   (4) None of the above

76. The Hamming distance between 001111 and 010011 is :
(1) 1   (2) 2   (3) 3   (4) 4

77. There are 5 routers and 6 networks in an interworking, using link state routing, how many routing tables are there ?
(1) 1   (2) 5   (3) 6   (4) 11

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P T O

78. Congestion control for multicasting flows from multiple sources to multiple destinations, the solution that can handle this is :
    (1) RSVP
    (2) Load shedding
    (3) Both (1) and (2)
    (4) None of these

79. Which one of the following protocols is **not** used to resolve one form of address to another one ?
    (1) DNS
    (2) ARP
    (3) DHCP
    (4) RARP

80. Consider the given IP address 156.216.24.65 with a subnet mark of 7-bits, what are the number of hosts and subnets ?
    (1) 512, 128
    (2) 510, 126
    (3) 511, 127
    (4) 509, 125

81. In an encryption scheme that uses RSA, values for p and q are selected to be 5 and 7 respectively. What could be the value of d ?
    (1) 12
    (2) 3
    (3) 11
    (4) 9

82. What is the size of key in triple DES ?
    (1) 168 bits
    (2) 112 bits
    (3) 56 bits
    (4) Either (1) or (2) or (3)

83. Which one of the following is **not** desired in a good SRS document ?
    (1) Functional requirements
    (2) Non-functional requirements
    (3) Goals of implementation
    (4) Algorithms for software implementation

84. According to Brooks, adding more people to an already late software project makes it :
    (1) late
    (2) fast
    (3) does not impact schedule
    (4) None of the above

85. For a real time software the KLOC is 28.2, what is the effort in person month calculated by using basic COCOMO model ?
    (1) 146
    (2) 198
    (3) 220
    (4) 248

86. 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

87. EDI over Internet uses :
    (1) MIME to attach EDI forms to e-mail messages
    (2) FTP to send business forms
    (3) HTTP to send business forms
    (4) SGML to send business forms

88. In electronic cash payment :

(1) A debit card payment system is used

(2) A credit card payment system is used

(3) RSA cryptography is used in transactions

(4) A customer buys several electronic coins which are digitally signed by coin issuing bank

89. Commonly used mode for 3G networks is :

(1) TDMA   (2) FDMA   (3) FDD   (4) TDD

90. The shape of the cellular region for maximum radio coverage is :

(1) Circular   (2) Square   (3) Oval   (4) Hexagon

91. Traffic intensity is expressed in :

(1) Erlangs

(2) Erlangs/MHz/km

(3) λ/sec

(4) dB/sec

92. Guard band is ?

(1) The channel spectrum

(2) The bandwidth allotted to signal

(3) The small unused bandwidth between the frequency channels to avoid interference

(4) The spectrum acquired by the noise between signals

93. OLE stands for :

(1) Open Linking and Embedding

(2) Objective Linking and Embedding

(3) Object Linking and Embedding

(4) Open Link and End

94. What does ERP stand for ?

(1) Expanse Research Project

(2) Enterprise Resource Planning

(3) Enterprise Research Planning

(4) Expanse Resource Project

95. Identify the correct sequence in which the following packets are transmitted on the network by a host when a browser requests a webpage from a remote server, assuming that the host has just been restarted ?
    (1) HTTP GET request, DNS query, TCP SYN
    (2) DNS query, HTTP GET request, , TCP SYN
    (3) TCP SYN, DNS query, HTTP GET request
    (4) DNS query, TCP SYN, HTTP GET request

96. Standard protocols like HTTP, SMTP, MNTP are part of :
    (1) Presentation layer
    (2) Application layer
    (3) Session layer
    (4) Not part of any layer

97. The representation of the value of a 16-bit unsigned integer X in hexadecimal number system is BCA9. The representation of the value of X in Octal number system is :
    (1) 136251
    (2) 571244
    (3) 736251
    (4) 571247

98. In data flow diagram, an originator or receiver of data is usually designed by :
    (1) Circle
    (2) Arrow
    (3) Rectangle
    (4) Square box

99. Consider the following function implemented in C :

    void print xy(int x, int y)

    {

    int * ptr;

    $x = 0$;

    $ptr = \&x$;

    $y = {}^*ptr$;

    $^*ptr = 1$;

    print f("%d%d", x, y);

    }

    the output of invoking print xy (1, 1) is :
    (1) 0, 0
    (2) 0, 1
    (3) 1, 0
    (4) 1, 1

100. Linked lists of NULL pointers to signal :
    (1) end of list
    (2) start of list
    (3) Either (1) or (2)
    (4) Neither (1) nor (2)

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

| B |

M.Phil./Ph.D./URS-EE-Nov.-2018 | SET-Y |

SUBJECT : Computer Science

100018

Sr. No. ....

Time : 1¼ **Hours**   Max. Marks : **100**   Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

Mother's Name_____ 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.*

2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilat‹ 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.

4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.

5. 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 booklet itself. Answers *must not* be ticked in the question booklet.

6. *There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.*

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8. *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.*

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1. Semaphore operations are atomic because they are implemented within the .... :
   (1) Kernel
   (2) Shell
   (3) User process
   (4) Normal process space

2. Which of the following scheduling algorithms could result in saturation ?
   (1) First Come First Served
   (2) Shortest Job First
   (3) Round Robin
   (4) Highest Response Ratio Next

3. The maximum number of processes that can be in ready state for a computer system with n CPUs is :
   (1) n
   (2) n^2
   (3) 2^n
   (4) Independent of n

4. In which of the following page replacement policies, Belady's anomaly may occur ?
   (1) FIFO
   (2) Optimal
   (3) LRU
   (4) MRU

5. Maximum data rate of channel for a noiseless 3-KHz binary channel is :
   (1) 3000 bps
   (2) 6000 bps
   (3) 1500 bps
   (4) None of the above

6. The Hamming distance between 001111 and 010011 is :
   (1) 1
   (2) 2
   (3) 3
   (4) 4

7. There are 5 routers and 6 networks in an interworking, using link state routing, how many routing tables are there ?
   (1) 1
   (2) 5
   (3) 6
   (4) 11

8. Congestion control for multicasting flows from multiple sources to multiple destinations, the solution that can handle this is :
   (1) RSVP
   (2) Load shedding
   (3) Both (1) and (2)
   (4) None of these

9. Which one of the following protocols is *not* used to resolve one form of address to another one ?
   (1) DNS
   (2) ARP
   (3) DHCP
   (4) RARP

10. Consider the given IP address 156.216.24.65 with a subnet mark of 7-bits, what are the number of hosts and subnets ?
    (1) 512, 128
    (2) 510, 126
    (3) 511, 127
    (4) 509, 125

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P. T. O.

11. Consider the grammar

$S \rightarrow a$

$S \rightarrow ab$

The given grammar is :

(1) LR (1) only

(2) LL (1) only

(3) Both LR (1) and LL (1)

(4) LR (1) but not LL (1)

12. The FIRST and FOLLOW sets for the grammar :

$S \rightarrow SS + \,|\, SS^* \,|\, a$

(1) FIRST(S) = {a}
    FOLLOW(S) = {+, *, $}

(2) FIRST(S) = {+}
    FOLLOW(S) = {+, *, $}

(3) FIRST(S) = {a}
    FOLLOW(S) = {+, *}

(4) FIRST(S) = {+, *}
    FOLLOW(S) = {+, *, $}

13. YACC builds up :

(1) SLR passing table

(2) Canonical LR passing table

(3) LALR passing table

(4) None of these

14. Resolution of externally defined symbols is performed by a :

(1) Linker   (2) Loader   (3) Compiler   (4) Interpreter

15. Consider the grammar :

$S \rightarrow (S) \,|\, a$

Let the number of states in SLR(1), LR(1) and LALR(1) passess for the grammar be n_1, n_2 and n_3 respectively. The following relationship holds good :

(1) $n_1 < n_2 < n_3$ (2) $n_1 = n_3 < n_2$ (3) $n_1 = n_2 = n_3$ (4) $n_1 \geq n_3 \geq n_2$

16. Consider the following Syntax Directed Translation Scheme (SDTS) with non-terminals {S, A} and terminals {a, b}

$S \rightarrow aA$ {print 1}

$S \rightarrow a$ {print 2}

$A \rightarrow Sb$ {print 3}

Using the above SDTS, the output printed by a bottom-up parser, for the input aab is :

(1) 132   (2) 223   (3) 231   (4) Syntax error

17. Replacing the expression 2 * 3.14 by 6.28 is :
  (1) Constant folding
  (2) Induction variable
  (3) Strength reduction
  (4) Code reduction

18. The evaluation strategy which delays the evaluation of an expression until its value is needed and which avoids repeated evaluations is :
  (1) Early evaluation
  (2) Late evaluation
  (3) Lazy evaluation
  (4) Critical evaluation

19. In a two pass assembler the pseudo-code EQU is to be evaluated during :
  (1) pass 1
  (2) pass 2
  (3) not evaluated by the assembler
  (4) None of the above

20. A compiler-compiler is a :
  (1) compiler which compiles a compiler program
  (2) software tool used in automatic generation of a compiler
  (3) compiler written in the same language it compiles
  (4) another name for cross compiler

21. The Boolean expression for the output f of the multiplexer shown below is :
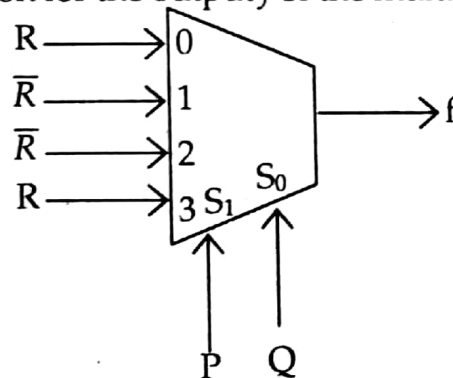
  (1) $\overline{P \oplus Q \oplus R}$
  (2) $P \oplus Q \oplus R$
  (3) $P + Q + R$
  (4) $\overline{P + Q + R}$

22. A 4-bit MOD-16 ripple counter uses JK flip-flops. If the propagation delay of each flip-flop is 50 ns sec, the maximum clock frequency that can be used is equal to :
  (1) 2 MHz
  (2) 3 MHz
  (3) 5 MHz
  (4) 20 MHz

23. For a given counter identify its behaviour :
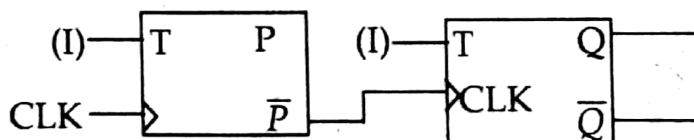
  The output is taken from PQ
  (1) MOD-4 up counter
  (2) MOD-2 down counter
  (3) MOD-4 down counter
  (4) MOD-2 up counter

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24. Consider the following two tables T_1 and T_2

T_1

P	Q	R
11	a	6
16	b	9
26	a	7

T_2

A	B	C
11	b	7
26	c	4
11	b	6

What is the number of tuples present in the result of algebraic expression ?

$$T_1 \bowtie_{(T1.P = T2.A)} T_2$$

(1) 2 (2) 3 (3) 4 (4) 5

25. Suppose $R_1(A, B)$ and $R_2(C, D)$ are two relation schemas. Let R_1 and R_2 be the corresponding relation instances. B is a foreign key that refers to C in R_2. If data in R_1 and R_2 satisfy referential integrity constraints, which of the following is true ?

(1) $\prod_B (R_1) - \prod_C (R_2) = \phi$ (2) $\prod_C (R_2) - \prod_B (R_1) = \phi$

(3) $\prod_B (R_1) - \prod_C (R_2) \neq \phi$ (4) Both (1) and (2)

26. The number of entities participating in the relationship is known as :
(1) Maximum cardinality (2) Composite identifiers
(3) Degree (4) None

27. Which one is correct ?
(1) Primary Key $\subset$ Super Key $\subset$ Candidate Key
(2) Candidate Key $\subset$ Super Key $\subset$ Primary Key
(3) Super Key $\subset$ Primary Key $\subset$ Candidate Key
(4) Primary Key $\subset$ Candidate Key $\subset$ Super Key

28. For the given tables

A

X	Y
a_1	b_1
a_2	b_1
a_2	b_2
a_1	b_2

B

Y
b_1
b_2

$A \div B$ will return :

(1) a_1, a_2 (2) a_1 (3) a_2 (4) None of these

29. Consider the join of a relation A with a relation B. If A has m tuples and B has n tuples, then the maximum and minimum sizes of the join respectively are :

(1) mn and $m + n$ (2) $(m + n)$ and $(m - n)$

(3) mn and m (4) mn and 0

30. Which one is *not* a query language ?

(1) SQL   (2) QBE   (3) My SQL   (4) Data log

31. A wheel graph with eleven vertices has a chromatic number of :

(1) 3   (2) 4   (3) 2   (4) None of these

32. Which of the following is a correct match ?

List-I	List-II
(i) Circuit	(a) There exists a path between every distinct pair of vertices
(ii) Connected graph	(b) A path that contains every edge of a graph exactly once
(iii) Euler Path	(c) A graph that can be drawn in a plane with no crossing
(iv) Planar Graph	(d) A path that begins and ends at the same vertex

(1) (i) - (b), (ii) - (c), (iii) - (d), (iv) - (a)   (2) (i) - (d), (ii) - (b), (iii) - (a), (iv) - (c)

(3) (i) - (d), (ii) - (a), (iii) - (b), (iv) - (c)   (4) None of these

33. Which one of the following is the minimum error code ?

(1) Octal code   (2) Gray code   (3) Binary code   (4) Excess-3 code

34. The minimum number of NAND gates required to implement $A \oplus B \oplus C$ is :

(1) 8   (2) 10   (3) 9   (4) 6

35. How many 2-input multiplexers are required to construct a 2^{10}-input multiplexer ?

(1) 31   (2) 10   (3) 127   (4) 1023

36. How many 3-to-8 line decoders with an enable input are needed to construct a 6-to-64 line decoder without using any other logic gates ?

(1) 7   (2) 8   (3) 9   (4) 10

37. The values of x and y, if $(x567)_8 + (2yx5)_8 = (71yx)_8$ is :

(1) 4, 3   (2) 3, 3   (3) 4, 4   (4) 4, 5

38. A computer uses a floating-point representation comprising a signed magnitude fractional mantissa and an excess-16 base-8 exponent. What decimal number is represented by a floating-point number whose exponent is 10011, mantissa 101000, and the sign bit set ?

(1) -6250 (2) -20480 (3) -320 (4) -0.00122

39. The following program fragment in C
    for (i = 3); i < 15; i + =3);
         printf("%d", i);
    results in :
    (1) a syntax error
    (2) an execution error
    (3) printing of 12
    (4) printing of 15

40. The body of the following for loop
    for (putchar ('a'); putchar(0); putchar('c'))
    putchar ('b');
    will be executed :
    (1) 0 times
    (2) 1 times
    (3) Infinitely many times
    (4) will not be executed because of syntax error

41. Traffic intensity is expressed in :
    (1) Erlangs
    (2) Erlangs/MHz/km
    (3) λ/sec
    (4) dB/sec

42. Guard band is ?
    (1) The channel spectrum
    (2) The bandwidth allotted to signal
    (3) The small unused bandwidth between the frequency channels to avoid interference
    (4) The spectrum acquired by the noise between signals

43. OLE stands for :
    (1) Open Linking and Embedding
    (2) Objective Linking and Embedding
    (3) Object Linking and Embedding
    (4) Open Link and End

44. What does ERP stand for ?
    (1) Expanse Research Project
    (2) Enterprise Resource Planning
    (3) Enterprise Research Planning
    (4) Expanse Resource Project

45. Identify the correct sequence in which the following packets are transmitted on the network by a host when a browser requests a webpage from a remote server, assuming that the host has just been restarted ?

(1) HTTP GET request, DNS query, TCP SYN

(2) DNS query, HTTP GET request, , TCP SYN

(3) TCP SYN, DNS query, HTTP GET request

(4) DNS query, TCP SYN, HTTP GET request

46. Standard protocols like HTTP, SMTP, MNTP are part of :

(1) Presentation layer (2) Application layer

(3) Session layer (4) Not part of any layer

47. The representation of the value of a 16-bit unsigned integer X in hexadecimal number system is BCA9. The representation of the value of X in Octal number system is :

(1) 136251 (2) 571244 (3) 736251 (4) 571247

48. In data flow diagram, an originator or receiver of data is usually designed by :

(1) Circle (2) Arrow (3) Rectangle (4) Square box

49. Consider the following function implemented in C :

```
void print xy(int x, int y)
{
     int * ptr;
     x = 0;
     ptr = &x;
     y = *ptr;
     *ptr = 1;
     print f("%d%d", x, y);
}
```

the output of invoking print xy (1, 1) is :

(1) 0, 0 (2) 0, 1 (3) 1, 0 (4) 1, 1

50. Linked lists of NULL pointers to signal :

(1) end of list (2) start of list

(3) Either (1) or (2) (4) Neither (1) nor (2)

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51. Which of the following system software resides in main memory always ?

(1) Text editor (2) Assembler (3) Linker (4) Loader

52. Which of the following UNIX tools receives input only from the standard input ?

(1) awk (2) grep (3) sed (4) tr

53. The CC command makes a total of :

(1) 1 pass (2) 2 passes (3) 4 passes (4) 5 passes

54. The following C program

main( )

{

    fork ( ); fork ( ); printf ("yes");

}

prints yes :

(1) only once (2) twice (3) 4 times (4) 8 times

55. Which of the following calls never returns an error ?

(1) getpid (2) fork (3) ioctl (4) open

56. The following sequence of commands grep x * . c > mn &

wc – 1 mn&

rm mn&

produces the same result as the single command :

(1) grep x * . c | wc – 1 (2) wc – 1 < grep x * .c

(3) grep x *.c > wc – 1 (4) None of the above

57. A process refers to 5 pages A, B, C, D and E in the order A; B; C; D; A; B; E; A; B; C; D; E. If the page replacement is FIFO, the number of pages which transfer with an empty internal store of 3 frames is :

(1) 8 (2) 10 (3) 9 (4) 7

58. Which of the following is FALSE ?
(1) User level threads are not scheduled by the Kernel
(2) When a user level thread is blocked, all other threads of its processes are blocked
(3) Context switching between user level threads is faster than context switching between Kernel level threads
(4) Kernel level threads cannot share the code segment

59. A shared variable x, initialized to 0, is operated one by four concurrent processes W, X, Y, Z as follows :

Each of the processes W and X reads x from memory, increments by one, stores it to memory, and the then terminates. Each of the processes Y and Z reads x from memory, decrements by two, stores it to memory, and the then terminates. Each process before reading x invokes the P operation (i.e. wait) on a counting semaphore S and invokes the V operation (i.e. signal) on the semaphore S after storing x to memory. Semaphore S is initialized to 2.

What is the maximum possible value of x after all processes complete execution ?

(1) –2   (2) –1   (3) 1   (4) 2

60. To avoid the race condition, the number of processes allowed in critical section is :

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

61. In an encryption scheme that uses RSA, values for p and q are selected to be 5 and 7 respectively. What could be the value of d ?
(1) 12   (2) 3   (3) 11   (4) 9

62. What is the size of key in triple DES ?
(1) 168 bits   (2) 112 bits   (3) 56 bits   (4) Either (1) or (2) or (3)

63. Which one of the following is *not* desired in a good SRS document ?
(1) Functional requirements   (2) Non-functional requirements
(3) Goals of implementation   (4) Algorithms for software implementation

64. According to Brooks, adding more people to an already late software project makes it :
(1) late   (2) fast
(3) does not impact schedule   (4) None of the above

65. For a real time software the KLOC is 28.2, what is the effort in person month calculated by using basic COCOMO model ?
(1) 146   (2) 198   (3) 220   (4) 248

66. 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

67. EDI over Internet uses :
(1) MIME to attach EDI forms to e-mail messages
(2) FTP to send business forms
(3) HTTP to send business forms
(4) SGML to send business forms

68. In electronic cash payment :
(1) A debit card payment system is used
(2) A credit card payment system is used
(3) RSA cryptography is used in transactions
(4) A customer buys several electronic coins which are digitally signed by coin issuing bank

69. Commonly used mode for 3G networks is :
(1) TDMA   (2) FDMA   (3) FDD   (4) TDD

70. The shape of the cellular region for maximum radio coverage is :
(1) Circular   (2) Square   (3) Oval   (4) Hexagon

71. Consider the given relation and functional dependencies $R(ABC)$
$FD = (AB \rightarrow C,\ C \rightarrow A)$
The relation is in which normal form ?
(1) 1 NF   (2) 2 NF   (3) 3 NF   (4) BCNF

72. Consider the given functional dependencies :
$AB \rightarrow CD$
$AF \rightarrow D$
$DE \rightarrow F$
$C \rightarrow G$
$F \rightarrow E$
$G \rightarrow A$
Which one of the following is false ?
(1) $\{CF\}^{+} = \{ACDFEG\}$
(2) $\{BG\}^{+} = \{ABCDG\}$
(3) $\{AB\}^{+} = \{ABCDG\}$
(4) $\{AF\}^{+} = \{ACDEFG\}$

73. The maximum number of superkeys for the relation schema $R(E, F, G, H)$ with E as the key is :

(1) 6   (2) 7   (3) 8   (4) 9

74. A hash function f defined as $f(\text{key}) = \text{key} \mod 7$, with linear probing, is used to insert the keys 37, 38, 72, 48, 98, 11, 56 into a table indexed from 0 to 6. What will be the location of key 11 ?

(1) 5   (2) 6   (3) 4   (4) 3

75. Consider the following :

Block size = 1025 bytes

Record length in data file = 100 bytes

Total number of records = 30000

Search key = 9 bytes

Pointer = 6 bytes

What is the number of index blocks ?

(1) 44   (2) 45   (3) 46   (4) None

76. A file is organized so that the ordering of data records is the same as or close to the ordering of data entries in some index. Then that index is called ?

(1) Dense   (2) Sparse   (3) Clustered   (4) Unclustered

77. B^+ trees are considered BALANCED because :

(1) The lengths of the paths from the root to all leaf nodes are all equal

(2) The lengths of the paths from the root to all leaf nodes differ from each other by at most 1

(3) The number of children of any two non-leaf sibling nodes differ by at most 1

(4) The number of records in any two leaf nodes differ by at most 1

78. For merging two sorted lists of sizes m and n into a sorted list of size $m + n$, we require comparisons of :

(1) $0(m)$ (2) $0(n)$ (3) $0(m + n)$ (4) $0(\log(m) + \log(n))$

79. A binary tree has n leaf nodes. The number of nodes of degree 2 in this tree is :

(1) $\log_2 n$ (2) $n - 1$ (3) n (4) 2^n

80. A binary search tree contains the values 1, 2, 3, 4, 5, 6, 7 and 8. The tree is traversed in preorder and the values are printed out. Which of the following sequences is a valid output ?

   (1) 53124786   (2) 53126487   (3) 53241678   (4) 53124768

81.
```
main( )
{
    int a = 5, b = 2;
    printf("%d", a+++b);
}
```
   (1) results in syntax error   (2) prints 7

   (3) prints 8   (4) prints 5

82. The following program
```
main( )
{
    int abc ( );
    abc ( );
    (*abc) ( );
}

int abc ( )
{ print f ("come"); }
```
   (1) results in a completion error   (2) prints come

   (3) prints come come   (4) results in a run time error

83. What does the following program print ?
```
# include <stdio.h>
main( )
{
    inc ( ); inc ( ); inc ( );
}
    inc ( )
{
    static int x;
    printf("%d", ++x);
}
```
   (1) 012

   (2) 123

   (3) prints 3 consecutive, but unpredictable numbers

   (4) prints 111

84. The expression 4 + 6 / 3 * 2 – 2 + 7 % 3 evalutes to :

   (1) 3   (2) 4   (3) 6   (4) 7

85. The following program fragment :

```
int i = 10;

void main ( )

{

    int i = 20;

    {

        int i = 30;

        cont << i << :: i;

    }

}
```

   (1) prints 3010   (2) prints 3020

   (3) will result in a run time error   (4) None of the above

86. The statements

```
int a = 5;

cont << "FIRST" >> (a << 2) << "SECOND";
```

outputs :

   (1) FIRST 52 SECOND   (2) FIRST 20 SECOND

   (3) SECOND 25 FIRST   (4) an error message

87. Which of the following is not a storage class supported by C++ ?

   (1) Register   (2) Auto   (3) Mutable   (4) Dynamic

88. C front :

   (1) is the front end of a C compiler

   (2) is the preprocessor of a C compiler

   (3) is a tool that translates a C++ code to its equivalent C code

   (4) none of the above

89. The circuit is used to convert one code to another. Identify it :
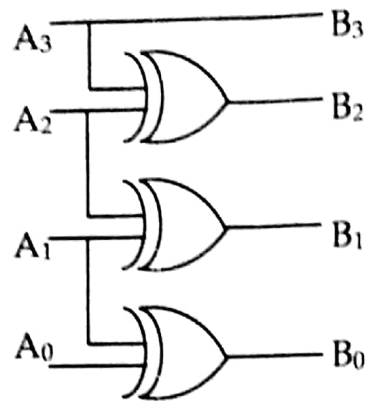
(1) Binary to Gray

(2) Gray to Binary

(3) Gray to XS-3

(4) Gray to 8421

90. the following multiplexer circuit is equal to :
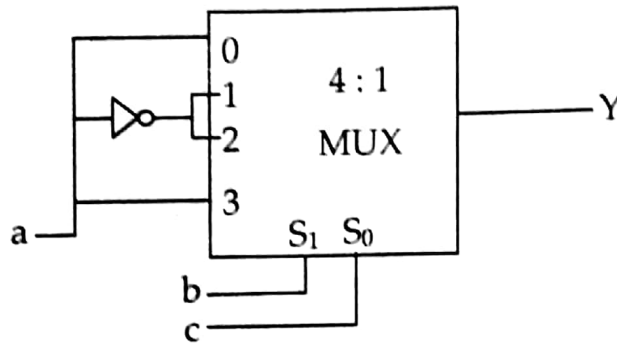
(1) Implementation of sum equation of full adder

(2) Implementation of carry equation of full adder

(3) Implementation of borrow equation of full subtractor

(4) All of the above

91. Let P, Q and R be three atomic prepositional assertions. Let X denote $(P \lor Q) \to R$ and Y denote $(P \to R) \lor (Q \to R)$. Which one of the following is a tautology ?

(1) $X \leftrightarrow Y$ (2) $Y \to X$ (3) $X \to Y$ (4) $\sim Y \to X$

92. Which one of the following well-formed formulae in predicate calculus is **not** valid ?

(1) $(\forall x\, p(x) \Rightarrow \forall x\, q(x)) \Rightarrow (\exists x \sim p(x) \lor \forall x\, q(x))$

(2) $(\exists x\, p(x) \lor \exists x\, q(x)) \Rightarrow \exists x\, (p(x) \lor q(x))$

(3) $\exists x\, (p(x) \land q(x)) \Rightarrow (\exists x\, p(x) \land \exists x\, q(x))$

(4) $\forall x\, (p(x) \lor q(x)) \Rightarrow (\forall x\, p(x) \lor \forall x\, q(x))$

93. Akshay speaks the truth in 45% of the cases. In a rainy season, on each day there is a 75% chance of raining. On a certain day in the rainy season, Akshay tells his mother that it is raining outside. What is the probability that it is actually raining ?

(1) $\dfrac{27}{38}$ (2) $\dfrac{25}{35}$ (3) $\dfrac{31}{36}$ (4) $\dfrac{52}{128}$

94. Two n bit binary strings S_1 and S_2 are chosen randomly with uniform probability. The probability that Hamming distance between these strings (the number of bit positions where the two strings differ) is equal to d is :

(1) $\dfrac{{}^{n}C_d}{2^n}$ (2) $\dfrac{{}^{n}C_d}{2^d}$ (3) $\dfrac{d}{2^n}$ (4) $\dfrac{1}{2^d}$

95. $f(x)$ and $g(x)$ are two functions differentiable in $[0, 1]$ such that $f(0) = 2$; $g(0) = 0$; $f(1) = 6$; and $g(1) = 2$. Then these must exist a constant C in :

(1) $(0, 1)$ such that $f'(c) = 2g'(c)$ (2) $[0, 1]$ such that $f'(c) = 2g'(c)$

(3) $(0, 1)$ such that $2f'(c) = g'(c)$ (4) $[0, 1]$ such that $2f'(c) = g'(c)$

96. $(G, *)$ is an abelian group. Then :

(1) $x = x^{-1}$, for any x belonging to G

(2) $x = x^2$, for any x belonging to G

(3) $(x * y)^2 = x^2 * y^2$, for any x, y belonging to G

(4) G is of finite order

97. The number of equivalence relations of the set $[1, 2, 3, 4]$ is :

(1) 15   (2) 16   (3) 24   (4) 4

98. In a set of integers, a relation R is defined as aRb, if and only if $b = |a|$. This relation is :

(1) Reflexive   (2) Irreflexive   (3) Symmetric   (4) Anti-symmetric

99. Which of the following statements is true ?

P : All totally ordered sets have least elements.

Q : The Hasse diagram of a totally ordered set is a line.

(1) P alone   (2) Q alone   (3) Both P and Q   (4) Neither P nor Q

100. Let *M* be a 3 × 3 adjacency matrix corresponding to a given graph of three nodes labeled 1, 2, 3. If entry (1, 3) in M^3 is 2, then the graph could be :

(1)

(2)

(3)

(4)

Total No. of Printed Pages : 17
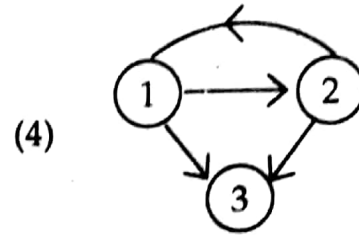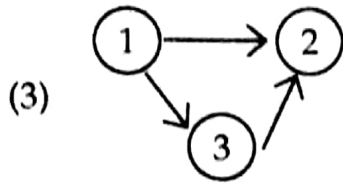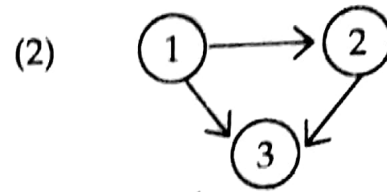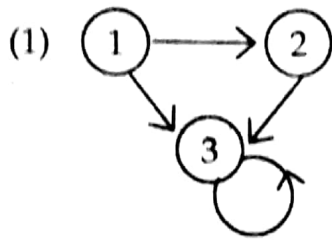
(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

C

SET-Y

M.Phil./Ph.D./URS-EE-Nov.-2018
SUBJECT : Computer Science

Sr. No. **100011**

Time : 1¼ Hours   Max. Marks : **100**   Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

Mother's Name_____ Date of Examination_____

_____
(Signature of the Candidate)

_____
(Signature of the Invigilator)

SEAL

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

1. *All questions are compulsory.*

2. The candidates *must return* the question booklet 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.

4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.

5. 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 booklet itself. Answers *must not* be ticked in the question booklet.

6. *There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.*

7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.

8. 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.

M.Phil./Ph.D./URS-EE-Nov.-2018/(Computer Sci.)(SET-Y)/(C)

C   **1**

1. Consider the given relation and functional dependencies $R(ABC)$

   $FD = (AB \rightarrow C, \ C \rightarrow A)$

   The relation is in which normal form ?

   (1) 1 NF   (2) 2 NF   (3) 3 NF   (4) BCNF

2. Consider the given functional dependencies :

   $AB \rightarrow CD$

   $AF \rightarrow D$

   $DE \rightarrow F$

   $C \rightarrow G$

   $F \rightarrow E$

   $G \rightarrow A$

   Which one of the following is false ?

   (1) $\{CF\}^+ = \{ACDFEG\}$ (2) $\{BG\}^+ = \{ABCDG\}$

   (3) $\{AB\}^+ = \{ABCDG\}$ (4) $\{AF\}^+ = \{ACDEFG\}$

3. The maximum number of super-keys for the relation schema $R(E, F, G, H)$ with E as the key is :

   (1) 6   (2) 7   (3) 8   (4) 9

4. A hash function f defined as f (key) = key mod 7, with linear probing, is used to insert the keys 37, 38, 72, 48, 98, 11, 56 into a table indexed from 0 to 6. What will be the location of key 11 ?

   (1) 5   (2) 6   (3) 4   (4) 3

5. Consider the following :

   Block size = 1025 bytes

   Record length in data file = 100 bytes

   Total number of records = 30000

   Search key = 9 bytes

   Pointer = 6 bytes

   What is the number of index blocks ?

   (1) 44   (2) 45   (3) 46   (4) None

6. A file is organized so that the ordering of data records is the same as or close to the ordering of data entries in some index. Then that index is called ?

   (1) Dense   (2) Sparse   (3) Clustered   (4) Unclustered

7. B^+ trees are considered BALANCED because :
   (1) The lengths of the paths from the root to all leaf nodes are all equal
   (2) The lengths of the paths from the root to all leaf nodes differ from each other by at most 1
   (3) The number of children of any two non-leaf sibling nodes differ by at most 1
   (4) The number of records in any two leaf nodes differ by at most 1

8. For merging two sorted lists of sizes m and n into a sorted list of size $m + n$, we require comparisons of :

   (1) $0(m)$ (2) $0(n)$ (3) $0(m + n)$ (4) $0(\log(m) + \log(n))$

9. A binary tree has n leaf nodes. The number of nodes of degree 2 in this tree is :

   (1) $\log_2 n$ (2) $n - 1$ (3) n (4) 2^n

10. A binary search tree contains the values 1, 2, 3, 4, 5, 6, 7 and 8. The tree is traversed in preorder and the values are printed out. Which of the following sequences is a valid output ?

    (1) 53124786   (2) 53126487   (3) 53241678   (4) 53124768

11.
```
main( )
{
    int a = 5, b = 2;
    printf("%d", a+++b);
}
```
    (1) results in syntax error   (2) prints 7
    (3) prints 8   (4) prints 5

12. The following program
```
main( )
{
    int abc ( );
    abc ( );
    (*abc) ( );
}
    int abc ( )
    { print f ("come"); }
```
    (1) results in a completion error   (2) prints come
    (3) prints come come   (4) results in a run time error

13. What does the following program print ?

```
# include <stdio.h>
main( )
{
    inc ( ); inc ( ); inc ( );
}
    inc ( )
{
    static int x;
    printf("%d", ++x);
}
```

(1) 012

(2) 123

(3) prints 3 consecutive, but unpredictable numbers

(4) prints 111

14. The expression $4 + 6 / 3 * 2 - 2 + 7 \% 3$ evalutes to :

    (1) 3   (2) 4   (3) 6   (4) 7

15. The following program fragment :

```
int i = 10;
void main ( )
{
    int i = 20;
    {
        int i = 30;
        cont << i << :: i;
    }
}
```

(1) prints 3010   (2) prints 3020

(3) will result in a run time error   (4) None of the above

4

16. The statements
    int $a = 5$;
    cont << "FIRST" >> $(a << 2)$ << "SECOND";
    outputs :
    (1) FIRST 52 SECOND
    (2) FIRST 20 SECOND
    (3) SECOND 25 FIRST
    (4) an error message

17. Which of the following is not a storage class supported by C++ ?
    (1) Register   (2) Auto   (3) Mutable   (4) Dynamic

18. C front :
    (1) is the front end of a C compiler
    (2) is the preprocessor of a C compiler
    (3) is a tool that translates a C++ code to its equivalent C code
    (4) none of the above

19. The circuit is used to convert one code to another. Identify it :
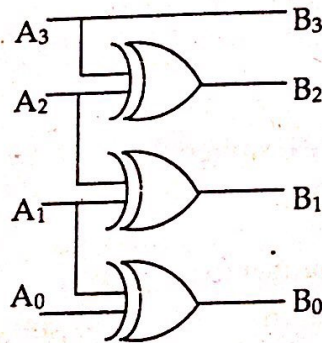
    (1) Binary to Gray
    (2) Gray to Binary
    (3) Gray to XS-3
    (4) Gray to 8421

20. the following multiplexer circuit is equal to :
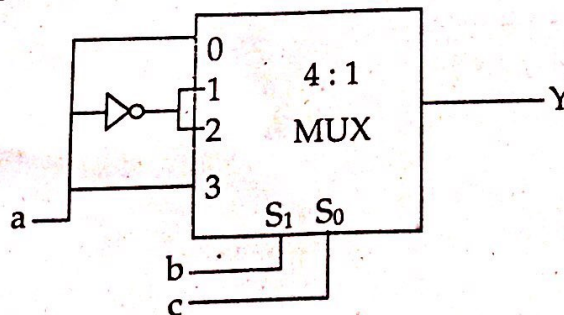
    (1) Implementation of sum equation of full adder
    (2) Implementation of carry equation of full adder
    (3) Implementation of borrow equation of full subtractor
    (4) All of the above

21. Let P, Q and R be three atomic prepositional assertions. Let X denote $(P \lor Q) \to R$ and Y denote $(P \to R) \lor (Q \to R)$. Which one of the following is a tautology ?

(1) $X \leftrightarrow Y$ (2) $Y \to X$ (3) $X \to Y$ (4) $\sim Y \to X$

22. Which one of the following well-formed formulae in predicate calculus is *not* valid ?

(1) $(\forall x\, p(x) \Rightarrow \forall x\, q(x)) \Rightarrow (\exists x \sim p(x) \lor \forall x\, mq(x))$

(2) $(\exists x\, p(x) \lor \exists x\, q(x)) \Rightarrow \exists x\, (p(x) \lor q(x)))$

(3) $\exists x\, (p(x) \land q(x)) \Rightarrow (\exists x\, p(x) \land \exists x\, q(x))$

(4) $\forall x\, (p(x) \lor q(x)) \Rightarrow (\forall x\, p(x) \lor \forall x\, q(x))$

23. Akshay speaks the truth in 45% of the cases. In a rainy season, on each day there is a 75% chance of raining. On a certain day in the rainy season, Akshay tells his mother that it is raining outside. What is the probability that it is actually raining ?

(1) $\dfrac{27}{38}$ (2) $\dfrac{25}{35}$ (3) $\dfrac{31}{36}$ (4) $\dfrac{52}{128}$

24. Two n bit binary strings S_1 and S_2 are chosen randomly with uniform probability. The probability that Hamming distance between these strings (the number of bit positions where the two strings differ) is equal to d is :

(1) $\dfrac{^nC_d}{2^n}$ (2) $\dfrac{^nC_d}{2^d}$ (3) $\dfrac{d}{2^n}$ (4) $\dfrac{1}{2^d}$

25. $f(x)$ and $g(x)$ are two functions differentiable in [0, 1] such that $f(0) = 2$; $g(0) = 0$; $f(1) = 6$; and $g(1) = 2$. Then these must exist a constant C in :

(1) (0, 1) such that $f'(c) = 2g'(c)$ (2) [0, 1] such that $f'(c) = 2g'(c)$

(3) (0, 1) such that $2f'(c) = g'(c)$ (4) [0, 1] such that $2f'(c) = g'(c)$

26. $(G, *)$ is an abelian group. Then :

(1) $x = x^{-1}$, for any x belonging to G

(2) $x = x^2$, for any x belonging to G

(3) $(x*y)^2 = x^2 * y^2$, for any x, y belonging to G

(4) G is of finite order

27. The number of equivalence relations of the set [1, 2, 3, 4] is :

(1) 15   (2) 16   (3) 24   (4) 4

28. In a set of integers, a relation R is defined as aRb, if and only if $b = |a|$. This relation is :

(1) Reflexive   (2) Irreflexive   (3) Symmetric   (4) Anti-symmetric
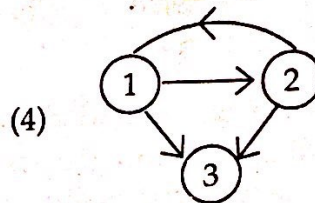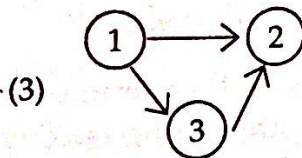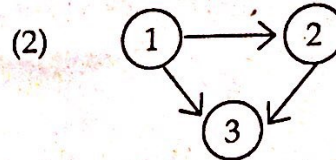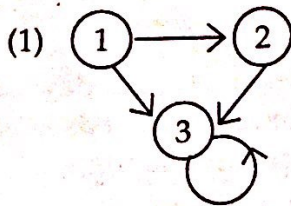
6

29. Which of the following statements is true ?
    P : All totally ordered sets have least elements.
    Q : The Hasse diagram of a totally ordered set is a line.
    (1) P alone   (2) Q alone   (3) Both P and Q   (4) Neither P nor Q

30. Let M be a 3×3 adjacency matrix corresponding to a given graph of three nodes labeled 1, 2, 3. If entry (1, 3) in M^3 is 2, then the graph could be :

31. Traffic intensity is expressed in :
    (1) Erlangs   (2) Erlangs/MHz/km
    (3) λ/sec   (4) dB/sec

32. Guard band is ?
    (1) The channel spectrum
    (2) The bandwidth allotted to signal
    (3) The small unused bandwidth between the frequency channels to avoid interference
    (4) The spectrum acquired by the noise between signals

33. OLE stands for :
    (1) Open Linking and Embedding
    (2) Objective Linking and Embedding
    (3) Object Linking and Embedding
    (4) Open Link and End

34. What does ERP stand for ?
    (1) Expanse Research Project
    (2) Enterprise Resource Planning
    (3) Enterprise Research Planning
    (4) Expanse Resource Project

35. Identify the correct sequence in which the following packets are transmitted on the network by a host when a browser requests a webpage from a remote server, assuming that the host has just been restarted ?
(1) HTTP GET request, DNS query, TCP SYN
(2) DNS query, HTTP GET request, , TCP SYN
(3) TCP SYN, DNS query, HTTP GET request
(4) DNS query, TCP SYN, HTTP GET request

36. Standard protocols like HTTP, SMTP, MNTP are part of :
(1) Presentation layer
(2) Application layer
(3) Session layer
(4) Not part of any layer

37. The representation of the value of a 16-bit unsigned integer X in hexadecimal number system is BCA9. The representation of the value of X in Octal number system is :
(1) 136251
(2) 571244
(3) 736251
(4) 571247

38. In data flow diagram, an originator or receiver of data is usually designed by :
(1) Circle
(2) Arrow
(3) Rectangle
(4) Square box

39. Consider the following function implemented in C :

```
void print xy(int x, int y)

{
        int * ptr;
        x = 0;
        ptr = &x;
        y = *ptr;
        *ptr = 1;
        print f("%d%d", x, y);
}
```

the output of invoking print xy (1, 1) is :
(1) 0, 0
(2) 0, 1
(3) 1, 0
(4) 1, 1

40. Linked lists of NULL pointers to signal :
(1) end of list
(2) start of list
(3) Either (1) or (2)
(4) Neither (1) nor (2)

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P. T. O.

Scanned with CamScanner

41. Which of the following system software resides in main memory always ?
    (1) Text editor   (2) Assembler   (3) Linker   (4) Loader

42. Which of the following UNIX tools receives input only from the standard input ?
    (1) awk   (2) grep   (3) sed   (4) tr

43. The CC command makes a total of :
    (1) 1 pass   (2) 2 passes   (3) 4 passes   (4) 5 passes

44. The following C program

    main( )

    {

        fork ( ); fork ( ); printf ("yes");

    }

    prints yes :

    (1) only once   (2) twice   (3) 4 times   (4) 8 times

45. Which of the following calls never returns an error ?.
    (1) getpid   (2) fork   (3) ioctl   (4) open

46. The following sequence of commands grep x * . c > mn &

    wc – 1 mn&

    rm mn&

    produces the same result as the single command :

    (1) grep x * . c | wc – 1   (2) wc – 1 < grep x * .c

    (3) grep x *.c > wc – 1   (4) None of the above

47. A process refers to 5 pages A, B, C, D and E in the order A; B; C; D; A; B; E; A; B; C; D; E. If the page replacement is FIFO, the number of pages which transfer with an empty internal store of 3 frames is :
    (1) 8 .   (2) 10   (3) 9   (4) 7

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48. Which of the following is FALSE ?

(1) User level threads are not scheduled by the Kernel

(2) When a user level thread is blocked, all other threads of its processes are blocked

(3) Context switching between user level threads is faster than context switching between Kernel level threads

(4) Kernel level threads cannot share the code segment

49. A shared variable x, initialized to 0, is operated one by four concurrent processes W, X, Y, Z as follows :

Each of the processes W and X reads x from memory, increments by one, stores it to memory, and the then terminates. Each of the processes Y and Z reads x from memory, decrements by two, stores it to memory, and the then terminates. Each process before reading x invokes the P operation (i.e. wait) on a counting semaphore S and invokes the V operation (i.e. signal) on the semaphore S after storing x to memory. Semaphore S is initialized to 2.

What is the maximum possible value of x after all processes complete execution ?

(1) −2   (2) −1   (3) 1   (4) 2

50. To avoid the race condition, the number of processes allowed in critical section is :

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

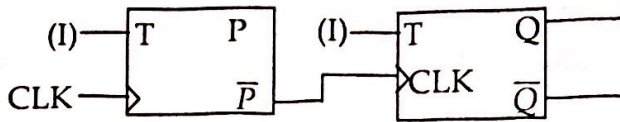**51.** The Boolean expression for the output f of the multiplexer shown below is :
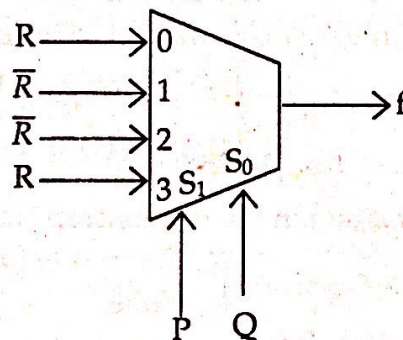
(1) $\overline{P \oplus Q \oplus R}$ (2) $P \oplus Q \oplus R$ (3) $P + Q + R$ (4) $\overline{P + Q + R}$

52. A 4-bit MOD-16 ripple counter uses JK flip-flops. If the propagation delay of each flip-flop is 50 ns sec, the maximum clock frequency that can be used is equal to :

(1) 2 MHz   (2) 3 MHz   (3) 5 MHz   (4) 20 MHz

53. For a given counter identify its behaviour :

The output is taken from PQ

(1) MOD-4 up counter   (2) MOD-2 down counter

(3) MOD-4 down counter   (4) MOD-2 up counter

54. Consider the following two tables T_1 and T_2

T_1

P	Q	R
11	a	6
16	b	9
26	a	7

T_2

A	B	C
11	b	7
26	c	4
11	b	6

What is the number of tuples present in the result of algebraic expression ?

$$T_1 \bowtie_{(T1.P = T2.A)} T_2$$

(1) 2   (2) 3   (3) 4   (4) 5

55. Suppose $R_1(A, B)$ and $R_2(C, D)$ are two relation schemas. Let R_1 and R_2 be the corresponding relation instances. B is a foreign key that refers to C in R_2. If data in R_1 and R_2 satisfy referential integrity constraints, which of the following is true ?

(1) $\prod_B (R_1) - \prod_C (R_2) = \phi$ (2) $\prod_C (R_2) - \prod_B (R_1) = \phi$

(3) $\prod_B (R_1) - \prod_C (R_2) \neq \phi$ (4) Both (1) and (2)

56. The number of entities participating in the relationship is known as :
(1) Maximum cardinality   (2) Composite identifiers
(3) Degree   (4) None

57. Which one is correct ?
(1) Primary Key $\subset$ Super Key $\subset$ Candidate Key
(2) Candidate Key $\subset$ Super Key $\subset$ Primary Key
(3) Super Key $\subset$ Primary Key $\subset$ Candidate Key
(4) Primary Key $\subset$ Candidate Key $\subset$ Super Key

58. For the given tables

A

X	Y
a_1	b_1
a_2	b_1
a_2	b_2
a_1	b_2

B

Y
b_1
b_2

$A \div B$ will return :

(1) a_1, a_2 (2) a_1 (3) a_2 (4) None of these

59. Consider the join of a relation A with a relation B. If A has m tuples and B has n tuples, then the maximum and minimum sizes of the join respectively are :

(1) mn and $m + n$ (2) $(m + n)$ and $(m - n)$

(3) mn and m (4) mn and 0

60. Which one is *not* a query language ?

(1) SQL   (2) QBE   (3) My SQL   (4) Data log

61. Semaphore operations are atomic because they are implemented within the .... :

(1) Kernel   (2) Shell

(3) User process   (4) Normal process space

62. Which of the following scheduling algorithms could result in saturation ?

(1) First Come First Served   (2) Shortest Job First

(3) Round Robin   (4) Highest Response Ratio Next

63. The maximum number of processes that can be in ready state for a computer system with n CPUs is :

(1) n (2) n^2 (3) 2^n (4) Independent of n

64. In which of the following page replacement policies, Belady's anomaly may occur ?

(1) FIFO   (2) Optimal   (3) LRU   (4) MRU

65. Maximum data rate of channel for a noiseless 3-KHz binary channel is :

(1) 3000 bps   (2) 6000 bps   (3) 1500 bps   (4) None of the above

66. The Hamming distance between 001111 and 010011 is :

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

67. There are 5 routers and 6 networks in an interworking, using link state routing, how many routing tables are there ?

(1) 1   (2) 5   (3) 6   (4) 11

C

68. Congestion control for multicasting flows from multiple sources to multiple destinations, the solution that can handle this is :
    (1) RSVP
    (2) Load shedding
    (3) Both (1) and (2)
    (4) None of these

69. Which one of the following protocols is *not* used to resolve one form of address to another one ?
    (1) DNS
    (2) ARP
    (3) DHCP
    (4) RARP

70. Consider the given IP address 156.216.24.65 with a subnet mark of 7-bits, what are the number of hosts and subnets ?
    (1) 512, 128
    (2) 510, 126
    (3) 511, 127
    (4) 509, 125

71. In an encryption scheme that uses RSA, values for p and q are selected to be 5 and 7 respectively. What could be the value of d ?
    (1) 12
    (2) 3
    (3) 11
    (4) 9

72. What is the size of key in triple DES ?
    (1) 168 bits
    (2) 112 bits
    (3) 56 bits
    (4) Either (1) or (2) or (3)

73. Which one of the following is *not* desired in a good SRS document ?
    (1) Functional requirements
    (2) Non-functional requirements
    (3) Goals of implementation
    (4) Algorithms for software implementation

74. According to Brooks, adding more people to an already late software project makes it :
    (1) late
    (2) fast
    (3) does not impact schedule
    (4) None of the above

75. For a real time software the KLOC is 28.2, what is the effort in person month calculated by using basic COCOMO model ?
    (1) 146
    (2) 198
    (3) 220
    (4) 248

76. 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

77. EDI over Internet uses :
    (1) MIME to attach EDI forms to e-mail messages
    (2) FTP to send business forms
    (3) HTTP to send business forms
    (4) SGML to send business forms

78. In electronic cash payment :

    (1) A debit card payment system is used

    (2) A credit card payment system is used

    (3) RSA cryptography is used in transactions

    (4) A customer buys several electronic coins which are digitally signed by coin issuing bank

79. Commonly used mode for 3G networks is :

    (1) TDMA   (2) FDMA   (3) FDD   (4) TDD

80. The shape of the cellular region for maximum radio coverage is :

    (1) Circular   (2) Square   (3) Oval   (4) Hexagon

81. A wheel graph with eleven vertices has a chromatic number of :

    (1) 3   (2) 4   (3) 2   (4) None of these

82. Which of the following is a correct match ?

List-I	List-II
(i) Circuit	(a) There exists a path between every distinct pair of vertices
(ii) Connected graph	(b) A path that contains every edge of a graph exactly once
(iii) Euler Path	(c) A graph that can be drawn in a plane with no crossing
(iv) Planar Graph	(d) A path that begins and ends at the same vertex

    (1) (i) - (b), (ii) - (c), (iii) - (d), (iv) - (a)   (2) (i) - (d), (ii) - (b), (iii) - (a), (iv) - (c)

    (3) (i) - (d), (ii) - (a), (iii) - (b), (iv) - (c)   (4) None of these

83. Which one of the following is the minimum error code ?

    (1) Octal code   (2) Gray code   (3) Binary code   (4) Excess-3 code

84. The minimum number of NAND gates required to implement $A \oplus B \oplus C$ is :
    (1) 8   (2) 10   (3) 9   (4) 6

85. How many 2-input multiplexers are required to construct a 2^{10}-input multiplexer ?
    (1) 31   (2) 10   (3) 127   (4) 1023

86. How many 3-to-8 line decoders with an enable input are needed to construct a 6-to-64 line decoder without using any other logic gates ?
    (1) 7   (2) 8   (3) 9   (4) 10

87. The values of x and y, if $(x567)_8 + (2yx5)_8 = (71yx)_8$ is :

    (1) 4, 3 (2) 3, 3 (3) 4, 4 (4) 4, 5

88. A computer uses a floating-point representation comprising a signed magnitude fractional mantissa and an excess-16 base-8 exponent. What decimal number is represented by a floating-point number whose exponent is 10011, mantissa 101000, and the sign bit set ?

    (1) -6250 (2) -20480 (3) -320 (4) -0.00122

89. The following program fragment in C
    for $(i = 3)$; $i < 15$; $i + =3$);
      print f("%d", i);
    results in :
    (1) a syntax error   (2) an execution error
    (3) printing of 12   (4) printing of 15

90. The body of the following for loop
    for (putchar ('a'); putchar(0); putchar('c'))
    putchar ('b');
    will be executed :
    (1) 0 times
    (2) 1 times
    (3) Infinitely many times
    (4) will not be executed because of syntax error

91. Consider the grammar

    $S \rightarrow a$

    $S \rightarrow ab$

    The given grammar is :

    (1) LR (1) only   (2) LL (1) only
    (3) Both LR (1) and LL (1)   (4) LR (1) but not LL (1)

92. The FIRST and FOLLOW sets for the grammar :
    $S \rightarrow SS + |SS^*|a$
    (1) FIRST(S) = {a}   (2) FIRST(S) = {+}
      FOLLOW(S) = {+, *, \$}   FOLLOW(S) = {+, *, \$}
    (3) FIRST(S) = {a}   (4) FIRST(S) = {+, *}
      FOLLOW(S) = {+, *}   FOLLOW(S) = {+, *, \$}

93. YACC builds up :

(1) SLR passing table

(2) Canonical LR passing table

(3) LALR passing table

(4) None of these

94. Resolution of externally defined symbols is performed by a :

(1) Linker   (2) Loader   (3) Compiler   (4) Interpreter

95. Consider the grammar :

$S \rightarrow (S) \mid a$

Let the number of states in SLR(1), LR(1) and LALR(1) passess for the grammar be n_1, n_2 and n_3 respectively. The following relationship holds good :

(1) $n_1 < n_2 < n_3$ (2) $n_1 = n_3 < n_2$ (3) $n_1 = n_2 = n_3$ (4) $n_1 \geq n_3 \geq n_2$

96. Consider the following Syntax Directed Translation Scheme (SDTS) with non-terminals {S, A} and terminals {a, b}

$S \rightarrow aA$ {print 1}

$S \rightarrow a$ {print 2}

$A \rightarrow Sb$ {print 3}

Using the above SDTS, the output printed by a bottom-up parser, for the input *aab* is :

(1) 132   (2) 223   (3) 231   (4) Syntax error

97. Replacing the expression 2 * 3.14 by 6.28 is :

(1) Constant folding   (2) Induction variable

(3) Strength reduction   (4) Code reduction

98. The evaluation strategy which delays the evaluation of an expression until its value is needed and which avoids repeated evaluations is :

(1) Early evaluation   (2) Late evaluation

(3) Lazy evaluation   (4) Critical evaluation

99. In a two pass assembler the pseudo-code EQU is to be evaluated during :

(1) pass 1   (2) pass 2

(3) not evaluated by the assembler   (4) None of the above

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P. T. O.

16

100. A compiler-compiler is a :

   (1) compiler which compiles a compiler program

   (2) software tool used in automatic generation of a compiler

   (3) compiler written in the same language it compiles

   (4) another name for cross compiler

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

D

M.Phil./Ph.D./URS-EE-Nov.-2018

SET-Y

SUBJECT : Computer Science

Sr. No. **100024**

Time : 1¼ Hours   Max. Marks : **100**   Total Questions : **100**

Roll No. (in figures)_____ (in words) _____

Name _____ Father's Name_____

Mother's Name_____ Date of Examination_____

_____
(Signature of the Candidate)

_____
(Signature of the Invigilator)

SEAL

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

1. *All questions are compulsory.*

2. The candidates *must return* the question booklet 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. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.

4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the university website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examination in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.

5. 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 booklet itself. Answers *must not* be ticked in the question booklet.

6. *There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.*

7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.

8. *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.*

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D

1

1. A wheel graph with eleven vertices has a chromatic number of :
   (1) 3   (2) 4   (3) 2   (4) None of these

2. Which of the following is a correct match ?

List-I	List-II
(i) Circuit	(a) There exists a path between every distinct pair of vertices
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(iv) Planar Graph	(d) A path that begins and ends at the same vertex

   (1) (i) - (b), (ii) - (c), (iii) - (d), (iv) - (a)   (2) (i) - (d), (ii) - (b), (iii) - (a), (iv) - (c)
   (3) (i) - (d), (ii) - (a), (iii) - (b), (iv) - (c)   (4) None of these

3. Which one of the following is the minimum error code ?
   (1) Octal code   (2) Gray code   (3) Binary code   (4) Excess-3 code

4. The minimum number of NAND gates required to implement $A \oplus B \oplus C$ is :
   (1) 8   (2) 10   (3) 9   (4) 6

5. How many 2-input multiplexers are required to construct a 2^{10}-input multiplexer ?
   (1) 31   (2) 10   (3) 127   (4) 1023

6. How many 3-to-8 line decoders with an enable input are needed to construct a 6-to-64 line decoder without using any other logic gates ?
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7. The values of x and y, if $(x567)_8 + (2yx5)_8 = (71yx)_8$ is :
   (1) 4, 3   (2) 3, 3   (3) 4, 4   (4) 4, 5

8. A computer uses a floating-point representation comprising a signed magnitude fractional mantissa and an excess-16 base-8 exponent. What decimal number is represented by a floating-point number whose exponent is 10011, mantissa 101000, and the sign bit set ?
   (1) − 6250   (2) −20480   (3) − 320   (4) − 0.00122

9. The following program fragment in C
   for $(i = 3); i < 15; i + =3);$
       printf("%d", i);
   results in :
   (1) a syntax error   (2) an execution error
   (3) printing of 12   (4) printing of 15

10. The body of the following for loop
for (putchar ('a'); putchar(0); putchar('c'))
putchar ('b');
will be executed :
(1) 0 times
(2) 1 times
(3) Infinitely many times
(4) will not be executed because of syntax error

11. Traffic intensity is expressed in :
(1) Erlangs
(2) Erlangs/MHz/km
(3) λ/sec
(4) dB/sec

12. Guard band is ?
(1) The channel spectrum
(2) The bandwidth allotted to signal
(3) The small unused bandwidth between the frequency channels to avoid interference
(4) The spectrum acquired by the noise between signals

13. OLE stands for :
(1) Open Linking and Embedding
(2) Objective Linking and Embedding
(3) Object Linking and Embedding
(4) Open Link and End

14. What does ERP stand for ?
(1) Expanse Research Project
(2) Enterprise Resource Planning
(3) Enterprise Research Planning
(4) Expanse Resource Project

15. Identify the correct sequence in which the following packets are transmitted on the network by a host when a browser requests a webpage from a remote server, assuming that the host has just been restarted ?
(1) HTTP GET request, DNS query, TCP SYN
(2) DNS query, HTTP GET request, , TCP SYN
(3) TCP SYN, DNS query, HTTP GET request
(4) DNS query, TCP SYN, HTTP GET request

16. Standard protocols like HTTP, SMTP, MNTP are part of :
(1) Presentation layer
(2) Application layer
(3) Session layer
(4) Not part of any layer

17. The representation of the value of a 16-bit unsigned integer X in hexadecimal number system is BCA9. The representation of the value of X in Octal number system is :
(1) 136251
(2) 571244
(3) 736251
(4) 571247

18. In data flow diagram, an originator or receiver of data is usually designed by :
(1) Circle
(2) Arrow
(3) Rectangle
(4) Square box

19. Consider the following function implemented in C :

```
void print xy(int x, int y)
{
    int * ptr;
    x = 0;
    ptr = &x;
    y = *ptr;
    *ptr = 1;
    print f("%d%d", x, y);
}
```

the output of invoking print xy (1, 1) is :
(1) 0, 0
(2) 0, 1
(3) 1, 0
(4) 1, 1

20. Linked lists of NULL pointers to signal :
(1) end of list
(2) start of list
(3) Either (1) or (2)
(4) Neither (1) nor (2)

21. Semaphore operations are atomic because they are implemented within the .... :
(1) Kernel
(2) Shell
(3) User process
(4) Normal process space

22. Which of the following scheduling algorithms could result in saturation ?
(1) First Come First Served
(2) Shortest Job First
(3) Round Robin
(4) Highest Response Ratio Next

23. The maximum number of processes that can be in ready state for a computer system with n CPUs is :

(1) n (2) n^2 (3) 2^n (4) Independent of n

24. In which of the following page replacement policies, Belady's anomaly may occur ?

(1) FIFO   (2) Optimal   (3) LRU   (4) MRU

25. Maximum data rate of channel for a noiseless 3-KHz binary channel is :

(1) 3000 bps   (2) 6000 bps   (3) 1500 bps   (4) None of the above

26. The Hamming distance between 001111 and 010011 is :

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

27. There are 5 routers and 6 networks in an interworking, using link state routing, how many routing tables are there ?

(1) 1   (2) 5   (3) 6   (4) 11

28. Congestion control for multicasting flows from multiple sources to multiple destinations, the solution that can handle this is :

(1) RSVP   (2) Load shedding

(3) Both (1) and (2)   (4) None of these

29. Which one of the following protocols is *not* used to resolve one form of address to another one ?

(1) DNS   (2) ARP   (3) DHCP   (4) RARP

30. Consider the given IP address 156.216.24.65 with a subnet mark of 7-bits, what are the number of hosts and subnets ?

(1) 512, 128   (2) 510, 126   (3) 511, 127   (4) 509, 125

31. Consider the grammar

$S \rightarrow a$

$S \rightarrow ab$

The given grammar is :

(1) LR (1) only   (2) LL (1) only

(3) Both LR (1) and LL (1)   (4) LR (1) but not LL (1)

32. The FIRST and FOLLOW sets for the grammar :

$S \rightarrow SS + | SS^* | a$

(1) FIRST(S) = {a}

   FOLLOW(S) = {+, *, $}

(2) FIRST(S) = {+}

   FOLLOW(S) = {+, *, $}

(3) FIRST(S) = {a}

   FOLLOW(S) = {+, *}

(4) FIRST(S) = {+, *}

   FOLLOW(S) = {+, *, $}

33. YACC builds up :

(1) SLR passing table

(2) Canonical LR passing table

(3) LALR passing table

(4) None of these

34. Resolution of externally defined symbols is performed by a :

(1) Linker (2) Loader (3) Compiler (4) Interpreter

35. Consider the grammar :

$S \rightarrow (S) | a$

Let the number of states in SLR(1), LR(1) and LALR(1) passess for the grammar be n_1, n_2 and n_3 respectively. The following relationship holds good :

(1) $n_1 < n_2 < n_3$ (2) $n_1 = n_3 < n_2$ (3) $n_1 = n_2 = n_3$ (4) $n_1 \geq n_3 \geq n_2$

36. Consider the following Syntax Directed Translation Scheme (SDTS) with non-terminals {S, A} and terminals {a, b}

$S \rightarrow aA$ {print 1}

$S \rightarrow a$ {print 2}

$A \rightarrow Sb$ {print 3}

Using the above SDTS, the output printed by a bottom-up parser, for the input *aab* is :

(1) 132 (2) 223 (3) 231 (4) Syntax error

37. Replacing the expression 2 * 3.14 by 6.28 is :

(1) Constant folding

(2) Induction variable

(3) Strength reduction

(4) Code reduction

38. The evaluation strategy which delays the evaluation of an expression until its value is needed and which avoids repeated evaluations is :

(1) Early evaluation

(2) Late evaluation

(3) Lazy evaluation

(4) Critical evaluation

39. In a two pass assembler the pseudo-code EQU is to be evaluated during :

(1) pass 1

(2) pass 2

(3) not evaluated by the assembler

(4) None of the above

40. A compiler-compiler is a :

(1) compiler which compiles a compiler program

(2) software tool used in automatic generation of a compiler

(3) compiler written in the same language it compiles

(4) another name for cross compiler

41. The Boolean expression for the output f of the multiplexer shown below is :
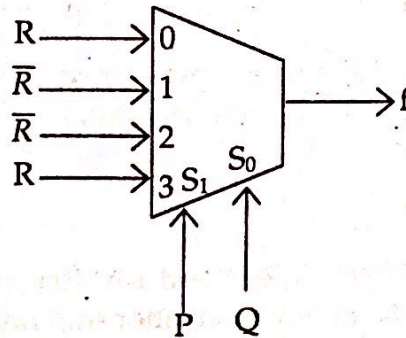
(1) $\overline{P \oplus Q \oplus R}$

(2) $P \oplus Q \oplus R$

(3) $P + Q + R$

(4) $\overline{P + Q + R}$

42. A 4-bit MOD-16 ripple counter uses JK flip-flops. If the propagation delay of each flip-flop is 50 ns sec, the maximum clock frequency that can be used is equal to :

(1) 2 MHz

(2) 3 MHz

(3) 5 MHz

(4) 20 MHz

43. For a given counter identify its behaviour :
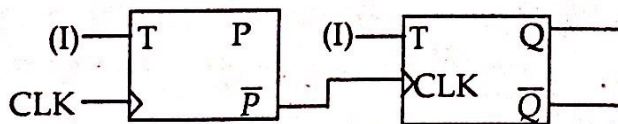
The output is taken from PQ

(1) MOD-4 up counter

(2) MOD-2 down counter

(3) MOD-4 down counter

(4) MOD-2 up counter

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44. Consider the following two tables T_1 and T_2

T_1

P	Q	R
11	a	6
16	b	9
26	a	7

T_2

A	B	C
11	b	7
26	c	4
11	b	6

What is the number tuples present in the result of algebraic expression ?

$$T_1 \bowtie_{(T1.P = T2.A)} T_2$$

(1) 2   (2) 3   (3) 4   (4) 5

45. Suppose $R_1(A, B)$ and $R_2(C, D)$ are two relation schemas. Let R_1 and R_2 be the corresponding relation instances. B is a foreign key that refers to C in R_2. If data in R_1 and R_2 satisfy referential integrity constraints, which of the following is true ?

(1) $\prod_B (R_1) - \prod_C (R_2) = \phi$

(2) $\prod_C (R_2) - \prod_B (R_1) = \phi$

(3) $\prod_B (R_1) - \prod_C (R_2) \neq \phi$

(4) Both (1) and (2)

46. The number of entities participating in the relationship is known as :

(1) Maximum cardinality   (2) Composite identifiers

(3) Degree   (4) None

47. Which one is correct ?

(1) Primary Key $\subset$ Super Key $\subset$ Candidate Key

(2) Candidate Key $\subset$ Super Key $\subset$ Primary Key

(3) Super Key $\subset$ Primary Key $\subset$ Candidate Key

(4) Primary Key $\subset$ Candidate Key $\subset$ Super Key

48. For the given tables

A

X	Y
a_1	b_1
a_2	b_1
a_2	b_2
a_1	b_2

B

Y
b_1
b_2

$A \div B$ will return :

(1) a_1, a_2 (2) a_1 (3) a_2 (4) None of these

49. Consider the join of a relation A with a relation B. If A has m tuples and B has n tuples, then the maximum and minimum sizes of the join respectively are :

(1) mn and $m + n$ (2) $(m + n)$ and $(m - n)$

(3) mn and m (4) mn and 0

50. Which one is *not* a query language ?

(1) SQL   (2) QBE   (3) My SQL   (4) Data log

51. main( )

```
{
    int a = 5, b = 2;
    printf("%d", a+++b);
}
```

(1) results in syntax error   (2) prints 7

(3) prints 8   (4) prints 5

52. The following program

```
main( )
{
    int abc ( );
    abc ( );
    (*abc) ( );
}
    int abc ( )
    { print f ("come"); }
```

(1) results in a completion error   (2) prints come

(3) prints come come   (4) results in a run time error

53. What does the following program print ?

```
# include <stdio.h>
main( )
{
    inc ( ); inc ( ); inc ( );
}
    inc ( )
{
    static int x;
    printf("%d", ++x);
}
```

(1) 012

(2) 123

(3) prints 3 consecutive, but unpredictable numbers

(4) prints 111

54. The expression $4 + 6 / 3 * 2 - 2 + 7 \% 3$ evalutes to :

(1) 3   (2) 4   (3) 6   (4) 7

55. The following program fragment :

```
int i = 10;
void main ( )
{
    int i = 20;
    {
        int i = 30;
        cont << i << :: i;
    }
}
```

(1) prints 3010   (2) prints 3020

(3) will result in a run time error   (4) None of the above

10

56. The statements

int $a = 5$;

cont << "FIRST" >> ($a << 2$) << "SECOND";

outputs :

(1) FIRST 52 SECOND

(2) FIRST 20 SECOND

(3) SECOND 25 FIRST

(4) an error message

57. Which of the following is not a storage class supported by C++ ?

(1) Register   (2) Auto   (3) Mutable   (4) Dynamic

58. C front :

(1) is the front end of a C compiler

(2) is the preprocessor of a C compiler

(3) is a tool that translates a C++ code to its equivalent C code

(4) none of the above

59. The circuit is used to convert one code to another. Identify it :
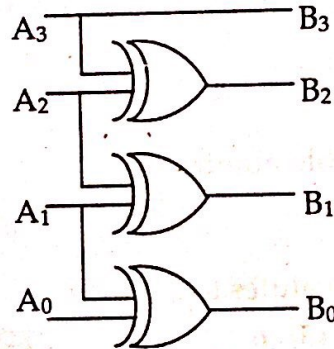
(1) Binary to Gray

(2) Gray to Binary

(3) Gray to XS-3

(4) Gray to 8421

60. the following multiplexer circuit is equal to :
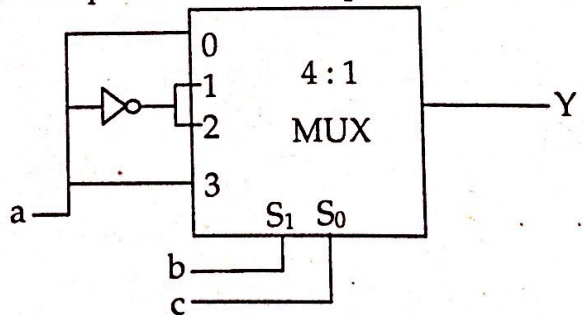
(1) Implementation of sum equation of full adder

(2) Implementation of carry equation of full adder

(3) Implementation of borrow equation of full subtractor

(4) All of the above

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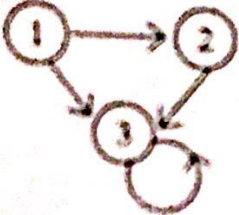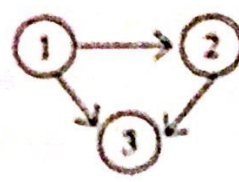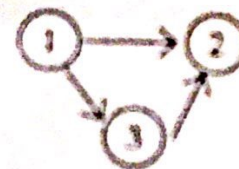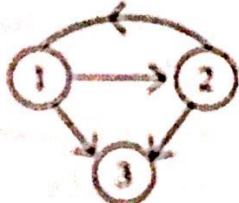
61. Consider the given relation and functional dependencies $R(ABC)$

$FD = (AB \rightarrow C, \ C \rightarrow A)$

The relation is in which normal form ?

(1) 1 NF   (2) 2 NF   (3) 3 NF   (4) BCNF

62. Consider the given functional dependencies :

$AB \rightarrow CD$

$AF \rightarrow D$

$DE \rightarrow F$

$C \rightarrow G$

$F \rightarrow E$

$G \rightarrow A$

Which one of the following is false ?

(1) $\{CF\}^+ = \{ACDFEG\}$ (2) $\{BG\}^+ = \{ABCDG\}$

(3) $\{AB\}^+ = \{ABCDG\}$ (4) $\{AF\}^+ = \{ACDEFG\}$

63. The maximum number of superkeys for the relation schema $R(E, F, G, H)$ with E as the key is :

(1) 6   (2) 7   (3) 8   (4) 9

64. A hash function f defined as f (key) = key mod 7, with linear probing, is used to insert the keys 37, 38, 72, 48, 98, 11, 56 into a table indexed from 0 to 6. What will be the location of key 11 ?

(1) 5   (2) 6   (3) 4   (4) 3

65. Consider the following :

Block size = 1025 bytes

Record length in data file = 100 bytes

Total number of records = 30000

Search key = 9 bytes

Pointer = 6 bytes

What is the number of index blocks ?

(1) 44   (2) 45   (3) 46   (4) None

66. A file is organized so that the ordering of data records is the same as or close to the ordering of data entries in some index. Then that index is called ?

(1) Dense   (2) Sparse   (3) Clustered   (4) Unclustered

67. B^+ trees are considered BALANCED because :

    (1) The lengths of the paths from the root to all leaf nodes are all equal

    (2) The lengths of the paths from the root to all leaf nodes differ from each other by at most 1

    (3) The number of children of any two non-leaf sibling nodes differ by at most 1

    (4) The number of records in any two leaf nodes differ by at most 1

68. For merging two sorted lists of sizes m and n into a sorted list of size $m + n$, we require comparisons of :

    (1) $0(m)$ (2) $0(n)$ (3) $0(m + n)$ (4) $0(\log(m) + \log(n))$

69. A binary tree has n leaf nodes. The number of nodes of degree 2 in this tree is :

    (1) $\log_2 n$ (2) $n - 1$ (3) n (4) 2^n

70. A binary search tree contains the values 1, 2, 3, 4, 5, 6, 7 and 8. The tree is traversed in preorder and the values are printed out. Which of the following sequences is a valid output ?

    (1) 53124786   (2) 53126487   (3) 53241678   (4) 53124768

71. Which of the following system software resides in main memory always ?

    (1) Text editor   (2) Assembler   (3) Linker   (4) Loader

72. Which of the following UNIX tools receives input only from the standard input ?

    (1) awk   (2) grep   (3) sed   (4) tr

73. The CC command makes a total of :

    (1) 1 pass   (2) 2 passes   (3) 4 passes   (4) 5 passes

74. The following C program

    ```
    main( )
    {
        fork ( ); fork (·); print f ("yes");
    }
    ```

    prints yes :

    (1) only once   (2) twice   (3) 4 times   (4) 8 times

75. Which of the following calls never returns an error ?

    (1) getpid   (2) fork   (3) ioctl   (4) open

76. The following sequence of commands grep x * . c > mn &

wc − 1 mn&

rm mn&

produces the same result as the single command :

    (1) grep x * . c $|$ wc − 1   (2) wc − 1 < grep x * .c

    (3) grep x *.c > wc − 1   (4) None of the above

77. A process refers to 5 pages A, B, C, D and E in the order A; B; C; D; A; B; E; A; B; C; D; E. If the page replacement is FIFO, the number of pages which transfer with an empty internal store of 3 frames is :

    (1) 8   (2) 10   (3) 9   (4) 7

78. Which of the following is FALSE ?

    (1) User level threads are not scheduled by the Kernel

    (2) When a user level thread is blocked, all other threads of its processes are blocked

    (3) Context switching between user level threads is faster than context switching between Kernel level threads

    (4) Kernel level threads cannot share the code segment

79. A shared variable x, initialized to 0, is operated one by four concurrent processes W, X, Y, Z as follows :

Each of the processes W and X reads x from memory, increments by one, stores it to memory, and the then terminates. Each of the processes Y and Z reads x from memory, decrements by two, stores it to memory, and the then terminates. Each process before reading x invokes the P operation (i.e. wait) on a counting semaphore S and invokes the V operation (i.e. signal) on the semaphore S after storing x to memory. Semaphore S is initialized to 2.

What is the maximum possible value of x after all processes complete execution ?

    (1) −2   (2) −1   (3) 1   (4) 2

14

80. To avoid the race condition, the number of processes allowed in critical section is :
   (1) 0   (2) 1   (3) 2   (4) 3

81. Let P, Q and R be three atomic prepositional assertions. Let X denote $(P \vee Q) \to R$ and Y denote $(P \to R) \vee (Q \to R)$. Which one of the following is a tautology ?
   (1) $X \leftrightarrow Y$ (2) $Y \to X$ (3) $X \to Y$ (4) $\sim Y \to X$

82. Which one of the following well-formed formulae in predicate calculus is *not* valid ?
   (1) $(\forall x \, p(x) \Rightarrow \forall x \, q(x)) \Rightarrow (\exists x \sim p(x) \vee \forall x \, q(x))$
   (2) $(\exists x \, p(x) \vee \exists x \, q(x)) \Rightarrow \exists x \, (p(x) \vee q(x)))$
   (3) $\exists x \, (p(x) \wedge q(x)) \Rightarrow (\exists x \, p(x) \wedge \exists x \, q(x))$
   (4) $\forall x \, (p(x) \vee q(x)) \Rightarrow (\forall x \, p(x) \vee \forall x \, q(x))$

83. Akshay speaks the truth in 45% of the cases. In a rainy season, on each day there is a 75% chance of raining. On a certain day in the rainy season, Akshay tells his mother that it is raining outside. What is the probability that it is actually raining ?
   (1) $\dfrac{27}{38}$ (2) $\dfrac{25}{35}$ (3) $\dfrac{31}{36}$ (4) $\dfrac{52}{128}$

84. Two n bit binary strings S_1 and S_2 are chosen randomly with uniform probability. The probability that Hamming distance between these strings (the number of bit positions where the two strings differ) is equal to d is :
   (1) $\dfrac{{}^nC_d}{2^n}$ (2) $\dfrac{{}^nC_d}{2^d}$ (3) $\dfrac{d}{2^n}$ (4) $\dfrac{1}{2^d}$

85. $f(x)$ and $g(x)$ are two functions differentiable in [0, 1] such that $f(0) = 2$; $g(0) = 0$; $f(1) = 6$; and $g(1) = 2$. Then these must exist a constant C in :
   (1) (0, 1) such that $f'(c) = 2g'(c)$ (2) [0, 1] such that $f'(c) = 2g'(c)$
   (3) (0, 1) such that $2f'(c) = g'(c)$ (4) [0, 1] such that $2f'(c) = g'(c)$

86. $(G, *)$ is an abelian group. Then :
   (1) $x = x^{-1}$, for any x belonging to G
   (2) $x = x^2$, for any x belonging to G
   (3) $(x * y)^2 = x^2 * y^2$, for any x, y belonging to G
   (4) G is of finite order

87. The number of equivalence relations of the set [1, 2, 3, 4] is :
   (1) 15   (2) 16   (3) 24   (4) 4

88. In a set of integers, a relation R is defined as aRb, if and only if $b = |a|$. This relation is :

(1) Reflexive   (2) Irreflexive   (3) Symmetric   (4) Anti-symmetric

89. Which of the following statements is true ?

P : All totally ordered sets have least elements.

Q : The Hasse diagram of a totally ordered set is a line.

(1) P alone   (2) Q alone   (3) Both P and Q   (4) Neither P nor Q

90. Let M be a 3 × 3 adjacency matrix corresponding to a given graph of three nodes labeled 1, 2, 3. If entry (1, 3) in M^3 is 2, then the graph could be :

91. In an encryption scheme that uses RSA, values for p and q are selected to be 5 and 7 respectively. What could be the value of d ?

(1) 12   (2) 3   (3) 11   (4) 9

92. What is the size of key in triple DES ?

(1) 168 bits   (2) 112 bits   (3) 56 bits   (4) Either (1) or (2) or (3)

93. Which one of the following is *not* desired in a good SRS document ?

(1) Functional requirements   (2) Non-functional requirements

(3) Goals of implementation   (4) Algorithms for software implementation

94. According to Brooks, adding more people to an already late software project makes it :

(1) late   (2) fast

(3) does not impact schedule   (4) None of the above

95. For a real time software the KLOC is 28.2, what is the effort in person month calculated by using basic COCOMO model ?

(1) 146   (2) 198   (3) 220   (4) 248

96. 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

97. EDI over Internet uses :
(1) MIME to attach EDI forms to e-mail messages
(2) FTP to send business forms
(3) HTTP to send business forms
(4) SGML to send business forms

98. In electronic cash payment :
(1) A debit card payment system is used
(2) A credit card payment system is used
(3) RSA cryptography is used in transactions
(4) A customer buys several electronic coins which are digitally signed by coin issuing bank

99. Commonly used mode for 3G networks is :
(1) TDMA   (2) FDMA   (3) FDD   (4) TDD

100. The shape of the cellular region for maximum radio coverage is :
(1) Circular   (2) Square   (3) Oval   (4) Hexagon

Maharshi Dayanand University Rohtak
Deptt. of ...Computer Science...
M. Phil/ PhD/URS Entrance Examination Answer Key

Sr. No.	Set-A	Set-B	Set-C	Set-D
1	C	A	C	A
2	D	B	D	C
3	A	D	C	B
4	A	A	A	A
5	A	B	B	D
6	C	C	C	C
7	A	B	A	A
8	D	A	C	C
9	B	C	B	D
10	A	B	D	A
11	A	D	B	A
12	C	A	C	C
13	B	C	B	C
14	A	A	D	B
15	D	B	A	D
16	C	C	B	B
17	A	A	D	A
18	C	C	C	D
19	D	A	A	C
20	A	B	A	A
21	B	B	C	A
22	C	C	D	B
23	B	A	A	D
24	D	B	A	A
25	A	A	A	B
26	B	C	C	C
27	D	D	A	B
28	C	A	D	A
29	A	D	B	C
30	A	C	A	B
31	B	A	A	D
32	C	C	C	A
33	A	B	C	C
34	B	A	B	A
35	A	D	D	B
36	C	C	B	C
37	D	A	A	A
38	A	C	D	C
39	D	D	C	A
40	C	A	A	B
41	C	A	D	B
42	D	C	D	C
43	C	C	D	A
44	A	B	C	B
45	B	D	A	A
46	C	B	D	C
47	A	A	C	D
48	C	D	D	A
49	B	C	D	D
50	**D**	**A**	**B**	**C**

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Sr. No.	Set-A	Set-B	Set-C	Set-D
51	D	D	B	B
52	A	D	C	C
53	C	D	A	B
54	A	C	B	D
55	B	A	A	A
56	C	D	C	B
57	A	C	D	D
58	C	D	A	C
59	A	D	D	A
60	B	B	C	A
61	D	C	A	C
62	D	D	B	D
63	D	D	D	C
64	C	A	A	A
65	A	B	B	B
66	D	C	C	C
67	C	A	B	A
68	D	D	A	C
69	D	C	C	B
70	B	D	B	D
71	A	C	C	D
72	B	D	D	D
73	D	C	D	D
74	A	A	A	C
75	B	B	B	A
76	C	C	C	D
77	B	A	A	C
78	A	C	D	D
79	C	B	C	D
80	B	D	D	B
81	C	B	A	C
82	D	C	C	D
83	D	B	B	A
84	A	D	A	A
85	B	A	D	A
86	C	B	C	C
87	A	D	A	A
88	D	C	C	D
89	C	A	D	B
90	D	A	A	A
91	A	C	D	C
92	C	D	A	D
93	C	A	C	D
94	B	A	A	A
95	D	A	B	B
96	B	C	C	C
97	A	A	A	A
98	D	D	C	D
99	C	B	A	C
100	A	A	B	D

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