CS-301

B.TECH.

THIRD SEMESTER EXAMINATION, 2001-2002

FOUNDATIONS OF INFORMATION TECHNOLOGY

Time—2 Hours   *Total Marks—50*

Note :   (1)   Attempt *ALL* questions.

(2)   This question paper contains *Four* questions.

1.   Attempt any *Four* parts of the following :— $3\frac{1}{2} \times 4 = 14$

(*a*)   What is the difference between Data and Information? Describe any three formats of representing Information in the Digital Computers.

(*b*)   What do you mean by Entropy of Information ? What does it signify ? Suppose a text is composed of three distinguished characters "A", "B" and "C". Their probability of occurrences are ·6, ·3 and ·1 respectively. Compute the Entropy and find minimum number of bits required to represent a text containing 100 such characters.

(*c*)   What do you mean by Compression ? Explain why data is required to be compressed. What is difference between Loss-Less and Lossy compressions ? Under what circumstances is the Lossy Compression acceptable ?

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

A	B	C	D	E	F
·30	·25	·20	·15	·05	·05

Turn Over

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

(e) Explain the salient features of LZW Compression. Why is this compression technique called Dictionary based compression technique ? What are advantages of LZW compression over other compression techniques ?

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

   (i) JPEG

   (ii) MPEG

2. Attempt any *Four* parts of the following :— $3 \times 4 = 12$

(a) What is Application Software ? What are the differences between Application and System Softwares? Justify your answer with suitable example.

(b) What are storage devices and why are they used ? Explain the essential differences between optical and magnetic storage devices. Give any one example of both storage devices.

(c) What are Computer Languages ? Explain the differences in High Level Language, Assembly and Machine Language. What are Fourth Generation languages ? How are 4 GLs. different than High Level Languages ?

(d) What do you mean by Software Development Life Cycle ? List various stages of Waterfall Model. What are main objectives of Feasibility Study Phase in Software Development ?

(e) Why is the Software called as Product ? What do you mean by Software Quality Assurance ? Explain the reason why it is necessary for IT industry to acquire either ISO or SEI-CMM certification.

(f) List any five areas of application of Information Technology. What were the objectives of ERNET project ? What are major achievements of this project ?

3. Attempt any *Four* parts of the following :— $3 \times 4 = 12$

(a) What are differences in Sequential and Combinational Circuits ? Draw a logic circuit for the Boolean Expression $Y = AB + AC + BD + CD$.

(b) What do you mean by Data Communication ? Explain the difference between Analog and Digital Signals. What for are Modulators/Demodulators required in communication systems ?

(c) What are Computer Networks ? What are the advantages of Computer Network ? Explain how Local Area Networks (LAN) are different from Wide Area Networks (WAN).

(d) What do you mean by Network Topology ? Explain the salient features of CSMA / CD protocol.

(e) What do you mean by Multiplexing of signals ? Explain salient features of Time Division Multiplexing.

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

4. Attempt any *Four* parts of the following :— $3 \times 4 = 12$

(a) What is Internet ? What are Internet Addresses ? Explain the general syntax of Internet Address and explain the procedure to visit a web site with suitable example.

(b) What is E-Commerce ? How is E-Commerce related with EDI ? List any three areas of application of E-Commerce.

(c) What do you mean by Electronic Payments ? Explain with a suitable example, how a customer pays electronically to the merchant for the product, he buys through Internet.

(d) What are Digital Signatures ? What are basic requirements of a Digital Signature System ?

(e) What is JAVA ? Explain the salient features of JAVA, which makes it suitable for Internet Application.

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

(i) HTML

(ii) Java Applet

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