

# 2011

## PART 09 – COMPUTER SCIENCE AND ENGINEERING & INFORMATION TECHNOLOGY

(Answer ALL questions)

- 76. A man alternately tosses a coin and throws a dice, beginning with the coin. Then probability that he will get a head before he gets a 5 or 6 on dice is**
- 1)  $1/4$                                   2)  $3/4$   
3)  $4/5$                                   4)  $4/7$
- 77. If mean = (3 median – mode) x, then value of x is**
- 1) 1    2) 2  
3)  $1/2$     4)  $3/2$
- 78. If the standard deviation for two variables X and Y are 3 and 4 respectively and their covariance is 8, then correlation coefficient between them is**
- 1)  $2/3$     2)  $8/(3\sqrt{2})$   
3)  $9/(8\sqrt{2})$                                   4)  $2/9$
- 79. If  $P(A) = 0.4$ ,  $P(A \cup B) = 0.7$  and A, B are independent, then  $P(B) =$**
- 1) 0.2    2) 0.3  
3) 0.5    4) 0.6
- 80. A language is denoted by a regular expression  $L = (x)^*(x|yx)$ . Which one of the following is not a legal string within L?**
- 1) yx    2) xyx  
3) x    4) xyxyx
- 81. Which one of the following languages over (a, b, c) is accepted by deterministic, pushdown automata?**
- 1)  $\{w \in w^R \mid w \in \{a, b\}^*\}$   
2)  $\{ww^R \mid w \in \{a, b, c\}^*\}$   
3)  $\{a^n b^n c^n \mid n \geq 0\}$   
4)  $\{w \mid w = w^R \text{ over } \{a, b, c\}\}$
- 82. Which one of the following pairs of regular expressions are equivalent?**
- 1)  $1(01)^*$  and  $(10)^*1$                   2)  $x(xx)^*$  and  $(xx)^*x$   
3)  $x^+$  and  $x^*x^+$                               4) All of the above
- 83. Time taken by one tape TM to simulate n moves of k-tape TM is**
- 1)  $O(n)$     2)  $O(n^k)$   
3)  $O(n^2)$     4) None of the above
- 84. Minimum Hamming distance method is used for correction of**
- 1) syntactic errors                              2) semantic errors  
3) algorithmic errors                            4) transcription errors
- 85. A compiler for a high level language that runs on one machine and produces code for a different machine is called**
- 1) Optimising compiler  
2) One pass compiler  
3) Cross compiler  
4) Multipass compiler
- 86. In an absolute loading scheme, which loader function is accomplished by assembler**
- 1) Reallocation                                  2) Allocation  
3) Linking    4) Loading

**87. Relocatable programs**

- 1) cannot be used with fixed partitions
- 2) can be loaded almost anywhere in memory
- 3) do not need a linker
- 4) can be loaded only at one specific location

**88. The most efficient data set organisation is**

- 1) a sequential file
- 2) an ISAM file
- 3) variable depending upon the usage of the data set
- 4) a partitioned data set

**89. A file is**

- 1) An abstract data type
- 2) Logical storage unit
- 3) File is usually non volatile
- 4) All of the above

**90. How many comparisons are needed to sort an array of length 5 if a straight selection sort is used and array is already in the opposite order?**

- 1) 1
- 2) 10
- 3) 15
- 4) 20

**91. How many real links are required to store a sparse matrix of 10 rows, 10 columns and 15 non-zero entries?**

- 1) 15
- 2) 20
- 3) 50
- 4) 100

**92. Which one of the following is useful in traversing a given graph by breadth first search?**

- 1) Stack
- 2) Set
- 3) List
- 4) Queue

**93. Maximum possible height of an AVL tree with 7 nodes is**

- 1) 3
- 2) 4
- 3) 5
- 4) None of the above

**94. Consider that n elements are to be sorted. The worst case time complexity of Bubble sort is**

- 1)  $O(1)$
- 2)  $O(\log n)$
- 3)  $O(n)$
- 4)  $O(n^2)$

**95. Algorithm which solves the all pair shortest path problem is**

- 1) Dijkstra's algorithm
- 2) Floyd's algorithm
- 3) Prim's algorithm
- 4) Warshall's algorithm

**96. Suppose  $f, g, h, k : N \rightarrow N$ . If  $f = O(h)$  and  $g = O(k)$ , then**

- 1)  $f + g = O(h + k)$
- 2)  $fg = O(hk)$
- 3) Both 1 and 2
- 4) None of the above

**97. Time complexity of an algorithm  $T(n)$ , where n is the input size is given by**

$$T(n) = \begin{cases} T(n-1) + 1/n & \text{if } n > 1 \\ 1 & \text{otherwise} \end{cases}$$

- 1)  $O(\log n)$
- 2)  $O(n)$
- 3)  $O(n^2)$
- 4)  $O(n^n)$

**98. The access method used for obtaining a record from a cassette tape is**

- 1) direct
- 2) sequential
- 3) random
- 4) parallel

**99. Memory refreshing may be done**

- 1) by the CPU that contains a special regress counter only
- 2) by an external refresh controller only
- 3) either by the CPU or by an external refresh controller
- 4) None of the above

**100. An SR flip flop cannot accept the following input entry**

- 1) Both inputs zero
- 2) Zero at R and one at S
- 3) Zero at S and one at R
- 4) Both inputs one

**101. How many illegitimate states has synchronous mod-6 counter?**

- 1) 3
- 2) 2
- 3) 1
- 4) 0

**102. Different computers are connected to a LAN by a cable and**

- 1) modem
- 2) interface card
- 3) special wires
- 4) telephone lines

**103. How many characters per sec (7 bits + 1 parity) can be transmitted over a 2400 bps line if the transfer is synchronous (1 start and stop bit)?**

- 1) 300
- 2) 240
- 3) 250
- 4) 275

**104. End-to-end connectivity is provided from host to host in the**

- 1) Network layer
- 2) Transport layer
- 3) Session layer
- 4) None of the above

**105. Which one of the following can be handled by a gate way?**

- 1) Protocol conversion
- 2) Packet resizing
- 3) Data encapsulation
- 4) Both 1 and 2

**106. Which one of the following is not the responsibility of the utilities component of DBMS software?**

- 1) Creating the physical and logical designs
- 2) Removing flagged records for deletion
- 3) Maintaining the data dictionary
- 4) Monitoring performance

**107. A data dictionary is a special file that contains**

- 1) the names of all fields in all files
- 2) the data types of all fields in all files
- 3) the width of all fields in all files
- 4) all of the above

**108. The minimum number of record movements required to merge five files A with 10 records, B with 20 records and C with 15 records and D with 5 records and E with 25 records is**

- 1) 165
- 2) 90
- 3) 75
- 4) 65

**109. In the text it was stated that a satellite with two uplink and one downlink slotted ALOHA channels can achieve a downlink utilisation of 0.736, given an infinite amount of buffer space. Expected number of success per slot will be**

- 1) 0.536
- 2) 0.636
- 3) 0.736
- 4) 0.836

**110. Design phase will usually be**

- 1) top-down
- 2) bottom-up
- 3) random
- 4) centrefringing

**111. Railway reservation system currently operational in India can be classified as a**

- 1) batch processing system
- 2) real time system
- 3) online system
- 4) expert system

**112. The visual interface developed by Xerox was modelled on a**

- 1) tree
- 2) file cabinet
- 3) desktop
- 4) testing

**113. Mnemonic codes and variable names are used in**

- 1) A machine language
- 2) An assembly language
- 3) A high level language
- 4) All of the above

**114. Maximum combined length of the command line arguments including the spaces between adjacent arguments is**

- 1) 128 characters
- 2) 256 characters
- 3) 67 characters
- 4) it may vary from one operating system to another

**115. Which one of the following comments regarding the reading of a string, using scanf (with option) and gets is true?**

- 1) Both can be used interchangeably
- 2) Scanf is delimited by end of line, while gets is not
- 3) Scanf is delimited by blank, while gets is not
- 4) None of the above

**DETAILED ANSWER**

**76. (2)** Probability of getting a head in a single toss of

$$\text{a coin} = \frac{1}{2} = p$$

Probability of getting 5 or 6 in a single throw

$$\text{of a die} = \frac{2}{6} = \frac{1}{3} = q$$

Required probability

$$= p + (1-p)(1-q) + p + (1-p)(1-q) + (1-q)p + \dots$$

$$= p + (1-p)(1-q) + p + (1-p)^2(1-q)^2 + \dots$$

$$= \frac{p}{1 - (1-p)(1-q)}$$

$$= \frac{\frac{1}{2}}{1 - \frac{1}{2} \times \frac{2}{3}}$$

$$= \frac{\frac{1}{2}}{\frac{2}{3}} = \frac{3}{4}$$

**77. (3)** Mode = 3 median - 2 mean

$$2 \text{ mean} = 3 \text{ median} - \text{mode}$$

$$\text{Mean} = (3 \text{ median} - \text{mode}) \times \frac{1}{2}$$

$$x = \frac{1}{2}$$

**78. (1)** Correlation =  $\frac{\text{Cov } xy}{S_x S_y}$

$$= \frac{8}{3 \times 4}$$

$$= \frac{8}{12} = \frac{2}{3}$$

**79. (2)** P(AuB) = P(A) + P(B) - P(AB)

$$0.7 = 0.4 + P(B) - 0$$

$$P(B) = 0.7 - 0.4 = 0.3$$

<b>ME - COMPUTER SCIENCE AND ENGINEERING AND INFORMATION TECHNOLOGY - ANSWERS</b>										
76.....2	77..... 3	78.....1	79.....2	80.....4	81..... 1	82.....4	83..... 4	84..... 1	85.....3	
86.....1	87..... 2	88.....1	89.....4	90.....4	91..... 3	92.....4	93..... 1	94..... 4	95.....2	
96.....2	97..... 1	98.....2	99.....3	100.....4	101..... 3	102.....2	103..... 1	104..... 2	105.....1	
106.....2	107..... 4	108.....4	109.....2	110.....2	111..... 3	112.....4	113..... 2	114..... 2	115.....3	