

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) $\frac{1}{4}$ 2) $\frac{3}{4}$
3) $\frac{4}{5}$ 4) $\frac{4}{7}$

77. If mean = (3 median – mode) x, then value of x is

- 1) 1 2) 2
3) $\frac{1}{2}$ 4) $\frac{3}{2}$

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) $\frac{2}{3}$ 2) $\frac{8}{3\sqrt{2}}$
3) $\frac{9}{8\sqrt{2}}$ 4) $\frac{2}{9}$

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

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

Probability of getting 5 or 6 in a single throw

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

Required probability

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

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

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

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

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

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) $P(A \cup B) = P(A) + P(B) - P(AB)$

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

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

ME - COMPUTER SCIENCE AND ENGINEERING AND INFORMATION TECHNOLOGY - ANSWERS									
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