



**Discipline: COMPUTER SCIENCE & ENGINEERING**

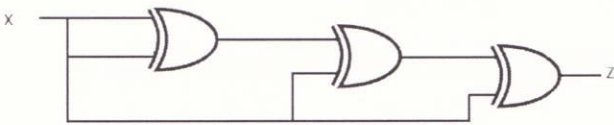
(Faculty of Engineering & Technology)

**3rd PhD ENTRANCE TEST (PET-2018)**

Roll No: \_\_\_\_\_ Date: **3rd June 2018** Signature of the Candidate: \_\_\_\_\_

- 1  $P \rightarrow (Q \rightarrow R)$  is equivalent to:  
 (a)  $(P \wedge Q) \rightarrow R$       (b)  $(P \vee Q) \rightarrow R$       (c)  $(P \vee Q) \rightarrow \neg R$       (d) None of these
- 2 Identify the correct translation into logical notation of the following assertion.  
"Some boys in the class are taller than all the girls"  
Note: taller(x,y) is true if x is taller than y.  
(a)  $(\exists x) (\text{boy}(x) \rightarrow (\forall y) (\text{girl}(y) \wedge \text{taller}(x,y)))$       (b)  $(\exists x) (\text{boy}(x) \wedge (\forall y) (\text{girl}(y) \wedge \text{taller}(x,y)))$   
(c)  $(\exists x) (\text{boy}(x) \rightarrow (\forall y) (\text{girl}(y) \rightarrow \text{taller}(x,y)))$        (d)  $(\exists x) (\text{boy}(x) \wedge (\forall y) (\text{girl}(y) \rightarrow \text{taller}(x,y)))$
- 3 Suppose p is the number of cars per minute passing through a certain road junction between 5 PM and 6 PM, and p has a Poisson distribution with mean 3. What is the probability of observing fewer than 3 cars during any given minute in this interval?  
(a)  $8 / (2e^3)$       (b)  $9 / (2e^3)$        (c)  $17 / (2e^3)$       (d)  $26 / (2e^3)$
- 4 Four fair coins are tossed simultaneously. The probability that at least one head and one tail turn up is :  
(a)  $1/16$       (b)  $1/8$        (c)  $7/8$       (d)  $15/16$
- 5 Given Set A = {2, 3, 4, 5} and Set B = {11, 12, 13, 14, 15}, two numbers are randomly selected, one from each set. What is the probability that the sum of the two numbers equals 16?  
 (a) 0.20      (b) 0.25      (c) 0.30      (d) 0.33
- 6 In a class of 40 students, 12 enrolled for both English and German. 22 enrolled for German. If the students of the class enrolled for at least one of the two subjects, then how many students enrolled for only English and not German?  
(a) 30      (b) 10       (c) 18      (d) 28
- 7 Which one of the following is NOT necessarily a property of a Group?  
 (a) Commutativity      (b) Associativity  
(c) Existence of inverse for every element      (d) Existence of identity
- 8 Let  $f: B \rightarrow C$  and  $g: A \rightarrow B$  be two functions and let  $h = f \circ g$ . Given that h is an onto function. Which one of the following is TRUE?  
(a) f and g should both be onto functions.       (b) f should be onto but g need not be onto  
(c) g should be onto but f need not be onto      (d) both f and g need not be onto
- 9 In how many different ways can the letters of the word 'RUMOUR' be arranged?  
(a) None of these      (b) 128      (c) 360       (d) 180



- 10 The number of distinct relations on a set of 3 elements is:  
 (a) 8 (b) 9 (c) 18  (d) 512
- 11 The min. number of nodes in a binary tree of depth  $d$  (root at level 0) is:  
 (a)  $2d - 1$  (b)  $2d + 1 - 1$   (c)  $d + 1$  (d)  $d$
- 12 The number of colors required to properly color the vertices of every planer graph is:  
 (a) 2 (b) 3 (c) 4  (d) 5
- 13 Which of the following statement is true:  
 (a) Every graph is not its own sub graph.  
 (b) The terminal vertexes of a graph are of degree two.  
 (c) A tree with  $n$  vertices has  $n$  edges.  
 (d) A single vertex in graph  $G$  is a sub graph of  $G$
- 14 Which of the following circuit can be used as parallel to serial converter?  
 (a) Multiplexer (b) Demultiplexer (c) Decoder (d) Digital counter
- 15 Output of the following logic circuit is:  
  
 (a) 0 (b) 1 (c)  $x$  (d)  $x'$
- 16 The binary equivalent of the octal numbers 13.54 is:  
 (a) 1011.1011 (b) 1101.1110 (c) 1000.1110 (d) all of these
- 17 The functional difference between S-R flip-flop and J-K flip-flop is that J-K flip-flop:  
 (a) Is faster than S-R flip-flop (b) Has a feed-back path  
 (c) Accepts both inputs 1 (d) Both (a) and (b)
- 18 The use of hardware in Memory management is through segment relocation and protection is:  
 (a) To perform address translation to reduce size of the memory  
 (b) To perform address translation to reduce execution time overhead  
 (c) Both (a) and (b)  
 (d) None of the above
- 19 Pseudo-instructions are:  
 (a) Assembler directives  
 (b) Instructions in any program that have corresponding machine code instruction  
 (c) Instruction in any program whose absence will not change the output for any input  
 (d) None of these



- 20 Which of the following is not typically found in the status register of a microprocessor?  
 (a) Overflow (b) Zero result (c) Negative result  (d) None of the above
- 21 If the binary search algorithm determines that the search argument is in the lower half of the array, which of the following statements will, set the appropriate variable to the appropriate value?  
 (a) start Sub = middle Sub - 1 (b) start Sub = middle Sub + 1  
 (c) stop Sub = middle Sub - 1 (d) stop Sub = middle Sub + 1
- 22 The expression which accesses the  $(ij)^{\text{th}}$  entry of a  $m \times n$  matrix stored in column major form is:  
 (a)  $n \times (i-1)+j$   (b)  $m \times (j-1)+i$  (c)  $m \times (n-j)+j$  (d)  $n \times (m-i)+j$
- 23 The correct matching for the following pairs is:  
 (A) All pairs shortest path (1) Greedy  
 (B) Quick sort (2) Depth-first search  
 (C) Minimum weight spanning tree (3) Dynamic programming  
 (D) Connected Components (4) Divide and conquer  
 (a) A-2, B-4, C-1, D-3  (b) A-3, B-4, C-1, D-2  
 (c) A-3, B-4, C-2, D-1 (d) A-4, B-1, C-2, D-3
- 24 A hash table of length 10 uses open addressing with hash function  $h(k)=k \bmod 10$ , and linear probing. After inserting 6 values into an empty hash table, the table is as shown below. Which one of the following choices gives a possible order in which the key values could have been inserted in the table?

0	
1	
2	42
3	23
4	34
5	52
6	46
7	33
8	
9	

- (a) 46, 42, 34, 52, 23, 33 (b) 34, 42, 23, 52, 33, 46  
 (c) 46, 34, 42, 23, 52, 33 (d) 42, 46, 33, 23, 34, 52
- 25 Which of the following is true?  
 (a) Every subset of a regular set is regular  (b) Every finite subset of non-regular set is regular  
 (c) The union of two non-regular set is not regular (d) Infinite union of finite set is regular
- 26 Following context free grammar  
 $S \rightarrow aB \mid bA$   
 $A \rightarrow b \mid aS \mid bAA$   
 $B \rightarrow b \mid bS \mid aBB$   
 generates strings of terminals that have:  
 (a) Equal number of a's and b's (b) Odd number of a's and odd number b's  
 (c) Even number of a's and even number of b's (d) Odd number of a's and even number of a's



- 27 Power of:
- (a) DFMSM and NDFMSM are same (b) DFMSM and NDFMSM are different  
 (c) DPDM and NDPDM are different (d) Both (A) and (C)
- 28 Which of the following problems is solvable?
- (a) Writing a universal Turing machine  
 (b) Determining of an arbitrary turing machine is an universal turing machine  
 (c) Determining of a universal turing machine can be written for fewer than k instructions for some k  
 (d) Determining of a universal turing machine and some input will halt
- 29 An intermediate code form is:
- (a) Postfix notation (b) Syntax trees (c) Three address codes (d) All of these
- 30 Language which have many types, but the type of every name and expression must be calculated at compile time are:
- (a) Strongly-type languages (b) Weakly typed languages  
 (c) Loosely typed languages (d) None of these
- 31 Which of the following is true for machine language?
- (a) Repeated execution of program segments  
 (b) Depicting flow of data in a system  
 (c) A sequence of instructions which, when followed properly, solves a problem  
 (d) The language which communicates with the computer using only the binary digits 1 and 0.
- 32 A linker reads four modules whose lengths are 200, 800, 600 and 500 words, respectively. If they are loaded in that order, what are the relocation constants?
- (a) 0, 200, 500, 600 (b) 0, 200, 1000, 1600  
 (c) 200, 500, 600, 800 (d) 200, 700, 1300, 2100
- 33 The volatility of a file refers to:
- (a) The number of records added or deleted from a file composed to the original number of records in that file  
 (b) Efficiency with which non-sequential files are processed  
 (c) The extent where the records of the file are contiguous and in proximity to others  
 (d) Percentage of records that has changed in a given time period.
- 34 Determine the number of page faults when references to pages occur in the following order: 1, 2, 4, 5, 2, 1, 2, 4. Assume that the main memory can accommodate 3 pages and the main memory already has the pages 1 and 2, with page 1 having been brought earlier than page 2. (LRU algorithm is used)
- (a) 3 (b) 5 (c) 4 (d) None of these
- 35 Cascading termination refers to termination of all child processes before the parent terminates:
- (a) Normally (b) Abnormally (c) Normally or abnormally (d) None of these



- 36 To obtain better memory utilization, dynamic loading is used. With dynamic loading, a routine is not loaded until it is called for. For implementing dynamic loading:
- (a) Special support from hardware is essential
  - (b) Special support from operating system is essential
  - (c) Special support from both hardware and operating system are essential
  - (d) User programs can implement dynamic loading without any special support from the operating system or the hardware
- 37 Which one of the following statements is false?
- (a) The data dictionary is normally maintained by the database administrator
  - (b) Data elements in the database can be modified by changing the data dictionary
  - (c) The data dictionary contains the name and description of each data element
  - (d) The data dictionary is a tool used exclusively by the database administrator
- 38 Manager's salary details are hidden from the employee. This is:
- (a) Conceptual level data hiding
  - (b) Physical level data hiding
  - (c) External level data hiding
  - (d) None of these
- 39 Which of the following is correct:
- (a) a SQL query automatically eliminates duplicates
  - (b) SQL permits attribute names to be repeated in the same relation
  - (c) a SQL query will not work if there are no indexes on the relations
  - (d) None of these
- 40 Fiber optic cable has maximum segment length of :
- (a) 500 m
  - (b) 200 m
  - (c) 100 m
  - (d) 2000 m

