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Number of Printed Pages—4 **CS–301**

B. TECH.

THIRD SEMESTER EXAMINATION, 2002–2003

FOUNDATIONS OF INFORMATION TECHNOLOGY

Time : Two Hours *Total Marks : 50*

Note : (1) This question paper contains FOUR questions.
(2) Attempt ALL questions.

1. Attempt any FOUR of the following :— (3½×4 =14)

(*a*) Why is Huffman Coding considered better as compared to Shannon-Fano Code ? Determine the Huffman Coding of the following frequencies —

a : 1, b : 1, c : 2, d : 3, e = 5, f : 8, g : 13, h : 21

(*b*) Name various compression techniques. Discuss LZW compression and its advantages over other compression techniques.

(*c*) What do you mean by Information ? What are levels of information in a business organization ? What is information content of the statement —

" The sun rises in the East " ?

(*d*) Do Entropy and Information signify the same thing ? Consider a text string of length 100 consisting of four characters : A, B, C and D. The probability of occurrence of characters are shown below :—

Characters	Probability of occurrence
A	0·5
B	0·3
C	0·1
D	0·1

Compute the Entropy of the text and find minimum number of bits required to represent the text.

(*e*) Are data Encryption and Compression same thing ? If not, then differentiate them. What is the difference between Loss-less and Lossy Compressions.

(*f*) Explain the terms, audio, video and animation.

2. Attempt any FOUR of the following :— (3×4=12)

(*a*) What is a microcomputer ? Differentiate between a microprocessor and a microcomputer. Give one example of each.

(*b*) What is a computer bus ? Name the buses and their functions used in a computer. Which one of the computer's buses are bidirectional ?

(*c*) Show the hierarchy of memories used in a computer system. Explain the functions and characteristics of each one.

(*d*) Explain the Life-cycle of a software development process. List various stages of Waterfall Model.

(*e*) Explain the coding, testing and maintenance of a system.

(*f*) Giving one example of each, explain the difference among high level, low level and 4GL languages. Write a query format in a 4GL language.

3. Attempt any TWO of the following :— (6 × 2=12)

(*a*) (*i*) What are Registers ? What are they used for ?

(*ii*) Draw a schematic diagram of 4-bit register.

(*iii*) What are Transducers ? Explain the role of transducers in communication.

(*b*) Differentiate between the following :—

(*i*) Circuit switching and Packet switching

(*ii*) LAN and WAN

(*iii*) Half duplex and full duplex transmission modes

(*c*) (*i*) Draw the truth table for the following Boolean function :—

$$F(A, B, C) = \mathbf{A} + B.C + A\mathbf{B}$$

(*ii*) What is Asynchronous Transfer Mode ? What is ATM switch ? Under what circumstances is the ATM switching used ?

4. Attempt any TWO of the following :— (6×2=12)

(*a*) (*i*) How does E-commerce help to reduce the cost of a product for the consumer ? Explain with an example.

(*ii*) What is meant by Cipher Text ? How is the cipher text delivered to the recipient over the

communication channel ? Explain how the cipher text is converted into the original document.

(*b*) (*i*) How can a firewall be used as a proxy ? What are the advantages of making a proxy server ?

(*ii*) What is the language used for the WAP application ? List the salient features of WML (Wireless Markup Language). How is WML different from HTML ?

(*c*) (*i*) Explain, why Java is considered as the best language for Internet applications.

(*ii*) What are smart cards ? How are smart cards used for shopping on the Web ? Draw a diagram showing all the steps involved in purchasing a product by the smart card in the digital medium.

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