

Web Programming.

QP Code : NP-19851

(3 Hours)

[Total Marks : 80

- N. B. :** (1) Question No. 1 is **compulsory**.
 (2) Write any **three** questions out of **remaining**.
 (3) Assume suitable data if required.

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| 1. (a) Differentiate between GET and POST. | 5 |
| (b) Explain issues in web designing. | 5 |
| (c) Explain PHP string functions. | 5 |
| (d) Explain XML DTD. | 5 |
| 2. (a) Write JavaScript program to change background colour continuously. | 10 |
| (b) What is CSS ? Explain the ways by which CSS is included in HTML. | 10 |
| 3. (a) Explain page life cycle of JSP application. | 10 |
| (b) Write an ASP.NET program to insert a new record in database. | 10 |
| 4. (a) What is XML and XSLT ? Explain with an example. | 5 |
| (b) Write a HTML code to illustrate use of table and lists. | 5 |
| (c) What is session tracking ? What are the ways to do session tracking ? How session tracking is done in PHP. | 10 |
| 5. (a) Write a JSP program to display today's date. | 5 |
| (b) Explain JavaScript objects Window and Document. | 10 |
| (c) What is JQUERY ? Illustrate the use of JQUERY with a program. | 5 |
| 6. (a) List various events on various HTML elements and explain Event handling in JavaScript with example. | 10 |
| (b) Explain ADO.NET with example. | 10 |

Automata Theory. — S.E. Sem-IV (CBCS).
I.T. June 2014.

QP Code : NP-19812

(3 Hours)

[Total Marks : 80

- N.B. : (1) Question No. 1 is compulsory.
(2) Solve any three questions from remaining questions.
(3) Draw suitable diagrams wherever necessary.
(4) Assume suitable data, if necessary.

1. (a) Design a DFA to accept strings over the alphabet $\Sigma = \{a, b\}$ containing even number of 'a's. 5
(b) Let G be the grammar. Find the leftmost derivation, rightmost derivation and parse tree for the expression a^*b+a^*b 5

$$G: S \rightarrow S + S \mid S * S \\ S \rightarrow a \mid b$$

- (c) Give formal definition of a Push Down Automata (PDA) 5
(d) State and explain closure properties of regular languages. 5
2. (a) Design a DFA to accept 10
(i) Binary strings in which every 0 is followed by 11
(ii) Strings over the binary alphabet that do not contain the substring 010
- (b) Design a Mealy machine over the alphabet $\{0, 1\}$ which outputs EVEN, ODD according to the number of 1's encountered as even or odd. 10
3. (a) (a) Using pumping lemma prove that the following language is not regular 10
 $L = \{ ww \mid w \in \{0, 1\}^* \}$
(b) Design a NFA for accepting input strings that contain either the keyword 000 or the keyword 010 and convert it into an equivalent DFA. 10
4. (a) Construct a PDA accepting the following language $L = \{a^n b^m a^n \mid m, n \geq 1\}$ 10
(b) Design a Turing machine to recognize the language $L = \{a^n b^n a^n \mid n \geq 1\}$ 10

5. (a) Explain algorithm for the conversion of a Context Free Grammar (CFG) to Chomsky Normal Form (CNF) and use it to convert the following CFG to CNF 10
 $S \rightarrow bA \mid aB$
 $A \rightarrow bAA \mid aS \mid a$
 $B \rightarrow aBB \mid bS \mid b$
- (b) Convert the following Context Free Grammar to GNF 10
 $S \rightarrow AB \mid BC$
 $A \rightarrow AB \mid a$
 $B \rightarrow AA \mid CB \mid b$
 $C \rightarrow a \mid b$
6. Write short notes on (any two) 20
(a) Variants of a Turing Machine
(b) Post Correspondence Problem
(c) Chomsky Hierarchy
(d) Recursive and recursively enumerable languages.
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SE - IT - CBCS
Sem - IV - CN
23/5/14

QP Code : NP-19737

(3 Hours)

[Total Marks :80]

- N.B. (1) Question No. 1 is **Compulsory**.
(2) Attempt any **three** questions out of remaining questions.
(3) Figures to the right indicate full marks.
(4) Assumptions made should be clearly stated.
(5) Assume suitable data wherever required and justify it.

1	(a) What is a network? What are its goals and applications?	05
	(b) Discuss and compare various types of networks.	05
	(c) Is there any relationship between transmission media and topology?	05
	(d) What are the goals of TCP/IP Model?	05
2	(a) What is OSI Model? Explain the functions and protocols and services of each layer.	10
	(b) Describe about the different Guided transmission Medias.	10
3	(a) Explain the functions of data link layer.	10
	(b) Explain the Taxonomy of multiple access protocols.	10
4	(a) Explain different categories of routing algorithms.	10
	(b) What is IP addressing? How it is classified? How is subnet addressing is performed.	10
5	(a) What are the elements of transport protocols?	10
	(b) Explain TCP Congestion Control.	10
6	Write short notes on (any 4):- a) Connection oriented and connectionless service. b) Sliding window protocol. c) Mobile Telephone system. d) Communication Satellite e) Internet Control protocols. f) UDP	20

SE IT SEM IV (CBGS)

ITC

16/6/2014

QP Code : NP-19886

(3 Hours)

Total Marks: 80

N.B.: (1) Question No.1 is compulsory.

(2) Solve any three questions out of the remaining questions.

1. (a) Explain the physical significance of Entropy in Information theory (2M)
(b) What is Compression? List different Compression algorithms. (3M)
(c) Describe Fermat's Little Theorem. (3M)
(d) Find the generator and parity check matrices of a (7, 4) cyclic code with generator polynomial $g(X) = 1 + X + X^3$. (3M)
(e) What is Random Number Generation and when it is needed. (3M)
(f) What are the security goals? Define Cryptography. (3M)
(g) Write about Convolution Codes. (3M)
2. (a) Name the source coding techniques used in the following types of files and classify them as lossy or lossless.
(i) .zip (ii) .jpg (iii) .mpg (iv) .bmp (v) .gif (10M)
(b) Define generator and parity check matrices of a (7, 4) linear block code. (10M)
Explain how to generate a linear block code using G-matrix. Explain with an example.
3. (a) Describe about Discrete probability and logarithms. (10M)
(b) Given $x_i = \{x_1, x_2, x_3, x_4, x_5, x_6\}$ with probabilities as below: (10M)
 $p(x_i) = \{0.3, 0.25, 0.2, 0.12, 0.08, 0.05\}$.
Make Huffman code. Find efficiency of this code.
4. (a) What do you mean by Symmetric key cryptography? Explain DES in detail. (10M)
(b) A (7, 4) cyclic code has a generator polynomial: $g(X) = X^3 + X + 1$. (10M)
(i) Draw the block diagram of encoder and syndrome calculator.
(ii) Find generator and parity check matrices in systematic form.
5. (a) Describe with example Modular Arithmetic, Exponentiation and Congruences. (10M)
(b) Explain Diffie-Hellman Algorithm. Which attack, is it vulnerable to? (10M)
6. Write Short notes on: (20M)
(a) Types of Entropy (b) Digital Signature (c) RLE
(d) Prime Number Generation

29/5/2014

(Comp 4 IT)

COA Sem-IV

(SE comp)

QP Code : NP-19761 IT

(3 Hours)

[Total Marks :80

- N.B.:**— (1) Question no.1 is **compulsory**.
(2) Solve any **three** questions out of remaining **five** questions.
(3) Assume suitable data if **necessary**.
(4) Answer to **each** new question to be started on a **fresh** page.

1. (a) What is stored program concept? 3 ✓
(b) Show IEEE 754 Standards for Binary Floating-Point Representation for 32 bit single format and 64 bit double format. 3 ✓
(c) What are applications of Microprogramming? 3 ✓
(d) What is Virtual Memory? 4 ✓
(e) Explain in brief function of 8089 I/O Processor. 4 ✓
(f) Name the Flynn's Classification of Parallel Processing Systems. 3 ✓
2. (a) Draw the flow chart for Booth's Algorithm for Twos Complement Multiplication. 5
(b) Using Booth's Algorithm show the multiplication of 7×5 . 7
(c) Explain with diagram functioning of Microprogrammed Control Unit. 8
3. (a) What are the differences between RISC and CISC processors? ✓ 5 ✓
(b) Describe hardwired control unit and specify its advantages. ✓ 7 ✓
(c) What are characteristics of memory devices? ✓ 8 ✓
4. (a) Explain in details Memory Hierarchy with examples. 6 ✓
(b) What are elements of cache design? Explain in details. ✓ 8 ✓
(c) What are major requirements for an I/O module? 6 ✓
5. (a) Explain the DMA based data transfer techniques for I/O devices. 8 ✓
(b) Explain concepts of nanoprogramming. 6 ✓
(c) What is instruction pipelining? 6 ✓
6. Write short notes on:
(a) Touch Pad 7 ✓
(b) L1, L2 and L3 Cache memory. 7 ✓
(c) Programmed I/O 6 ✓

QP Code : **NP-19682**

(3 Hours)

[Total Marks : 80

- N. B. : (1) Question no. **one** is compulsory.
 (2) Answer **any three** questions from Q.2 to Q.6.

1. (a) If $A = \begin{bmatrix} x & 4x \\ 2 & y \end{bmatrix}$ has eigen values 5 and -1 then find values of x and y. 5
- (b) Evaluate $\int_c (\bar{z} + 2z) dz$ along the circle $c: x^2 + y^2 = 1$. 5
- (c) State true or false with justification: If the two lines of regression are $x + 3y - 5 = 0$ and $4x + 3y - 8 = 0$ then the correlation coefficient is +0.5. 5
- (d) Find dual of following LP model 5
- $\max z = 2x_1 + 3x_2 + 5x_3$
 subject to
 $x_1 + x_2 - x_3 \geq -5$
 $x_1 + x_2 + 4x_3 = 10$
 $-6x_1 + 7x_2 - 9x_3 \leq 4$
 & $x_1, x_2 \geq 0$ and x_3 is unrestricted.
2. (a) Using Cauchy's integral formula, evaluate $\int_c \frac{(12z - 7) dz}{(z - 1)^2 (2z + 3)}$ where 6
- $C: |z + i| = \sqrt{3}$.
- (b) Determine whether matrix A is derogatory $A = \begin{bmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$. 6
- (c) In a competitive examination, the top 15% of the students appeared will get grade 'A', while the bottom 20% will be declared fail. If the grades are normally distributed with mean % of marks 75 and S.D. 10, determine the lowest % of marks to receive grade A and the lowest % of marks that passes. 8
3. (a) The daily consumption of electric power (in millions of kwh) is r.v. X with PDF $f(x) = k x e^{-x/3}$, $x > 0$. Find k and the probability that on a given day the electricity consumption is more than expected electricity consumption. 6

[TURN OVER

- (b) Using Simplex method, solve the following LPP 6

$$\max z = 15x_1 + 6x_2 + 9x_3 + 2x_4$$

$$\text{s.t. } 2x_1 + x_2 + 5x_3 + 6x_4 \leq 20$$

$$3x_1 + x_2 + 3x_3 + 25x_4 \leq 24$$

$$7x_1 + x_4 \leq 70$$

$$\& \quad x_1, x_2, x_3, x_4 \geq 0$$

- (c) Obtain ALL Taylor's and Laurent's series expansions of function 8

$$\frac{(z-2)(z+2)}{(z+1)(z+4)} \text{ about } z = 0.$$

4. (a) Find the moment generating function of Poisson distribution and hence find mean and variance. 6

- (b) Obtain the equation of the line of regression of cost on age from the following table giving the age of a car of certain make and the annual maintenance cost. Also find maintenance cost if age of the car is 9 years. 6

Age of car (in years) : x	2	4	6	8
Maintenance cost : y (in thousands)	5	7	8.5	11

- (c) Show that the matrix A is diagonalizable, find its diagonal form and 8

$$\text{transforming matrix, if } A = \begin{bmatrix} -9 & 4 & 4 \\ -8 & 3 & 4 \\ -16 & 8 & 7 \end{bmatrix}.$$

5. (a) A sample of 8 students of 16 years each shown up a mean systolic blood pressure of 118.4 mm of Hg with S.D. of 12.17 mm. While a sample of 10 students of 17 years each showed the mean systolic BP of 121.0 mm with S.D. of 12.88 mm during in investigation. The investigator feels that the systolic BP is related to age. Do you think that the data provides enough reasons to support investigator's feeling at 5% LoS? Assume the distribution of systolic BP to be normal. 6

- (b) Using Cauchy's residue theorem, show that $\int_0^{2\pi} \frac{\cos 2\theta}{5 + 4 \cos \theta} d\theta = \frac{\pi}{6}$. 6

[TURN OVER

(c) Using dual simplex method, solve 8

$$\begin{aligned} \max z &= -2x_1 - x_3 \\ \text{s.t. } x_1 + x_2 - x_3 &\geq 5 \\ x_1 - 2x_2 + 4x_3 &\geq 8 \\ \& \quad x_1, x_2, x_3 \geq 0 \end{aligned}$$

6. (a) A total of 3759 individuals were interviewed in a public opinion survey on a political proposal. Of them, 1872 were men and the rest were women. A total of 2257 individuals were in favour of the proposal and 917 were opposed to it. A total of 243 men were undecided and 442 women were opposed to the proposal. Do you justify on the hypothesis that there is no association between sex and attitude, at 5% LoS. 6

(b) Using Kuhn – Tucker's method solve 6

$$\begin{aligned} \text{Maximize } Z &= 2x_1^2 + 12x_1x_2 - 7x_2^2 \\ \text{Subject to the constraints } &2x_1 + 5x_2 \leq 98 \text{ and } x_1, x_2 \geq 0 \end{aligned}$$

(c) (i) Average mark scored by 32 boys is 72 with standard deviation of 8 while that for 36 girls is 70 with standard deviation of 6. Test at 1% LoS whether the boys perform better than the girls. 4

(ii) If the first four moments of a distribution about the value 4 of the random variable are $-1.5, 17, -30$ and 108 then find first four raw moments. 4

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