B. Tech. (Sem. I & II)

SPECIAL CARRYOVER EXAMINATION, 2006-07

INFORMATION TECHNOLOGY

Time : 3 Hours] [Total Marks : 100

1 Attempt any four parts of the following :  \(4 \times 5 = 20\)

(a) Explain the term data and information by giving suitable example. Describe any three formats of representing information in digital computer.

(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 occurrence is .5, .4, .1 respectively. Compute the entropy and find the minimum number of bits required to represent a text containing 100 such characters.

(c) Why is Huffman coding considered better as compared to Shannon-Fano Code? Determine the Huffman coding of the following frequencies:

A : 20, B : 15, C : 20, D : 25, E : 5, F : 5, G : 2, H : 8

Z-1305/1306] 1 [Contd...
(d) Consider the text string "DISDIDSDIDISDIDIA$DIDI". Show all the steps of LZ78 compression including dictionary formation. Explain the role of dictionary tree in compression.

(e) Explain the different formats used for storing photographs in computer.

(f) What do you understand by Arithmetic Coding? What are the features which make it different from Huffman and Shannon-Fano compression?

2 Attempt any four parts of the following: $4 \times 5 = 20$

(a) Draw block diagram of digital computer and explain its various components.

(b) Differentiate between the following:
   (i) RAM and ROM
   (ii) Flowchart and DFD
   (iii) Firmware and Humanware
   (iv) High level language and UGL.

(c) Discuss the advantages and disadvantages of high level language and assembly level language.

(d) What do you understand by SDLC? – Explain.

(e) What is meant by SEI capability maturity model? Discuss the various levels of SEI-CMM model.

(f) List the different software testing techniques. What is meant by Black Box testing? How is it different from White Box testing?

Z-1305/1306] 2

[Contd...]
3 Attempt any four parts of the following: \(4 \times 5 = 20\)

(a) (i) Convert \((1100101101.1101)_2\) into equivalent decimal and hexadecimal numbers.
(ii) Convert \((962.52)_{10}\) into its equivalent binary and octal numbers.

(b) Draw the truth table for the following expression:

\[ F_1 F_2 + F_2 \text{ where } F_1(ABC) = A \overline{B} + C \text{ and } F_2(ABC) = \overline{A} \overline{B} \overline{C} \]

(c) What are Flip-Flops? Explain the working of clocked Flip-Flops.

(d) What do you understand by the term modulation? Explain any two modulation techniques in detail.

(e) Explain different computer networks in detail.

(f) Write short notes on any three:

(i) ISDN
(ii) CSMA/CD
(iii) ATM
(iv) Client-Server Architecture.

4 Attempt any four parts of the following: \(4 \times 5 = 20\)

(a) What is Internet? Discuss the import usage of Internet.

(b) What do you mean by File Transfer Protocol (FTP)? What are the FTP sites? Explain with suitable example, how a FTP session is established.
(c) What is the importance of Electronic Data Interchange (EDI) in E-Commerce? "The EDI application is a part of E-Commerce". Justify the statement.

(d) Define the network infrastructure requirement of E-Commerce applications. What precautions must be taken in order to get safe and secure execution of business transaction on the Web.

(e) What is meant by Public key cryptography? What are the differences between private and public keys?

(f) Write short notes on any three:
   (i) Telnet
   (ii) Electronic Payment System
   (iii) Digital Signature
   (iv) Firewall.

5 Attempt any two parts of the following: 2x10=20

(a) (i) Discuss the usage of operating system in detail.
   (ii) Explain the salient features of MS-Word.

(b) Explain the architecture of DBMS in detail. Also comment on the components of DBMS.

(c) Write short notes on any two:
   (i) MS-Excel
   (ii) NICNET
   (iii) Application of IT in E-Commerce.