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

SUBJECT : Computer Science

100017

SET-Y

Sr. No.

Total No. of Printed Pages : 17

| Time : 1¼ Hours | Max. Marks : 100 | Total Questions : 100 |
|------------------------------|---------------------|--------------------------------|
| Roll No. (in figures) | (in words) | |
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- **1.** Let *P*, *Q* and *R* be three atomic prepositional assertions. Let X denote $(P \lor Q) \rightarrow R$ and Y denote $(P \rightarrow R) \lor (Q \rightarrow R)$. 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)
$$(\forall x \ p(x) \Rightarrow \forall x \ q(x)) \Rightarrow (\exists x \sim p(x) \lor \forall x \ q(x))$$

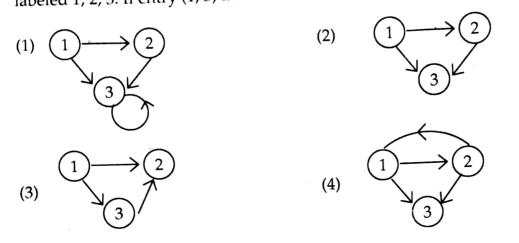
- (2) $(\exists x \ p(x) \lor \exists x \ q(x)) \Rightarrow \exists x \ (p(x) \lor q(x)))$
- (3) $\exists x (p(x) \land q(x)) \Rightarrow (\exists x p(x) \land \exists x q(x))$
- (4) $\forall x (p(x) \lor q(x)) \Rightarrow (\forall x p(x) \lor \forall x q(x))$
- **3.** Akshay speaks the truth in 45% 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) $\frac{27}{38}$ (2) $\frac{25}{35}$ (3) $\frac{31}{36}$ (4) $\frac{52}{128}$
- **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) $\frac{{}^{n}C_{d}}{2^{n}}$ (2) $\frac{{}^{n}C_{d}}{2^{d}}$ (3) $\frac{d}{2^{n}}$ (4) $\frac{1}{2^{d}}$
- **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
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- Which of the following statements is true ? 9.
 - P: All totally ordered sets have least elements.

 - Q: The Hasse diagram of a totally ordered set is a line. (4) Neither P nor Q (3) Both P and Q (2) Q alone

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 : 10.



A wheel graph with eleven vertices has a chromatic number of : 11. (4) None of these (3) 2 (2) 4 (1) 3

Which of the following is a correct match? 12.

List-I

List-II

- (a) There exists a path between every distinct pair of vertices (i) Circuit (b) A path that contains every edge of a graph exactly once (ii) Connected graph
- (c) A graph that can be drawn in a plane with no crossing (iii) Euler Path
- (d) A path that begins and ends at the same vertex (iv) Planar Graph
- (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 ?
- (3) Binary code (4) Excess-3 code (1) Octal code (2) Gray code The minimum number of NAND gates required to implement $A \oplus B \oplus C$ is : 14. (2) 10 (3) 9 (1) 8 (4) 6

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15. How many 2-input multiplexes are required to construct a 2¹⁰-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 (4) 10 (3) 9 The values of *x* and *y*, if $(x567)_8 + (2yx5)_8 = (71yx)_8$ is : 17. (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 The body of the following for loop 20. 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 (4) prints 5 (3) prints 8

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22. The following program

main()

```
int abc ( );
abc ( );
(*abc) ( );
```

```
}
```

{

```
int abc ()
```

```
{ print f ("come"); }
```

(1) results in a completion error

(3) prints come come

(2) prints 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
```

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(4) 7

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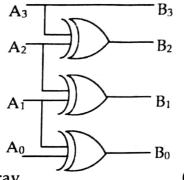
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```
The following program fragment :
    25.
         int i = 10;
         void main ()
         ł
             int i = 20;
             ł
                int i = 30;
                 cont << i << :: i;
             ł
         }
         (1) prints 3010
                                                (2) prints 3020
         (3) will result in a run time error
                                                (4) None of the above
        The statements
   26.
        int a = 5;
        cont << "FIRST" >> (a << 2) << "SECOND";
        outputs:
                                                (2) FIRST 20 SECOND
        (1) FIRST 52 SECOND
        (3) SECOND 25 FIRST
                                                 (4) an error message
        Which of the following is not a storage class supported by C++?
  27.
                                                 (3) Mutable
                            (2) Auto
                                                                     (4) Dynamic
        (1) Register
        C front :
  28.
        (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
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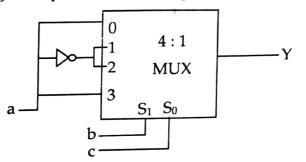
29. The circuit is used to convert one code to another. Identify it :



- (1) Binary to Gray
- (3) Gray to XS-3

(2) Gray to Binary(4) Gray to 8421

30. the following multiplexer circuit is equal to :



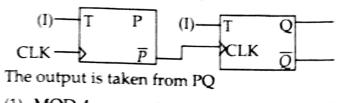
- (1) Implementation of sum equation of full adder
- (2) Implementation of carry equation of full adder
- (3) Implementation of borrow equation of full subtractor
- (4) All of the above

the autout 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 :



- (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

| | | <i>T</i> ₂ | | |
|---|--------|-----------------------|---------------------------|---|
| Q | R | A | В | с |
| a | 6 | 11 | ь | 7 |
| ь | 9 | 26 | с | 4 |
| a | 7 | 11 | b | 6 |
| | a b | a 6 b 9 | Q R A a 6 11 b 9 26 | Q R A B a 6 11 b b 9 26 c |

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

- **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

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- **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

| | 5 | | |
|-----|--|--|--|
| | $ \begin{array}{c ccc} A \\ \hline X & Y \\ \hline a_1 & b_1 \\ \hline a_2 & b_1 \\ \hline a_2 & b_2 \\ \hline c_1 & b_2 \\ \hline c_2 & c_2 \\ \hline c_$ | | |
| | $a_1 b_2$ A ÷ B will return : | · · · · | |
| | (1) a_1, a_2 (2) a_1 | (3) a ₂ (4) None of these | |
| 39. | | a relation B. If A has m tuples and B has n | |
| 40. | Which one is not a query language ?(1) SQL(2) QBE | (3) My SQL (4) Data log | |
| 41. | Consider the given relation and function $FD = (AB \rightarrow C, C \rightarrow A)$ The relation is in which normal form ? (1) 1 NF (2) 2 NF | nal dependencies <i>R(ABC</i>) (3) 3 NF (4) BCNF | |
| 42. | Consider the given functional depender $AB \rightarrow CD$ $AF \rightarrow D$ $DE \rightarrow F$ $C \rightarrow G$ $F \rightarrow E$ $G \rightarrow A$ Which one of the following is false ? | | |
| | $(1) \{CF\}^+ = \{ACDFEG\}$ | $(2) \{BG\}^+ = \{ABCDG\}$ | |
| | $(3) \{AB\}^+ = \{ABCDG\}$ | $(4) \{AF\}^+ = \{ACDEFG\}$ | |
| | | | |

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| 43. | The maximum nu the key is : | mber of superkeys (| for the relation schem | ma R(E, F, G, H) with E as |
|-----|---|----------------------------------|-------------------------|---|
| | (1) 6 | (2) 7 | (3) 8 | (4) 9 |
| 44. | | 2, 48, 98, 11, 56 into | | ar probing, is used to insert m 0 to 6. What will be the |
| | (1) 5 | (2) 6 | (3) 4 | (4) 3 |
| 45. | Consider the follow | ving : | | |
| | Block size = 1025 b | ytes | | |
| | Record length in d | ata file = 100 bytes | | |
| | Total number of re | cords = 30000 | | * |
| | Search key = 9 byte | 25 | | |
| | Pointer = 6 bytes | | | |
| | What is the numbe | er of index blocks ? | | |
| | (1), 44 | (2) 45 | | (4) None |
| 46. | A file is organized ordering of data en | ntries in some index | . Then that index is c | |
| | (1) Dense | (2) Sparse | (3) Clustered | (4) Unclustered |
| 47. | | dered BALANCED | | |
| | (1) The lengths of | the paths from the | root to all leaf nodes | are all equal |
| | at most 1 | • | | es differ from each other by |
| | (3) The number of | f children of any two | o non-leaf sibling no | des differ by at most 1 |
| | (4) The number of | f records in any two | leaf nodes differ by | at most 1 |
| 48. | For merging two require compariso | sorted lists of sizes ns of : | s m and n into a so | orted list of size $m + n$, we |
| | (1) $0(m)$ | (2) $0(n)$ | (3) $0(m+n)$ | (4) $0(\log(m) + \log(n))$ |
| 49. | | leaf nodes. The nu | mber of nodes of de | gree 2 in this tree is : |
| | (1) $\log_2 n$ | | (3) <i>n</i> | (4) 2^n |
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10 A binary search tree contains the values 1, 2, 3, 4, 5, 6, 7 and 8. The tree is traversed in 50. preorder and the values are printed out. Which of the following sequences is a valid output? (4) 53124768 (3) 53241678 (1) 53124786 (2) 53126487 Consider the grammar 51. $S \rightarrow a$ $S \rightarrow ab$ The given grammar is : (2) LL (1) only (1) LR (1) only (4) LR (1) but not LL (1) (3) Both LR (1) and LL (1) The FIRST and FOLLOW sets for the grammar : 52. $S \rightarrow SS + |SS^*|a$ (2) $FIRST(S) = \{+\}$ (1) $FIRST(S) = \{a\}$ $FOLLOW(S) = \{+, *, \$\}$ $FOLLOW(S) = \{+, *, \$\}$ (3) $FIRST(S) = \{a\}$ (4) $FIRST(S) = \{+, *\}$ $FOLLOW(S) = \{+, *, \$\}$ $FOLLOW(S) = \{+, *\}$ YACC builds up : 53. (1) SLR passing table (2) Canonical LR passing table (3) LALR passing table (4) None of these Resolution of externally defined symbols is performed by a : 54. (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 : (2) $n_1 = n_3 < n_2$ (3) $n_1 = n_2 = n_3$ (4) $n_1 \ge n_3 \ge n_2$ (1) $n_1 < n_2 < n_3$ M.Phil/Ph.D/URS-EE-Nov.-2018/(Comp. Sci.)(SET-Y)/(A)

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| 56. | Consider the following Syntax terminals $\{S, A\}$ and terminals $\{a, b\}$ | Directed Translation Scheme (SDTS) with non- |
| | $S \rightarrow aA$ {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 <i>aab</i> is : |
| | (1) 132 (2) 223 | (3) 231 (4) Syntax error |
| 57. | Replacing the expression 2 * 3.14 b | y 6.28 is : |
| | (1) Constant folding | (2) Induction variable |
| | (3) Strength reduction | (4) Code reduction |
| 58. | The evaluation strategy which de needed and which avoids repeate | ays the evaluation of an expression until its value is d evaluations is : |
| | (1) Early evaluation | (2) Late evaluation |
| | (3) Lazy evaluation | (4) Critical evaluation |
| 5 9 . | In a two pass assembler the pseud | o-code EQU is to be evaluated during : |
| | (1) pass 1 | (2) pass 2 (4) None of the above |
| | (3) not evaluated by the assemble | er (4) None of the above |
| 60. | A compiler-compiler is a : | |
| | (1) compiler which compiles a co | |
| | (2) software tool used in automa | |
| | (3) compiler written in the same | |
| | (4) another name for cross comp | |
| 61. | (1) Text editor (2) Assemble | |
| 62. | Which of the following UNIX too | s receives input only from the standard input ? |
| | (1) awk (2) grep | (3) sed (4) tr |
| 63. | The CC command makes a total of | f : |
| | (1) 1 pass (2) 2 passes | (3) 4 passes (4) 5 passes |
| | | |

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12 The following C program 64. main() ł fork (); fork (); printf ("yes"); ł prints yes : (4) 8 times (3) 4 times (1) only once (2) twice **65.** Which of the following calls never returns an error ? (4) open (3) ioctl (2) fork (1) getpid The following sequence of commands grep x * . c > mn & 66. wc – 1 mn& rm mn& produces the same result as the single command : (1) grep x * : c | wc - 1(2) $wc - 1 < grep x^* .c$ (4) None of the above (3) grep x *.c > wc - 1 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 : (3) 9 (2) 10 (4) 7 (1) 8

- **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

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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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| 14 | | (| tiple sources to multiple |
|-------|---|------------------------------------|---|
| 78. | Congestion control for multic destinations, the solution that ca | I handle this is | |
| | (1) RSVP | (2) Load sheddii | ng |
| | (3) Both (1) and (2) | (4) None of these | e faddress to |
| 79. | Which one of the following pro another one ? | otocols is <i>not</i> used to reso | |
| | (1) DNS (2) ARP | (3) DHCP | (4) RARP |
| 80. | Consider the given IP address 1 | 56.216.24.65 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 u | ses RSA, values for p and | q are selected to be 5 and 7 |
| | respectively. What could be the (1) 12 (2) 3 | value of <i>d</i> ? (3) 11 | (4) 9 |
| | | | |
| 82. | What is the size of key in triple(1) 168 bits(2) 112 bits | | (4) Either (1) or (2) or (3) |
| 83. | Which one of the following is no | t desired in a good SRS do | ocument? |
| | (1) Functional requirements (3) Goals of implementation | | nal requirements for software implementation |
| | | e e e | |
| 84. | According to Brooks, adding mo (1) late | (2) fast | te software project makes it? |
| | (3) does not impact schedule | (4) None of the | above |
| 85. | For a real time software the calculated by using basic COCC | KLOC is 28.2, what is OMO model ? | the effort in person month |
| | (1) 146 (2) 198 | (3) 220 | (4) 248 |
| 86. | Register renaming is done in pi | pelined processors : | |
| | (1) as an alternative to register | allocation at compile tim | e |
| | (2) for efficient access to functi(3) to handle certain kinds of h | | Variables |
| | (4) as part of address translatio | | |
| 87. | EDI over Internet uses : | | |
| 07. | (1) MIME to attach EDI forms | to e-mail messages | · · · · · · |
| | (2) FTP to send business forms | | |
| | (3) HTTP to send business for(4) SGML to send business for | | |
| | | | |
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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

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P. T. O.

Identify the correct sequence in which the following packets are transmitted on the 16 network by a host when a browser requests a webpage from a remote server, 95. 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 Standard protocols like HTTP, SMTP, MNTP are part of : 96. (2) Application layer (1) Presentation layer (4) Not part of any layer (3) Session layer The representation of the value of a 16-bit unsigned integer X in hexadecimal number 97. system is BCA9. The representation of the value of X in Octal number system is : (4) 571247 (3) 736251 (2) 571244 (1) 136251 **98.** In data flow diagram, an originator or receiver of data is usually designed by : (4) Square box (3) Rectangle (2) Arrow (1) Circle **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 : (3) 1,0 (2) 0, 1 (4) 1, 1 (1) 0, 0Linked lists of NULL pointers to signal : 100. (1) end of list (2) start of list (4) Neither (1) nor (2) (3) Either (1) or (2)

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| | Total No. of Printe | d Pages : 17 |
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| (DO N | OT OPEN THIS QUESTION BOOKLET BEFORE TIME OR I | UNTIL YOU |
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| | SUBJECT : Computer Science | 1000 |

| Sr. No. | | | | •• |
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| Time : 1¼ Hours | Max. Marks : 100 | Total Questions : 100 |
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- 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.
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CF A

| 1. | Semaphore operation | ons are atomic becau | | | ted | within the : |
|-----|---|---|---------------|------------------------------|-------|---------------------------|
| | (1) Kernel | | • • | Shell | | |
| | (3) User process | | (4) | Normal process | s spa | ice |
| 2. | Which of the follow | ing scheduling algo | rithr | ns could result in | sat | uration ? |
| | (1) First Come First | t Served | | | | |
| | (2) Shortest Job First | st | | | | |
| | (3) Round Robin | | | | | |
| | (4) Highest Respor | se Ra tio Next | | | | |
| 3. | The maximum num with <i>n</i> CPUs is : | nber of processes the | at ca | n be in ready sta | te fo | or a computer system |
| | (1) <i>n</i> | (2) n^2 | (3) | 2 ^{<i>n</i>} | (4) | Independent of n |
| 4. | In which of the follo | owing page replacer | nent | policies, Belady' | s an | omaly may occur ? |
| | (1) FIFO | (2) Optimal | | LRU | | MRU |
| 5. | Maximum data rate | e of channel for a no | isele | ss 3-KHz binary | char | nnel is : |
| э. | (1) 3000 bps | (2) 6000 bps | | 1500 bps | | None of the above |
| | | · · · - | . , | • | | |
| 6. | The Hamming dista | | | | (A) | 4 |
| | (1) 1 | (2) 2 | (3) | | (4) | |
| 7. | There are 5 routers many routing table | | an ii | nterworking, usii | ng li | ink state routing, how |
| | (1) 1 | (2) 5 | (3) | 6 | (4) | 11 |
| 8. | Congestion contro destinations, the so | ol for multicasting lution that can hand | flo lle th | ws from multi nis is : | ple | sources to multiple |
| | (1) RSVP | | | Load shedding | | |
| | (3) Both (1) and (2) |) | (4) | None of these | | |
| 9. | Which one of the fanother one? | following protocols | is n | ot used to resolv | ve o | one form of address to |
| | (1) DNS | (2) ARP | (3) | DHCP | (4) | RARP |
| 10. | | | 24.6 | 5 with a subnet n | nark | c of 7-bits, what are the |
| | number of hosts an (1) 512 128 | nd subnets ? (2) 510, 126 | (3) |) 511, 127 | (4) |) 509, 125 |
| | (1) 512, 128 | (2) 510, 120 | | <i>J</i> J I I, I <i>Z</i> / | (4) | ,, |
| | | | | | | |

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В

P. T. O.

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| 11. | . Consider the grammar | |
|------|--|---|
| | $S \rightarrow a$ | |
| | $S \rightarrow ab$ | |
| | The given grammar is : | |
| | | . (1) only |
| | (3) Both LR (1) and LL (1) (4) LH | R (1) but not LL (1) |
| 12. | 2. The FIRST and FOLLOW sets for the grammar | : |
| | $S \to SS + SS^* a \tag{2}$ | $\mathbf{P}(\mathbf{T}(\mathbf{C}) = \{1\}$ |
| | | $RST(S) = \{+\}$ DLLOW(S) = $\{+, *, \$\}$ |
| | | $RST(S) = \{+, *\}$ |
| | | $DLLOW(S) = \{+, *, \$\}$ |
| 13. | 3. YACC builds up : | |
| | (1) SLR passing table (2) C | anonical LR passing table |
| | (3) LALR passing table (4) N | ione of these |
| 14. | Resolution of externally defined symbols is pe | rformed by a : |
| | | ompiler (4) Interpreter |
| 15. | 5. Consider the grammar : | • |
| | $S \rightarrow (S) \mid a$ | d I AI D(1) massess for the anomar be |
| | Let the number of states in SLR(1), LR(1) an n_1 , n_2 and n_3 respectively. The following relationships the states of the | ationship holds good : |
| | (1) $n_1 < n_2 < n_3$ (2) $n_1 = n_3 < n_2$ (3) $n_1 = n_3 < n_2$ (3) $n_2 < n_3 < n_3$ (3) $n_3 < n_3 < n_3 < n_3$ (3) $n_3 < n_3 $ | |
| 16. | 6. Consider the following Syntax Directed T terminals {S, A} and terminals {a, b} | ranslation Scheme (SDTS) with non- |
| | $S \rightarrow aA$ {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) 2 | • |
| | | |
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B

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Replacing the expression 2 * 3.14 by 6.28 is : 17.

- (1) Constant folding (2) Induction variable
- (3) Strength reduction (4) Code reduction

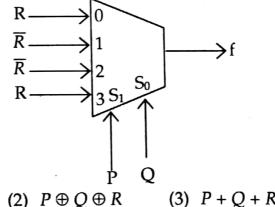
The evaluation strategy which delays the evaluation of an expression until its value is 18. needed and which avoids repeated evaluations is :

- (2) Late evaluation (1) Early evaluation
- (4) Critical evaluation (3) Lazy evaluation
- In a two pass assembler the pseudo-code EQU is to be evaluated during : 19.
 - (2) pass 2 (1) pass 1 (4) None of the above
 - (3) not evaluated by the assembler
- **20.** A compiler-compiler is a :

(1) $\overline{P \oplus Q \oplus R}$

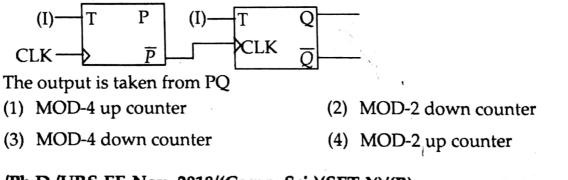
В

- (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
- The Boolean expression for the output *f* of the multiplexer shown below is : 21.



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

- A 4-bit MOD-16 ripple counter uses JK flip-flops. If the propagation delay of each 22. flip-flop is 50 ns sec, the maximum clock frequency that can be used is equal to :
 - (3) 5 MHz (1) 2 MHz (2) 3 MHz (4) 20 MHz
- For a given counter identify its behaviour : 23.



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| T_1 | | | T_2 | | |
|-------|---|---|-------|---|---|
| Р | Q | R | Α | В | С |
| 11 | а | 6 | 11 | b | 7 |
| 16 | b | 9 | 26 | с | 4 |
| 26 | а | 7 | 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 |

Suppose $R_1(A, B)$ and $R_2(C, D)$ are two relation schemas. Let R_1 and R_2 be the 25. 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) $\prod_{B} (R_1) \prod_{C} (R_2) \neq \dot{\phi}$
- (4) Both (1) and (2)
- The number of entities participating in the relationship is known as : 26.
 - (1) Maximum cardinality
- (2) Composite identifiers

(3) Degree

(4) None

Which one is correct? 27.

(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
- For the given tables 28.

| A | | 2 |
|----------------|----------------|----------------|
| X | Y | B |
| a1 | b_1 | Y |
| a ₂ | b_1 | b 1 |
| a ₂ | b ₂ | b ₂ |
| a1 | b ₂ | |
| A ÷ B | will | return : |

(1) a_1, a_2

(2) a₁

(3) a_2

(4) None of these

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| 29. | | of a relation A with ximum and minimu | m si (2) | | spec | <i>n</i> tuples and <i>B</i> has <i>n</i> tively are : |
|-----|--|--|-------------------|-----------------------------------|-----------------|--|
| 30. | Which one is <i>not</i> a (1) SQL | query language ? (2) QBE | (3) | My SQL | (4) | Data log |
| 31. | | h eleven vertices has (2) 4 | a ch (3) | | | None of these |
| 32. | Which of the follow List-I | ving is a correct mate | ch? | List-I | I | |
| y | (i) Circuit(ii) Connected grap(iii) Euler Path(iv) Planar Graph | oh (b) A path tha (c) A graph th | at con nat ca | | of a ş olane | |
| | |), (iii) - (d), (iv) - (a) | | |), (iii |) - (a), (iv) - (c) |
| | |), (iii) - (b), (iv) - (c) | | | | |
| 33. | Which one of the for (1) Octal code | ollowing is the minin (2) Gray code | | Binary code ? | (4) | Excess-3 code |
| 34. | The minimum num (1) 8 | nber of NAND gates (2) 10 | reqı (3) | | nt A (4) | |
| 35. | How many 2-input (1) 31 | multiplexers are red (2) 10 | | ed to construct a 127 | | |
| 36. | How many 3-to-8 l line decoder without (1) 7 | ine decoders with ar ut using any other lo (2) 8 | ogic | able input are ne gates ? 9 | | d to construct a 6-to-64 10 |
| 37. | The values of <i>x</i> and | $y, \text{ if } (x567)_8 + (2yx5)_8 $ | 5) ₈ = | $(71yx)_8$ is : | | |
| | (1) 4,3 | (2) 3, 3 | (3) | 4, 4 | (4) | 4,5 |
| 38. | fractional mantissa | a and an excess-16 loating-point numb | bas | se-8 exponent. | Wha | g a signed magnitude at decimal number is 0011, mantissa 101000, |
| | (1) - 6250 | (2) -20480 | (3) | - 320 | (4) |) - 0.00122 |

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В

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| | | | | ŧ | 3 |
|-----|---|-------|----|---|---|
| 39. | <pre>The following program fragment in C for (i = 3); i < 15; i + =3); printf("%d", i); results in : (1) a syntax error (3) printing of 12</pre> | | | an execution error 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 sym | | er | rror | |
| 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 | | | | |
| | | | | he frequency channels to avoid interference | e |
| | (4) The spectrum acquired by the nois | e be | tv | ween 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 | 5 | | | |
| 44 | • What does ERP stand for ? | | | | |
| | (1) Expanse Research Project | | | | |
| | (2) Enterprise Resource Planning | | | •* | |
| | (3) Enterprise Research Planning | | | | |
| | (4) Expanse Resource Project | | | | |
| M.P | hil./Ph.D./URS-EE-Nov2018/(Comp. Sc | i.)(S | E | ET-Y)/(B) | |
| | | | | | |

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, 45. 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 Standard protocols like HTTP, SMTP, MNTP are part of : 46. (2) Application layer (1) Presentation layer (4) Not part of any layer (3) Session layer The representation of the value of a 16-bit unsigned integer X in hexadecimal number 47. system is BCA9. The representation of the value of X in Octal number system is : (4) 571247 (3) 736251 (2) 571244 (1) 136251 In data flow diagram, an originator or receiver of data is usually designed by : 48. (4) Square box (3) Rectangle (2) Arrow (1) Circle Consider the following function implemented in C : 49. 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 : (4) 1, 1 (3) 1, 0(2) 0, 1 (1) 0, 0Linked lists of NULL pointers to signal : 50. (2) start of list (1) end of list (4) Neither (1) nor (2) (3) Either (1) or (2) P. T. O. M.Phil./Ph.D./URS-EE-Nov.-2018/(Comp. Sci.)(SET-Y)/(B)

8 **51.** Which of the following system software resides in main memory always? (4) Loader (3) Linker (2) Assembler (1) Text editor **52.** Which of the following UNIX tools receives input only from the standard input ? (4) tr (3) sed (1) awk (2) grep **53.** The CC command makes a total of : (4) 5 passes (3) 4 passes (1) 1 pass (2) 2 passes 54. The following C program main() { fork (); fork (); printf ("yes"); } prints yes : (4) 8 times (1) only once (2) twice (3) 4 times 55. Which of the following calls never returns an error? (3) ioctl (4) open (1) getpid (2) fork The following sequence of commands grep x * . c > mn & 56. wc - 1 mn&rm mn& produces the same result as the single command : (1) grep $x^* \cdot c | wc - 1$ (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 : (2) 10 (3) 9 (1) 8 (4) 7

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:

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

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66.

(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) $\{AB\}^+ = \{ABCDG\}$ $(4) \quad \{AF\}^+ = \{ACDEFG\}$ M.Phil./Ph.D./URS-EE-Nov.-2018/(Comp. Sci.)(SET-Y)/(B)

Register renaming is done in pipelined processors :

(1) as an alternative to register allocation at compile time

| | | | | | 11 |
|-----|--|--|--|---|------------------------|
| 73. | The maximum the key is : | number of superke | ys for the relation s | schema R(E, F, G, H) w | ith E as |
| | (1) 6 | (2) 7 | (3) 8 | (4) 9 | |
| 4. | A hash function the keys 37, 38, location of key 1 | 72, 48, 98, 11, 56 i | = key mod 7, with nto a table indexed | linear probing, is used from 0 to 6. What wi | to insert ll be the |
| | (1) 5 | (2) 6 | (3) 4 | (4) 3 | |
| 5. | Consider the fol | lowing : | | | |
| | Block size = 102 | 5 bytes | | | |
| | Record length ir | n data file = 100 byte | S | , | |
| | Total number of | records = 30000 | | | |
| | Search key = 9 b | ytes - | | | |
| | Pointer = 6 byte | S | | | |
| | What is the num | nber of index blocks | ? | | |
| | (1) 44 | (2) 45 | (3) 46 | (4) None | |
| ô. | A file is organiz | zed so that the ord a entries in some inc | ering of data record dex. Then that index | ls is the same as or clo c is called ? | se to the |
| | (1) Dense | (2) Sparse | (3) Clustered | | - |
| 7. | B^+ trees are con | nsidered BALANCI | ED because : | | |
| | | of the paths from t | | odes are all equal | |
| | | | | nodes differ from each | other by |
| | (3) The numbe | r of children of any | two non-leaf siblin | g nodes differ by at mo | st 1 |
| | (4) The numbe | r of records in any t | two leaf nodes diffe | r by at most 1 | |
| 3. | For merging tw require compar | | izes <i>m</i> and <i>n</i> into | a sorted list of size m | + <i>n</i> , we |
| | (1) $0(m)$ | (2) $0(n)$ | (3) $0(m+n)$ | (4) $0(\log(m) + \log(m))$ | og (n)) |
| 9. | A binary tree h | as <i>n</i> leaf nodes. The | number of nodes of | of degree 2 in this tree is | 3: |
| | (1) $\log_2 n$ | (2) $n-1$ | (3) <i>n</i> | (4) 2^n | |
| | | | | | |
| | | | | | |

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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? (4) 53124768 (3) 53241678 (1) 53124786 (2) 53126487 81. main() int a = 5, b = 2;printf("%d", a+++b); (2) prints 7 (1) results in syntax error (3) prints 8 (4) prints 5 The following program 82. main() ł int abc (); abc (); (*abc) (); } int abc () { print f ("come"); } (1) results in a completion error (2) prints come (4) results in a run time error (3) prints come come What does the following program print? 83. # 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

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12

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B

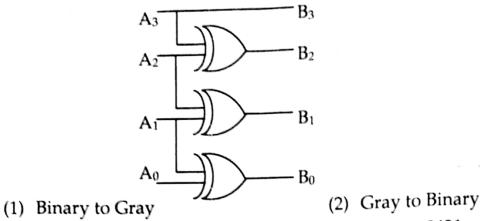
```
84. The expression 4 + 6 / 3 * 2 - 2 + 7 \% 3 evalutes to :
      (1) 3
                          (2) 4
                                                                    (4) 7
                                               (3) 6
      The following program fragment :
 85.
      int i = 10;
      void main ()
          int i = 20;
          ł
              int i = 30;
              cont << i << :: i;
          }
      ł
      (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 \ll "FIRST" >> (a \ll 2) \ll "SECOND";
      outputs :
      (1) FIRST 52 SECOND
                                              (2) FIRST 20 SECOND
      (3) SECOND 25 FIRST
                                              (4) an error message
     Which of the following is not a storage class supported by C++?
 87.
      (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
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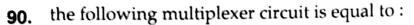
13

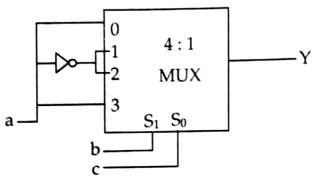
The circuit is used to convert one code to another. Identify it : 89.



(4) Gray to 8421

(3) Gray to XS-3





- (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
- Let *P*, *Q* and *R* be three atomic prepositional assertions. Let X denote $(P \lor Q) \rightarrow R$ and 91. Y denote $(P \rightarrow R) \lor (Q \rightarrow R)$. Which one of the following is a tautology ? (2) $Y \rightarrow X$ (3) $X \rightarrow Y$ (4) $\sim Y \rightarrow X$ (1) $X \leftrightarrow Y$
- Which one of the following well-formed formulae in predicate calculus is not valid? 92.

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

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

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

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

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- **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) $\frac{27}{38}$ (2) $\frac{25}{35}$ (3) $\frac{31}{36}$ (4) $\frac{52}{128}$

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) $\frac{{}^{n}C_{d}}{2^{n}}$ (2) $\frac{{}^{n}C_{d}}{2^{d}}$ (3) $\frac{d}{2^{n}}$ (4) $\frac{1}{2^{d}}$
- **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

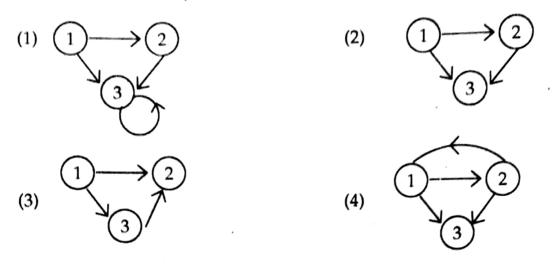
98. In a set of integers, a relation *R* is defined as *aRb*, if and only if b = |a|. This relation is :

- (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

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100. Let *M* be a 3 \times 3 adjacency matrix corresponding to a given graph of three nodes labeled 1, 2, 3. If entry (1, 3) in M³ is 2, then the graph could be :



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| | Total No. of Printer | |
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| | ARE ASKED TO DO SO) | SET-Y |
| С | M.Phil./Ph.D./URS-EE-Nov2018 | |
| | 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 | |

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SEA

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.
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| | | · · · · · · · · · · · · · · · · · · · | | and the state of the |
|-----------------|---|--|--|---|
| 1. | Consider the given | relation and func | tional dependencie | s R(ABC) |
| | $FD = (AB \rightarrow C, C - C)$ | | | |
| | The relation is in w (1) 1 NF | vhich normal form (2) 2 NF | ? (3) 3 NF | (4) BCNF |
| 2. | Consider the giver $AB \rightarrow CD$ $AF \rightarrow D$ | n functional depend | dencies : | |
| | $DE \to F$ $C \to G$ | | | |
| | $F \to E$ $G \to A$ | | | The strength of the second |
| | Which one of the f | ollowing is false? | | |
| | (1) $\{CF\}^+ = \{ACD\}$ | • | (2) $\{BG\}^+ = \{AI\}$ | 3CDG} |
| | (3) $\{AB\}^+ = \{ABC\}$ | 5 6 S S S S S | (4) $\{AF\}^+ = \{A(A)\}^+ = \{A(A)\}^$ | and a set of the Contract of the set of the |
| | | and the second second second | | |
| 3. | The maximum nu the key is : | mber of super-key | rs for the relation se | chema R(E, F, G, H) with E a |
| | A1 | | | |
| | (1) 6 | (2) 7 | (3) 8 | (4) 9 |
| 4. | A hash function f | defined as <i>f</i> (key) = 2, 48, 98, 11, 56 in | = key mod 7, with li | near probing, is used to inser |
| 4. | A hash function f the keys 37, 38, 7 | defined as <i>f</i> (key) = 2, 48, 98, 11, 56 in | = key mod 7, with li | near probing, is used to inser |
| | A hash function f the keys 37, 38, 7 location of key 11 | defined as f (key) = 2, 48, 98, 11, 56 in ? (2) 6 | = key mod 7, with li to a table indexed | near probing, is used to inser from 0 to 6. What will be the |
| 4. 5. | A hash function <i>f</i> the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo | defined as f (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : | = key mod 7, with li to a table indexed | near probing, is used to inser from 0 to 6. What will be the |
| | A hash function <i>f</i> the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo Block size = 1025 b | defined as f (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : pytes | = key mod 7, with li to a table indexed (3) 4 | near probing, is used to inser from 0 to 6. What will be the |
| | A hash function <i>f</i> the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo Block size = 1025 k Record length in c | defined as <i>f</i> (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : bytes lata file = 100 bytes | = key mod 7, with li to a table indexed (3) 4 | near probing, is used to inser from 0 to 6. What will be the |
| | A hash function <i>f</i> the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo Block size = 1025 k Record length in c Total number of re | defined as f (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : bytes lata file = 100 bytes ecords = 30000 | = key mod 7, with li to a table indexed (3) 4 | near probing, is used to inser from 0 to 6. What will be the |
| | A hash function f the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo Block size = 1025 k Record length in c Total number of re Search key = 9 byt | defined as f (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : bytes lata file = 100 bytes ecords = 30000 | = key mod 7, with li to a table indexed (3) 4 | near probing, is used to inser from 0 to 6. What will be the |
| | A hash function <i>f</i> the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo Block size = 1025 k Record length in c Total number of re Search key = 9 byt Pointer = 6 bytes | defined as <i>f</i> (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : bytes lata file = 100 bytes ecords = 30000 ses | = key mod 7, with li to a table indexed (3) 4 | near probing, is used to inser from 0 to 6. What will be the |
| | A hash function f the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo Block size = 1025 k Record length in d Total number of re Search key = 9 byt Pointer = 6 bytes What is the number | defined as f (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : bytes data file = 100 bytes ecords = 30000 res er of index blocks ? | = key mod 7, with li to a table indexed (3) 4 | near probing, is used to inser from 0 to 6. What will be the |
| | A hash function <i>f</i> the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo Block size = 1025 k Record length in c Total number of re Search key = 9 byt Pointer = 6 bytes What is the number (1) 44 | defined as f (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : bytes data file = 100 bytes ecords = 30000 res er of index blocks ? (2) 45 | = key mod 7, with li to a table indexed (3) 4 (3) 46 | near probing, is used to inser from 0 to 6. What will be the (4) 3 (4) None |
| | A hash function <i>f</i> the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo Block size = 1025 k Record length in d Total number of re Search key = 9 byt Pointer = 6 bytes What is the number (1) 44 | defined as f (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : oytes lata file = 100 bytes ecords = 30000 res er of index blocks ? (2) 45 d so that the order | key mod 7, with lit to a table indexed (3) 4 (3) 46 (3) 46 | near probing, is used to inser from 0 to 6. What will be the (4) 3 (4) None is the same as or close to th |
| 5. | A hash function <i>f</i> the keys 37, 38, 7 location of key 11 (1) 5 Consider the follo Block size = 1025 k Record length in d Total number of re Search key = 9 byt Pointer = 6 bytes What is the number (1) 44 | defined as f (key) = 2, 48, 98, 11, 56 in ? (2) 6 wing : oytes lata file = 100 bytes ecords = 30000 res er of index blocks ? (2) 45 d so that the order | = key mod 7, with li to a table indexed (3) 4 (3) 46 | near probing, is used to inser from 0 to 6. What will be the (4) 3 (4) None is the same as or close to th |

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1

2 B^+ trees are considered BALANCED because : (1) The lengths of the paths from the root to all leaf nodes are all equal 7. (2) The lengths of the paths from the root to all leaf nodes differ from each other by (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 : (4) $O(\log(m) + \log(n))$ (3) 0(m+n)(2) 0(n)(1) 0(m)A binary tree has *n* leaf nodes. The number of nodes of degree 2 in this tree is : 9. (4) 2^n (3) n (2) n-1(1) $\log_2 n$ 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? (4) 53124768 (3) 53241678 (2) 53126487 (1) 53124786 11. main() ł int a = 5, b = 2;printf("%d", a+++b); (2) prints 7 (1) results in syntax error (4) prints 5 (3) prints 8 The following program 12. main() int abc (); abc(); (*abc) (); 1 int abc () { print f ("come"); } (2) prints come (1) results in a completion error (4) results in a run time error (3) prints come come

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C

```
13. What does the following program print?
```

```
# include <stdio.h>
```

main()

inc(); inc(); inc();

inc()

static int x;
printf("%d", ++x);

- ſ
- (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
```

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) 7

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- - The statements 16.
 - int a = 5;
 - cont << "FIRST" >> (a << 2) << "SECOND";
 - outputs:
 - (1) FIRST 52 SECOND

(2) FIRST 20 SECOND

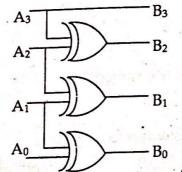
C

- (4) an error message

- (3) SECOND 25 FIRST

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

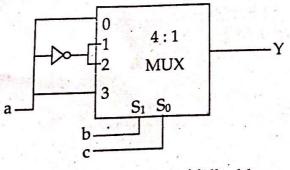
- C front : 18.
 - (1) is the front end of a C compiler
 - (2) is the preprocessor of a C compiler
 - (3) is a tool that translates a C++ code to its equivalent C code
 - (4) none of the above
- The circuit is used to convert one code to another. Identify it : 19.



(1) Binary to Gray

(2) Gray to Binary (4) Gray to 8421

- (3) Gray to XS-3
- the following multiplexer circuit is equal to : 20.



- (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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- **21.** Let *P*, *Q* and *R* be three atomic prepositional assertions. Let X denote $(P \lor Q) \rightarrow R$ and Y denote $(P \rightarrow R) \lor (Q \rightarrow R)$. Which one of the following is a tautology?
 - (3) $X \rightarrow Y$ (4) $\sim Y \rightarrow X$ (1) $X \leftrightarrow Y$ (2) $Y \rightarrow X$
- 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) $(\exists x \ p(x) \lor \exists x \ q(x)) \Rightarrow \exists x \ (p(x) \lor q(x)))$

C

- (3) $\exists x (p(x) \land q(x)) \Rightarrow (\exists x p(x) \land \exists x q(x))$
- (4) $\forall x (p(x) \lor q(x)) \Rightarrow (\forall x p(x) \lor \forall x q(x))$
- Akshay speaks the truth in 45% of the cases. In a rainy season, on each day there is a 23. 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)
$$\frac{27}{38}$$
 (2) $\frac{25}{35}$ (3) $\frac{31}{36}$ (4) $\frac{52}{128}$

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

(1)
$$\frac{{}^{n}C_{d}}{2^{n}}$$
 (2) $\frac{{}^{n}C_{d}}{2^{d}}$ (3) $\frac{d}{2^{n}}$ (4) $\frac{1}{2^{d}}$

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)

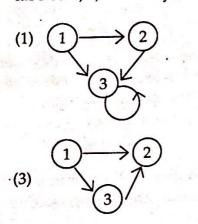
- (2) [0, 1] such that f'(c) = 2g'(c)
- (3) (0, 1) such that 2f'(c) = g'(c)

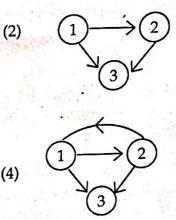
- (4) [0, 1] such that 2f'(c) = g'(c)
- **26.** (G, *) is an abelian group. Then :
 - (1) $x = x^{-1}$, for any x belonging to G
 - (2) $x = x^2$, for any x belonging to G
 - (3) $(x^*y)^2 = x^2 * y^2$, for any *x*, *y* belonging to *G*
 - (4) G is of finite order
- The number of equivalence relations of the set [1, 2, 3, 4] is : 27.
 - (1) 15 (2) 16 (3) 24 (4) 4
- In a set of integers, a relation R is defined as *a*R*b*, if and only if b = |a|. This relation is : 28. (1) Reflexive (2) Irreflexive (3) Symmetric (4) Anti-symmetric

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- 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.
 - (4) Neither P nor Q (3) Both P and Q (2) Q alone (1) P alone
- 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 : 30.





- Traffic intensity is expressed in : 31.
 - (1) Erlangs
 - (3) λ/sec
- Guard band is? 32.
 - (1) The channel spectrum
 - (2) The bandwidth allotted to signal
 - (3) The small unused bandwidth between the frequency channels to avoid interference

(4) dB/sec

- (4) The spectrum acquired by the noise between signals
- OLE stands for : 33.
 - (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

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(2) Erlangs/MHz/km

Identify the correct sequence in which the following packets are transmitted on the 35. 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 Standard protocols like HTTP, SMTP, MNTP are part of : 36. (1) Presentation layer (2) Application layer (3) Session layer (4) Not part of any layer The representation of the value of a 16-bit unsigned integer X in hexadecimal number 37. system is BCA9. The representation of the value of X in Octal number system is : (1) 136251 (2) 571244 (3) 736251 (4) 571247 In data flow diagram, an originator or receiver of data is usually designed by : 38. (1) Circle (2) Arrow (3) Rectangle (4) Square box Consider the following function implemented in C : 39. void print xy(int x, int y)- diam 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 Linked lists of NULL pointers to signal : 40. (1) end of list (2) start of list (3) Either (1) or (2) (4) Neither (1) nor (2)

С

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8

| 41. | Which of the follo (1) Text editor | owing system softwar (2) Assembler | re resides in main m (3) Linker | emory always ? (4) Loader | |
|------------------|--|---------------------------------------|--|--|-------|
| 42. | - 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 | | | om the standard input ? | |
| | (1) awk | (2) grep | (3) sed | (4) tr | |
| 43. | The CC comman | d makes a total of : | | ana an | |
| | (1) 1 pass | (2) 2 passes | (3) 4 passes | (4) 5 passes | |
| 44. | The following C | program | Casilia - | | |
| | main() | F8 | | a har a the Western | |
| • 2 2 2 2 | 1 | | on a configer of | and the second | |
| | fork (); fork | (); printf ("yes"); | en de la companya de La companya de la comp | | |
| • | 1 | (<i>"</i> F(<i>) "</i> | | | |
| | prints yes : | | | and the second second | |
| | (1) only once | (2) twice | (3) 4 times | (4) 8 times | 1 + 4 |
| | | | 1 | (+) o times | |
| 45. | Which of the fol | lowing calls never re | turns an error ?. | 4 | |
| | (1) getpid | (2) fork | (3) `ioctl | (4) open | |
| 46. | The following se | equence of command | s grep x * . c > mn & | c | |
| | wc – 1 mn& | | | | |
| | rm mn& | | | | |
| * | produces the sam | me result as the singl | e command : | | |
| | (1) grep x*.c | wc - 1 | (2) wc $-1 < gr$ | ep x * .c | |
| | (3) grep x *.c > | | (4) None of the | | |
| | | | | | |
| 47. | And the second sec | placement is FIFO, th | X | A; B; C; D; A; B; E; A; B; C; I which transfer with an emp | |
| | (1) 8 . | (2) 10 | (3) 9 | (4) 7 | |

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48. Which of the following is FALSE ?

C

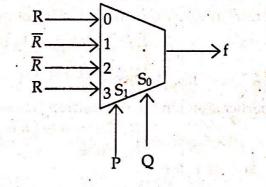
- (1) User level threads are not scheduled by the Kernel
- (2) When a user level thread is blocked, all other threads of its processes are blocked
- (3) Context switching between user level threads is faster than context switching between Kernel level threads
- (4) Kernel level threads cannot share the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

(4), 3

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
- **51.** The Boolean expression for the output f of the multiplexer shown below is :

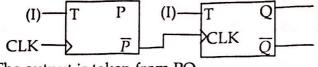


- (1) $\overline{P \oplus Q \oplus R}$ (2) $P \oplus Q \oplus R$ (3) P + Q + R (4) $\overline{P + Q + R}$
- 52. A 4-bit MOD-16 ripple counter uses JK flip-flops. If the propagation delay of each flip-flop is 50 ns sec, the maximum clock frequency that can be used is equal to :
 (1) 2 MHz
 (2) 3 MHz
 (3) 5 MHz
 (4) 20 MHz

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- 10
 - For a given counter identify its behaviour : 53.



The output is taken from PQ

- (1) MOD-4 up counter
- (3) MOD-4 down counter
- (2) MOD-2 down counter
- (4) MOD-2 up counter
- Consider the following two tables T_1 and T_2 54.

| <i>T</i> ₁ | | | <i>T</i> ₂ | | |
|-----------------------|---|---|-----------------------|---|---|
| Р | Q | R | A | В | C |
| 11 | a | 6 | 11 | b | 7 |
| 16 | b | 9 | 26 | с | 4 |
| 26 | a | 7 | 11 | b | 6 |

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

- Suppose $R_1(A, B)$ and $R_2(C, D)$ are two relation schemas. Let R_1 and R_2 be the 55. 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) $\prod_{B} (R_1) \prod_{C} (R_2) = \phi$
 - (3) $\prod_{B} (R_1) \prod_{C} (R_2) \neq \phi$
- (2) $\prod_{C} (R_2) \prod_{B} (R_1) = \phi$
- (4) Both (1) and (2)
- The number of entities participating in the relationship is known as : 56.
 - (1) Maximum cardinality
- (2) Composite identifiers

(3) Degree

(4) None

57. Which one is correct?

· (1) 2

- (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

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97 33-28 3VO 63

C

58. For the given tables

| | A |
|-------------|---|
| [| XYB |
| | $a_1 b_1 Y$ |
| 101. | a_2 b_1 b_1 |
| | $\begin{array}{c cc} a_2 & b_2 & b_2 \\ \hline a_1 & b_2 & \end{array}$ |
| • | $\begin{bmatrix} a_1 & b_2 \end{bmatrix}$ A ÷ B will return : |
| | (1) a_1, a_2 (2) a_1 (3) a_2 (4) None of these |
| | Consider the join of a relation A with a relation B. If A has m tuples and B has n |
| 9. | tuples, then the maximum and minimum sizes of the join respectively are. |
| | (1) $mn \text{ and } m + n$ (2) $(m + n) \text{ and } (m - n)$ |
| | (3) mn and m (4) mn and 0 |
| 60. | Which one is <i>not</i> 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 |
| 1. 181 - | (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 <i>n</i> 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 : |
| 05. | (1) 3000 bps (2) 6000 bps (3) 1500 bps (4) None of the above |
| 66. | The Hamming distance between 001111 and 010011 is : |
| 00. | (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 ? |
| | |

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| | Congestion control for multic destinations, the solution that car | n nanule ui | 13 10 . | | None State | |
|------------|---|--|---|-----------------------|--|---------------------------|
| | (1) RSVP | | Load shedd | | | |
| | (3) Both (1) and (2) | | None of the | | | |
| 69. | Which one of the following pro another one ? | tocols is no | ot used to re | | | lress to . |
| | (1) DNS (2) ARP | | DHCP | 1 | RARP | |
| 70. | Consider the given IP address 15 number of hosts and subnets ? (1) 512, 128 (2) 510, 126 | | | | of 7-bits, what 509, 125 | are the |
| 71. | In an encryption scheme that us respectively. What could be the v | es RSA, val | lues fọr p an | d q are : (4) | and the second second | and 7 |
| | (1) 12 | 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1 | an an an an an an an an Anna Anna Anna Anna An An an Anna Anna | | - Sisha divisi | 38N |
| 72. | What is the size of key in triple E (1) 168 bits (2) 112 bits |)ES ? (3) | 56 bits | (4) | Either (1) or (2) |) or (3) |
| 73. | (1) Functional requirements (3) Goals of implementation | (2) (4) | Non-function Algorithms | for soft | ware implemen | |
| 74. | According to Brooks, adding mor (1) late (3) does not impact schedule | (2) (4) | fast None of the | above | | |
| | | | 8.2, what is | the eff | ort in person | month |
| 75. | For a real time software the k calculated by using basic COCO | MO model | ? | | | |
| 75. | For a real time software the k calculated by using basic COCON (1) 146 (2) 198 | MO model (3) | ? 220 | (4) | 248 | |
| | For a real time software the k calculated by using basic COCOI (1) 146 (2) 198 | MO model (3) elined proc | ? 220 essors : | (4) | 248 | 20 |
| 75. 76. | For a real time software the k calculated by using basic COCOR (1) 146 (2) 198 Register renaming is done in pipe (1) as an alternative to register a | MO model (3) elined proc llocation at | ? 220 essors : compile tim | (4) e | 248 | 26 |
| | For a real time software the k calculated by using basic COCOR (1) 146 (2) 198 Register renaming is done in pipe (1) as an alternative to register a (2) for efficient access to function | MO model (3) elined proc llocation at n parameter | ? 220 essors : compile tim | (4) e variables | 248 | 28 |
| | For a real time software the k calculated by using basic COCOR (1) 146 (2) 198 Register renaming is done in pipe (1) as an alternative to register a (2) for efficient access to function (3) to handle certain kinds of has | MO model (3) elined proc llocation at n parameter zards | ? 220 essors : compile tim rs and local y | (4) e variables | 248 90.10 - 5 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 - 6 | 20 20 |
| | For a real time software the k calculated by using basic COCOR (1) 146 (2) 198 Register renaming is done in pipe (1) as an alternative to register a (2) for efficient access to function (3) to handle certain kinds of has (4) as part of address translation | MO model (3) elined proc llocation at n parameter zards | ? 220 essors : compile tim rs and local y | (4) e variables | 248 | 2 0 |
| 76. | For a real time software the k calculated by using basic COCON (1) 146 (2) 198 Register renaming is done in pipe (1) as an alternative to register a (2) for efficient access to function (3) to handle certain kinds of has (4) as part of address translation EDL over Internet uses : | MO model (3) elined proc llocation at n parameter zards | ? 220 essors : compile tim rs and local y | (4) e variables | 248 | 20 25 23 |
| | For a real time software the k calculated by using basic COCON (1) 146 (2) 198 Register renaming is done in pipe (1) as an alternative to register a (2) for efficient access to function (3) to handle certain kinds of has (4) as part of address translation EDL over Internet uses : | MO model (3) elined proc llocation at n parameter zards | ? 220 essors : compile tim rs and local y | (4) e variables | 248 | 202 205 20 2 |
| 76. | For a real time software the k calculated by using basic COCOR (1) 146 (2) 198 Register renaming is done in pipe (1) as an alternative to register a (2) for efficient access to function (3) to handle certain kinds of has (4) as part of address translation EDI over Internet uses : (1) MIME to attach EDI forms to (2) FTP to send business forms | MO model (3) elined proc llocation at n parameter zards e-mail mes | ? 220 essors : compile tim rs and local v | (4) e variable | 248 | 248 215 213 |
| 76. | For a real time software the k calculated by using basic COCON (1) 146 (2) 198 Register renaming is done in pipe (1) as an alternative to register a (2) for efficient access to function (3) to handle certain kinds of has (4) as part of address translation EDL over Internet uses : | MO model (3) elined proc llocation at n parameter zards e-mail mes | ? 220 essors : compile tim rs and local v | (4) e variable | 248 | 20 23 24 |

C

C

In electronic cash payment : 78. (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 Commonly used mode for 3G networks is : 79. (1) **TDMA** (2) FDMA (4) TDD (3) FDD The shape of the cellular region for maximum radio coverage is : 80. (1) Circular (2) Square (4) Hexagon (3) Oval A wheel graph with eleven vertices has a chromatic number of : 81. (1) 3 (2) 4 (4) None of these (3) 2 Which of the following is a correct match? 82. 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 (d) A path that begins and ends at the same vertex (iv) Planar Graph (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 Which one of the following is the minimum error code ? 83. (1) Octal code (2) Gray code (3) Binary code (4) Excess-3 code The minimum number of NAND gates required to implement $A \oplus B \oplus C$ is : 84. (1) 8 (2) 10 (3) 9 (4) 6 How many 2-input multiplexers are required to construct a 2¹⁰-input multiplexer ? 85. (1) 31 (2) 10 (3) 127 (4) 1023 How many 3-to-8 line decoders with an enable input are needed to construct a 6-to-64 86. line decoder without using any other logic gates ? (1) 7(2) 8 $(3) \cdot 9$ (4) 10

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| 87. | The values of x and | $y, 	ext{ if } (x567)_8 + (2yx)_8$ | $(5)_8 = (71yx)_8$ is : | |
|------------|---|------------------------------------|--|---|
| | (1) 1 3 | (2) 3.3 | (3) 4, 4 | (4) 4, 5 |
| 88. | A computer uses fractional mantiss represented by a f and the sign bit set | loating-point numb | epresentation com 6 base-8 exponen ber whose exponen (3) – 320 | prising a signed magnitude t. What decimal number is nt is 10011, mantissa 101000, (4) – 0.00122 |
| • | (1) - 6250 | (2) -20480 | (3) = 320 | 74. (A. 1997) A. 1997 |
| 89. | The following prog for (<i>i</i> = 3); <i>i</i> < 15; <i>i</i> + print f("%d", <i>i</i>), results in : (1) a syntax error (3) printing of 12 | + =3); | (2) an executior(4) printing of 1 | n error .5 |
| 90. | The body of the fol for (putchar ('a'); p putchar ('b'); will be executed : (1) 0 times (2) 1 times (3) Infinitely many (4) will not be exec | utchar(0); putchar('o | | |
| 91. | Consider the gram | mar | | |
| | $S \rightarrow a$ | | | |
| | $S \rightarrow ab$ | | | |
| ~ <u>-</u> | The given gramma (1) LR (1) only (3) Both LR (1) an | e nas jensti (| (2) LL (1) only (4) LR (1) but no | |
| 92. | The FIRST and FOI | LOW sets for the g | rammar : | |
| | $S \rightarrow SS + SS^* a$ (1) FIRST(S) = {a} FOLLOW(S) = (3) FIRST(S) = {a} FOLLOW(S) = | {+, *, \$} {+, *} | (2) FIRST(S) = {- FOLLOW(S) (4) FIRST(S) = {- FOLLOW(S) | <pre>= {+, *, \$} +, *} = {+, *, \$}</pre> |
| M.Phil | ./Ph.D./URS-EE-No | v2018/(Comp. Sci. |)(SET-Y)/(C) | in white endertain with h |
| | | | | |

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С

| 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. | |
| | (1) $n_1 < n_2 < n_3$ (2) $n_1 = n_3 < n_2$ (3) $n_1 = n_2 = n_3$ (4) $n_1 \ge n_3 \ge n_2$ |
| 96. | Consider the following Syntax Directed Translation Scheme (SDTS) with non-terminals $\{S, A\}$ and terminals $\{a, b\}$ |
| 4 | $S \rightarrow aA$ {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 <i>aab</i> 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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A compiler-compiler is a : 100.

- (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

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Total No. of Printed Pages : 17 (DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO) M.Phil./Ph.D./URS-EE-Nov.-2018 SUBJECT : Computer Science

| 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 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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| Read Providence | | | | | A Read at the | |
|-----------------|--|-------------------------|-----------------|--|---|-----------|
| 1 | A wheel graph wi | th eleven v | ertices has a c | chromatic numb | er of : | 1.5 |
| | (1) 3 | (2) 4. | | 3) 2 | (4) None of the | se |
| 2. | Which of the follow List-I | wing is a co | orrect match a | Lis | - | |
| | (i) Circuit(ii) Connected gray(iii) Euler Path | ph (b) | A path that co | path between ev ontains every edg | ery distinct pair of ve e of a graph exactly o plane with no crossi | once |
| | (iv) Planar Graph | (d) | A path that be | egins 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 f | ollowing is | the minimum | n error code ? | | |
| | (1) Octal code | (2) Gray | |) Binary code | (4) Excess-3 cod | e |
| 4. | The minimum num (1) 8 | nber of NA (2) 10 | | uired to implen) 9 | thent $A \oplus B \oplus C$ is : (4) 6 | |
| 5. | How many 2-input | t multiplex | ers are requir | ed to construct : | 2 ¹⁰ -input multipl | ever? |
| (8.33 - | (1) 31 | (2) 10 | 10 | 127 | (4) 1023 | |
| 6. | How many 3-to-8 l line decoder witho (1) 7 | | y other logic | | eeded to construct a | a 6-to-64 |
| 7. | The values of x and | l y, if (x567 | $(2yx5)_{g} =$ | $(71yx)_{g}$ is: | | |
| | (1) 4,3 | (2) 3, 3 | | 4,4 | (4) 4,5 | |
| 8. | A computer uses fractional mantissa represented by a f and the sign bit set | a and an loating-poi | excess-16 bas | se-8 exponent. | What decimal nu | mber is |
| | (1) - 6250 | (2) -2048 | 80 (3) | - 320 | (4) - 0.00122 | 10 120 |
| 9. | The following prog for (<i>i</i> = 3); <i>i</i> < 15; <i>i</i> + printf("%d", <i>i</i>); | - | ent in C | an ang san | | |
| | results in : | | (0) | | | |
| | (1) a syntax error(3) printing of 12 | | | an execution e printing of 15 | rror | |
| | (o) printing of 12 | | (*) | P | | |

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D

P. T. O.

2

- 10. The body of the following for loop for (putchar ('a'); putchar(0); putchar('c')) putchar ('b'); will be executed :
 - (1) Oliver
 - (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
 - (3) λ/sec

- (2) Erlangs/MHz/km
- (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

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D 3 Standard protocols like HTTP, SMTP, MNTP are part of : 16. (1) Presentation layer (2) Application layer (3) Session layer (4) Not part of any layer The representation of the value of a 16-bit unsigned integer X in hexadecimal number 17. system is BCA9. The representation of the value of X in Octal number system is : (1) 136251 (2) 571244 (3) 736251 (4) 571247 In data flow diagram, an originator or receiver of data is usually designed by : 18. (1) Circle (2) Arrow (3) Rectangle (4) Square box Consider the following function implemented in C : 19. 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 Linked lists of NULL pointers to signal : 20. (1) end of list (2) start of list (3) Either (1) or (2) (4) Neither (1) nor (2) Semaphore operations are atomic because they are implemented within the ... 21. (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

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| 23. | The maximum number of processes that can be in ready state for a computer system with <i>n</i> CPUs is : | | | | | |
|-----|--|---|--|--|--|--|
| | (1) n (2) n^2 | (3) 2^n (4) Independent of n | | | | |
| 24. | (4) 5750 | lacement 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 00 |)1111 and 010011 is : | | | | |
| | (1) 1 (2) 2 | (3) 3 (4) 4 | | | | |
| 27. | There are 5 routers and 6 networks many routing tables are there ? | s in an interworking, using link state routing, how | | | | |
| | (1) 1 (2) 5 | (3) 6 (4) 11 | | | | |
| 28. | Congestion control for multicas destinations, the solution that can h | ting flows from multiple sources to multiple nandle this is : | | | | |
| | (1) RSVP | (2) Load shedding | | | | |
| | (3) Both (1) and (2) | (4) None of these | | | | |
| 29. | Which one of the following protoc another one ? | cols is <i>not</i> used to resolve one form of address to | | | | |
| | (1) DNS (2) ARP | (3) DHCP (4) RARP | | | | |
| 30. | Consider the given IP address 156.2 number of hosts and subnets ? | 216.24.65 with a subnet mark of 7-bits, what are the | | | | |
| | (1) 512, 128 (2) 510, 126 | (3) 511, 127 (4) 509, 125 | | | | |
| 31. | Consider the grammar | | | | | |
| | $S \rightarrow a$ | | | | | |
| | $S \rightarrow ab$ | in the second | | | | |
| | The given grammar is : | The second second ten and the | | | | |
| | (1) LR (1) only | (2) LL (1) only | | | | |
| | (3) Both LR (1) and LL (1) | (4) LR (1) but not LL (1) | | | | |
| | | | | | | |

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 $S \rightarrow SS + |SS^*|a$ (1) $FIRST(S) = \{a\}$ (2) $FIRST(S) = \{+\}$ $FOLLOW(S) = \{+, *, \$\}$ $FOLLOW(S) = \{+, *, \}$ (3) $FIRST(S) = \{a\}$ (4) $FIRST(S) = \{+, *\}$ FOLLOW(S) = {+, *} FOLLOW(S) = {+, *, \$} **33.** YACC builds up : (1) SLR passing table (2) Canonical LR passing table (3) LALR passing table (4) None of these Resolution of externally defined symbols is performed by a : 34. (1) Linker (2) Loader (3) Compiler (4) Interpreter **35.** 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) $n_1 \ge n_3 \ge n_2$ 36. Consider the following Syntax Directed Translation Scheme (SDTS) with nonterminals {*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 Replacing the expression 2 * 3.14 by 6.28 is : 37. (1) Constant folding (2) Induction variable (4) Code reduction (3) Strength reduction

ins addresses in the correct address

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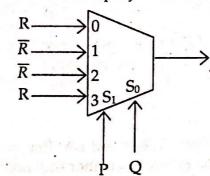
- The evaluation strategy which delays the evaluation of an expression until its value is 38. needed and which avoids repeated evaluations is :
 - (1) Early evaluation

- (2) Late evaluation
- (3) Lazy evaluation
- (4) Critical evaluation
- In a two pass assembler the pseudo-code EQU is to be evaluated during : 39.
 - (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
- The Boolean expression for the output *f* of the multiplexer shown below is : 41.

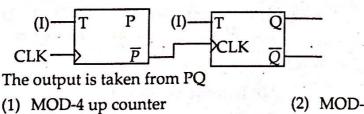


(1) $P \oplus Q \oplus R$ (4) P + Q + R(2) $P \oplus Q \oplus R$ (3) P + Q + R

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 : (4) 20 MHz

(2) 3 MHz (3) 5 MHz (1) 2 MHz

43. For a given counter identify its behaviour :



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

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44. Consider the following two tables T_1 and T_2

| T_1 | | | T ₂ | | |
|-------|---|---|----------------|---|---|
| Р | Q | R | A | В | С |
| 11 | a | 6 | 11 | b | 7 |
| 16 | b | 9 | 26 | с | 4 |
| 26 | a | 7 | 11 | b | 6 |

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

| CORNEL CONTRACTOR | | $T_1 \Join_{($ | T1.P = T2.A | A) T_2 | et on spirite Mariji da dag |
|-------------------|-------|----------------|-------------|----------------------------|--------------------------------|
| (1) 2 | (2) 3 | 81 (L); (L) | (3) 4 | i e de la de Seconda de | (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
 - (3) Degree

- (2) Composite identifiers
- (4) None

- 47. Which one is correct?
 - (1) Primary Key \subset Super Key \subset Candidate Key
 - (2) Candidate Key ⊂ Super Key ⊂ Primary Key
 - (3) Super Key \subset Primary Key \subset Candidate Key
 - (4) Primary Key \subset Candidate Key \subset Super Key

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D 8 For the given tables 48. А X Y B **a**1 bı Y bı b_1 a2 b₂ b2 a2 b₂ a $A \div B$ will return : (4) None of these $(2) a_1$ (1) a_1, a_2 (3) a₂ 49. Consider the join of a relation A with a relation B. If A has m tuples and B has ntuples, then the maximum and minimum sizes of the join respectively are : (2) (m + n) and (m - n)(1) mn and m + n(3) mn and m(4) mn and 0 Which one is not a query language? 50. (4) Data log (2) QBE (3) My SQL (1) SQL 51. main() int a = 5, b = 2;printf("%d", a+++b); (2) prints 7 (1) results in syntax error (4) prints 5 (3) prints 8 The following program 52. main() 1 int abc (); abc(); (*abc) (); ł int abc() { print f ("come"); } (1) results in a completion error (2) prints come (4) results in a run time error (3) prints come come

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53. What does the following program print ? # include <stdio.h> main()

```
inc(); inc(); inc();
```

inc()

D

. {

}

{

1

```
static int x;
printf("%d", ++x);
```

13.92.

- (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 ()
```

ł

ł

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

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The statements 56.

- int a = 5;cont << "FIRST" >> (a << 2) << "SECOND"; outputs: (1) FIRST 52 SECOND
 - (2) FIRST 20 SECOND

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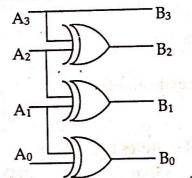
(3) SECOND 25 FIRST

(4) an error message

Which of the following is not a storage class supported by C++?(4) Dynamic (3) Mutable 57. (2) Auto (1) Register

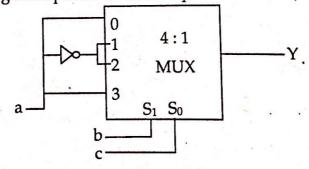
C front : 58.

- (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
- The circuit is used to convert one code to another. Identify it : 59.



- (1) Binary to Gray
- (3) Gray to XS-3

- (2) Gray to Binary (4) Gray to 8421
- the following multiplexer circuit is equal to : 60.



- (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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| v | | | | 7 4 | | |
|--------|---|----------------|---|----------------|--|----------------|
| 61. | Consider the given relation and function $FD = (AB \rightarrow C, C \rightarrow A)$ | nal c | lependencies R(| ABC |) | |
| | The relation is in which normal form ? | | | | | |
| | (1) 1 NF (2) 2 NF | (3) | 3 NF | (4) | BCNF | |
| 62. | | | n de tel servietar E (tración de tel serviet | | | |
| | $AF \to D$ $DE \to F$ $C \to G$ | | a la sector | | na serieri an Santari | |
| 1 der | $F \rightarrow E$ | | | • | ng kanalan in | |
| - 64 | $G \rightarrow A$ Which one of the following is false ? | entra) | ite an sinad | | alice vyraid S | 621. |
| | (1) $\{CF\}^+ = \{ACDFEG\}$ | (2) | $\{BG\}^+ = \{ABCL\}$ | 9G} | | |
| | (3) $\{AB\}^+ = \{ABCDG\}$ | (4) | $\{AF\}^+ = \{ACDE\}$ | FG} | | |
| 63. | The maximum number of superkeys for the key is : | or th | e relation schen | na R | (E, F, G, H) with | E as |
| | (1) 6 (2) 7 | (3) | 8 | (4) | 9 | |
| 64. | A hash function f defined as f (key) = key the keys 37, 38, 72, 48, 98, 11, 56 into location of key 11? | ey m a tab | od 7, with linea le indexed fror | r pro n 0 t | bing, is used to i o 6. What will b | nsert e the |
| | (1) 5 (2) 6 | (3) | 4 | (4) | 3 | |
| 65. | Consider the following : | | 20 J. 19 1 2 4 | | | |
| | Block size = 1025 bytes | | Section 4 | | | |
| | Record length in data file = 100 bytes | | | | The second second | |
| | Total number of records = 30000 | | | | | |
| | Search key = 9 bytes | • | | | | |
| | Pointer = 6 bytes | | | | | |
| C | What is the number of index blocks ? | | | 1. | | |
| | (1) 44 (2) 45 | (3) | 46 | (4) | None | |
| 66. | A file is organized so that the ordering ordering of data entries in some index. | ; of c Then | lata records is t that index is ca | he s lled | ame as or close t ? | o the |
| | (1) Dense (2) Sparse | | Clustered | (4) | Unclustered | |
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| 12 | | | | D |
|-----------|---|--|--|---|
| 67. | B^+ trees are considered 1 | BALANCED becau | 1se : | |
| | (1) The lengths of the pa | | | all equal |
| | | | | ffer from each other by |
| | (3) The number of childr | ren of any two nor | l-leaf sibling nodes of | liffer by at most 1 |
| | (4) The number of record | ds in any two leaf | nodes differ by at m | ost 1 |
| 68. | For merging two sorted require comparisons of : | | | |
| | (1) $0(m)$ (2) (2) |)(<i>n</i>) (3) | $0(m+n) \qquad (4$ | $0(\log(m) + \log(n))$ |
| 69. | A binary tree has n leaf no | | | |
| | (1) $\log_2 n$ (2) <i>n</i> | | |) 2 ⁿ |
| 70. | A binary search tree conta preorder and the values a output ? | ains the values 1, 2 are printed out. W | 2, 3, 4, 5, 6, 7 and 8. Thich of the followin | The tree is traversed in ng sequences is a valid |
| | (1) 53124786 (2) 5 | 3126487 (3) | 53241678 (4) | 53124768 |
| 71. | Which of the following sy | stem software res | ides in main memor | y always ? |
| | (1) Text editor (2) A | Assembler (3) | Linker (4) | Loader |
| 72. | Which of the following Ul | NIX tools receives | input only from the | standard input ? |
| | (1) awk (2) g | rep (3) | sed (4) | tr |
| 73. | The CC command makes a | a total of : | | 145. AV |
| | (1) 1 pass (2) 2 | passes (3) | 4 passes (4) | 5 passes |
| 74. | The following C program | | | |
| 1 | nain() | | | |
| | | | | |
| | fork (); fork (•); print f | ("yes"); | and the second second | |
| } | | | · · · | |
| F | rints yes : | | | |
| (| l) only once (2) tw | vice (3) | 4 times (4) | 8 times |
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| D | | | | | 13 |
|------|---|---|---|--|----------------------------------|
| 75. | Which of the | following calls never | returns an error ? | | |
| | (1) getpid | (2) fork | (3) ioctl | (4) open | |
| 76. | The followin | g sequence of comman | nds grep x * . c > mr | 1 & | |
| | | e et elle a start a de la | | | |
| | rm mn& | and the second second | 1 | 9- (• 14 | e at suge |
| | produces the | e same result as the sir | gle command : | | |
| | (1) grep x * | .c. wc-1 | (2) wc $-1 < 8$ | grep x * .c | |
| | (3) grep x *. | .c > wc – 1 | (4) None of t | he above | : |
| 77. | E. If the pag | | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | er A; B; C; D; A; B; E; A es which transfer with a | |
| | (1) 8 | (2) 10 | (3) 9 | (4) 7 | • |
| 78. | . Which of th | e following is FALSE ? | and a second second | | |
| | (1) User lev | vel threads are not sche | eduled by the Kerne | ्रिय प्राणं के अपने किया होता थे. जन्म | |
| | (2) When a | user level thread is blo | ocked, all other threa | ids of its processes are l | blocked |
| | | switching between un Kernel level threads | iser level threads is | faster than context s | witching |
| | (4) Kernel l | evel threads cannot sh | are the code segmer | t | |
| 79. | A shared va X, Y, Z as fo | | 0, is operated one b | y four concurrent proc | cesses W, |
| | memory, ar memory, de process befo S and invol | nd the then terminate ecrements by two, sto ore reading x invokes | es. Each of the properties it to memory, the <i>P</i> operation (i.e. i.e. signal) on the | , increments by one, st ocesses Y and Z reads and the then terminal wait) on a counting se semaphore S after sto | s x from tes. Each maphore |
| | What is the | maximum possible va | lue of x after all pro | cesses complete execut | ion ? |
| | (1) -2 | (2) -1 | (3) 1 | (4) 2 | |
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To avoid the race condition, the number of processes allowed in critical section is : 80. (3) 2 **81.** Let *P*, *Q* and *R* be three atomic prepositional assertions. Let X denote $(P \lor Q) \rightarrow R$ and *X* denote $(P \lor Q) \rightarrow R$ and Y denote $(P \rightarrow R) \lor (Q \rightarrow R)$. Which one of the following is a tautology ? $(4) \quad \sim Y \to X$ $(3) X \to Y$ (2) $Y \rightarrow X$ **82.** Which one of the following well-formed formulae in predicate calculus is *not* valid? (1) $X \leftrightarrow Y$ (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) $\forall x (p(x) \lor q(x)) \Rightarrow (\forall x p(x) \lor \forall x q(x))$ 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 83. that it is raining outside. What is the probability that it is actually raining? (4) $\frac{52}{128}$ (3) $\frac{31}{36}$ (2) $\frac{25}{35}$ (1) $\frac{27}{38}$

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 :

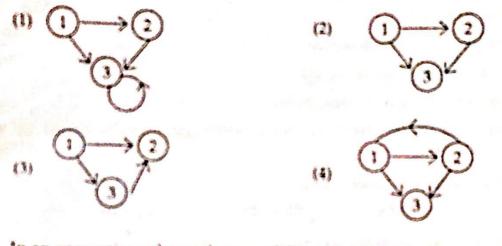
(1)
$$\frac{{}^{n}C_{d}}{2^{n}}$$
 (2) $\frac{{}^{n}C_{d}}{2^{d}}$ (3) $\frac{d}{2^{n}}$ (4) $\frac{1}{2^{d}}$

- **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

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 - **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) Palone (2) Qalone (3) Both Pand 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 M³ 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 |
|---|-------|---------|---------|---------|
| | | | | |

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- 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 Camputer Science

M. Phil/ PhD/URS Entrance Examination Answer Key

Maharshi Dayanand University Rohtak

Deptt. of Computer Science

M. Phil/ PhD/URS Entrance Examination Answer

| Sr. No. | Set-A | Set-B | Set-C | Set-D | Sr. No. | Set-A | Set-B | Set-C | Set-l |
|---------|-------|-------|-------|-------|---------|-------|--------|--------|-------|
| 1 | С | Ą | С | A | 51 | D | D | В | B |
| 2 | D | B / | D | С | 52 | A | D | C | C |
| 3 | A | D ~ | С | В | 53 | С | D | A | B |
| 4 | A | A | A | A | 54 | A | C - | B | D |
| 5 | A | В | В | D | 55 | В | A - | A | A |
| 6 | С | C | С | С | 56 | C | D / | С | B |
| 7 | A | Β | A | A | 57 | A | C | D | D |
| 8 | D | Α / | С | С | 58 | С | D | A | C |
| 9 | В | C < | В | D | 59 | A | D | D | A |
| 10 | A | B < | D | A | 60 | В | B / | C | A |
| 11 | A | D | В | A | 61 | D | C / | A | C |
| 12 | С | A / | С | C | 62 | D | D / | B | D |
| 13 | В | C / | В | С | 63 | D | D / | D | C |
| 14 | A | A / | D | В | 64 | C | A | A | A |
| 15 | D | B / | A | D | 65 | A | B | B | B |
| 16 | С | C / | В | В | 66 | D | C / | C | C |
| 17 | А | Α ′ | D | A | 67 | C | A / | B | A |
| 18 | С | C / | С | D | 68 | D | D / | A | C |
| 19 | D | Α - | A | С | 69 | D | C / | C | B |
| 20 | A | B - | A | A | 70 | B | D / | B | D |
| 21 | В | Β - | С | A | 71 | A | C < | C | |
| 22 | C. | C - | D | В | 72 | B | D | D | D |
| 23 | В | Α - | A | D | 72 | D | C | D | D |
| 24 | D | B ~ | A | A | 74 | A | A | | D |
| 25 | A | Α - | A | В | 75 | B | B | A | C. |
| 26 | В | C / | С | C | 76 | C | С | B C | A |
| 27 | D | D / | A | B | 70 | В | | | D |
| 28 | С | Α - | D | A | 78 | A | A C | A | С |
| 29 | A | D - | B | C | 78 | C | B | D C | D |
| 30 | A | C / | A | B | 80 | В | D | | D |
| 31 | В | Α - | A | D | 81 | C | | D | В |
| 32 | С | C ~ | С | A | 82 | D | B | A. | C. |
| 33 | A | B / | C | C | 83 | | C | C. | D |
| 34 | В | A < | В | A | 84 | D | B | B | A |
| 35 | A | D / | D | B | 84 | A | D | A | A |
| 36 | C | C / | B | C | 86 | B | A | D | A |
| 37 | D | A - | A | A | 86 | | B | C | С |
| 38 | A | C / | D. | C | | A | D | A | A |
| 39 | D | D / | C | A | 88 | D | C | C | D |
| 40 | C | A / | A | B | 89 | C | A | D | В |
| 41 | C | A / | D | B | 90 | D | A | A | A |
| 42 | D | C / | D | C | 91 | A | С | D | С |
| 43 | C | C ~ | D | | 92 | C | D | A | D · |
| 44 | A | B / | C | A B | 93 | C | A | | D |
| 45 | B | D / | | | 94 | | A | | A |
| 46 | С | B | A | A | 95 | | | | B |
| 40 | A | A / | D | C | 96 | | | | С |
| 47 | C | D / | C | D | 97 | | | | Α - |
| 48 | B | | D | A | 98 | | | С | D. |
| | | C | D | D | 99 | С | В | A | С |
| 50 | D | Α / | В | С | 100 | A | A | В | D |

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