

Roll No. | | | | | | | | | | |

No. of Printed Pages—4 **CS–301**

B. TECH.

THIRD SEMESTER EXAMINATION, 2003-2004

FOUNDATIONS OF INFORMATION TECHNOLOGY

Time : 2 Hours *Total Marks : 50*

Note : (1) The Question paper contains **FOUR** questions.

(2) Attempt **ALL** questions.

1. Attempt any FOUR parts :— **(3½×4=14)**

(a) Define the term Information Technology. What do you mean by IT enabled services ? List any five areas of application of Information Technology.

(b) What is the difference between Lossless and Lossy data compressions ? Explain the difference between Encoding and Compression. Under what circumstances are Lossy and Lossless compression techniques used ?

(c) Define Entropy of Information. Suppose a message is composed using four characters 'A','B','C' and 'D'. Probability of occurrence of these characters are 1/10, 1/10, 3/10, 1/2 respectively. Compute the entropy and find minimum number of bits required to represent a message containing 100 such characters.

(d) Suppose a text is composed of seven distinct characters. The characters and their probability of occurrences are shown in the following table :—

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A	B	C	D	E	F	G
·25	·20	·20	·15	·10	·05	·05

Obtain the Shannon-Fano code for each character and compute the total number of bits required to represent a text containing 100 such characters using SF code.

(e) Explain how an Image is represented in digital computer. Explain the salient features of JPEG in brief. Suppose an Image taking 10 MB of storage is compressed. If the compressed image takes 6 MB of storage, obtain the compression ratio.

(f) Suppose a text is composed of five distinct characters. The characters and their probability of occurrences are shown in the following table :—

A	B	C	D	E
·30	·20	·20	·15	·15

Obtain the Huffman code for each character and compute the total number of bits required to represent a text containing 100 characters, using Huffman code.

2. Attempt any FOUR parts :— **(3×4=12)**

(a) Explain the essential difference in RAM and ROM. Explain how Static RAM is different from Dynamic RAM ? Explain, in brief, why ROM is non-volatile.

(b) Give the general classification of Computer Languages. Explain why the translation of a program written in a High Level Language is required for execution. Explain the differences in Compilers and Interpreters.

(c) What do you mean by Software Development ? Explain why a strategic plan is required to develop large software product. List the various phases of classical Waterfall Model.

(d) What are the objectives of software testing ? Discuss the types of testing carried out by software development team before the delivery of software product.

(e) What do you mean by a Prototype ? Explain the salient features of Prototyping Model of software development ? Under what circumstances is prototyping model useful ?

(f) What do you mean by Software Quality Assurance ? What is SEI Capability Maturity Model ? List various level and requirements of SEI-CMM model.

3. Attempt any FOUR parts :— **(3×4=12)**

(a) What are Flip-flops ? Draw a neat schematic of RS filp-flop with characteristic table. What is the difference between Level and Edge triggered flip-flops ?

(b) Explain the difference between Sequential and Combinational digital circuits. Draw the logic circuit of the function Y=A.B+B.C+A.B.D along with their characteristic tables.

(c) What do you mean by Data Communication ? Discuss various types of communication media. What is the difference between Simplex, Duplex and Half Duplex transmissions ?

(d) What are Computer Networks ? What are motivations for building large computer

network ? What do you mean by Network Topology ? Explain any one in brief.

(e) What is the difference between Analog and Digital Signals ? What is the purpose of Modulation/Demodulation process in Data Communication ? Explain in brief, how an Analog Signal may be transmitted.

(f) Write a short note on any *one* of the following :-

(i) Multiplexing of Signals

(ii) ISDN

4. Attempt any FOUR parts :— (3×4=12)

(a) What is World Wide Web ? How can it be accessed ? What is TCP/IP ? Briefly explain the role of TCP/IP.

(b) What is HTML ? How is it different from Higher Level Languages ? Explain the role of HTTP in order to visit the web.

(c) What is Electronic Commerce ? What do you mean by B to B and B to C Electronic Commerce ? List any three areas where E Commerce may be used in our day-to-day life.

(d) What do you mean by Network Security ? What are Firewalls ? How may firewalls be used for network security ?

(e) What do you mean by Digital Signatures ? What are basic requirements of a Digital Signature System ? How are Digital Signatures different from conventional Ink-Pen Signatures ?

(f) Write a short note on any *one* of the following :—

(i) Electronic Data Interchange (EDI)

(ii) Telnet and FTP