IV IT CBGS

Sub-: Maths

Dt: 13/05/16

Q. P. Code : 541302

(3 Hours)

[Total Marks: 80

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

(2) Answer any three questions from Q.2 to Q.6

(3) Use of stastical Tables permitted.

(4) Figures to the right indicate full marks

1. (a) Find the Eigen values of $A^2 + 2I$, where $A = \begin{bmatrix} 1 & 0 & 0 \\ 2 & -2 & 0 \\ 3 & 5 & 3 \end{bmatrix}$ and I is the Identity matrix of order 3. 5

(b) Evaluate the line integral $\int_0^{1+i} (x^2 + iy)dz$ along the path $y = x$ 5

(c) If x is a continuous random variable with the probability density function given by

$$f(x) = \begin{cases} k(x - x^3) & 0 \le x \le 1 \\ 0 & otherwise \end{cases},$$

Find i) k ii) the mean of the distribution. 5

(d) Compute Spearman's rank correlation coefficient from the following data

X	18	20	34	52	12
Y	39	23	35	18	46

5

2. (a) Is the following matrix Derogatory? Justify.

$$\begin{bmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & -4 \end{bmatrix}$$ 6

(b) Evaluate $\oint_C \frac{e^{2z}}{(z-1)^4} dz$ where c is the circle $|z| = 2$ 6

(c) The marks of 1000 students in an Examination are found to be normally distributed with mean 70 and standard deviation 5, estimate the number of students whose marks will be i) between 60 and 75 ii) more than 75. 8

[Turn over

3. (a) Solve the following non-linear programming problem using Kuhn-Tucker conditions

Maximize $z = 10x_1 + 4x_2 - 2x_1^2 - x_2^2$

Subject to $2x_1 + x_2 \leq 5$; *and* $x_1, x_2 \geq 0$ 6

(b) Fit a Binomial distribution to the following data

x	0	1	2	3	4	5	6
F	5	18	28	12	7	6	4

6

(c) Is the following matrix diagonalizable? If yes, find the transforming matrix and the diagonal matrix.

$$\begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$$ 8

4. (a) Solve the following LPP using Simplex method

Maximize $z = 4x_1 + x_2 + 3x_3 + 5x_4$

Subject to $-4x_1 + 6x_2 + 5x_3 + 4x_4 \leq 20$

$-3x_1 - 2x_2 + 4x_3 + x_4 \leq 10$

$-8x_1 - 3x_2 + 3x_3 + 2x_4 \leq 20$

$x_1, x_2, x_3, x_4 \geq 0$ 6

(b) If a random variable X follows the Poisson distribution such that $P(X = 1) = 2P(X = 2)$, find the mean, the variance of the distribution and $P(X = 3)$ 6

(c) Expand $f(z) = \frac{1}{z(z-2)(z+1)}$ in the regions

i) $|z| < 1$, *ii)* $1 < |z| < 2$, *iii)* $|z| > 2$ 8

[Turn over

5. (a) Evaluate using Cauchy's Residue theorem $\oint_c \frac{2z-1}{z(2z+1)(z+2)}dz$ where c is $|z| = 1$. 6

(b) A certain stimulus administered to each of 12 patients resulted in the following change in blood pressure:

$5, 2, 8, -1, 3, 0, -2, 1, 5, 0, 4, 6$

Can it be concluded that the stimulus will increase the blood pressure (at 5% level of significance.)? 6

(c) Solve the following LPP using the Dual Simplex method

Maximise $z = -3x_1 - 2x_2$

Subject to $x_1 + x_2 \geq 1$

$x_1 + x_2 \leq 7$

$x_1 + 2x_2 \geq 10$

$x_2 \leq 3$

$x_1, x_2 \geq 0$ 8

6.(a) Find the equations of lines of regression for the following data

x	5	6	7	8	9	10	11
y	11	14	14	15	12	17	16

6

(c) Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1)(x^2+4)}dx$ using contour integration. 6

(b) In an experiments on pea breeding, the following frequencies of seeds were obtained

Round and Yellow	Wrinkled and yellow	Round and green	Wrinkled and green	Total
315	101	108	32	556

Theory predicts that the frequencies should be in proportions 9: 3: 3: 1.

Examine the correspondence between theory and experiment using Chi-square Test 8

Se Sem. IV COMPS I.T. Dt: 19/05/16

Sub:- C.N.

QP Code : 549602

(3 Hours) **[Total Marks : 80**

N.B. : (1) Question no. **1** is **compulsory**
(2) Attempt **any three** questions from the remaining questions.
(3) Total **four** questions need to be solved.

1. Answer any **four** **20**
   (a) Compare slotted ALOHA and Pure ALOHA.
   (b) Explain selective repeat protocol.
   (c) Explain TCP timer
   (d) Compare Linux and windows operating system
   (e) Explain PSTN.

2. (a) What is OSI model? Give the functions and services of each layer. **10**
   (b) Explain Guided Transmission media in detail. **10**

3. (a) What are the different types of routing algorithms? Explain shortest path routing algorithm in detail? **10**
   (b) Explain (i) IP address (ii) Subnet Mask **6**
   (c) An IPV_4 Packet has arrived with the first "8 bits" as shown : 0100 0010. The receiver discards? Why? **4**

4. (a) Draw and explain TCP segment heade. **10**
   (b) Explain TCP Congestion Control. **10**

5. (a) What is HDLC? Explain the frame formats of I-frame, U- frame and S-Frame? **10**
   (b) Compare Connetionless and connection oriented services. **5**
   (c) Explain Traditional Ethernet **5**

6. Write short notes on following (any **four**) **20**
   (i) Compare LAN, MAN, WAN
   (ii) BGP
   (iii) Explain CRC with example
   (iv) CDMA/CA
   (v) Bridges, Router, Switches.

IT (CBGS)

SE Sem-IV

Automata Theory

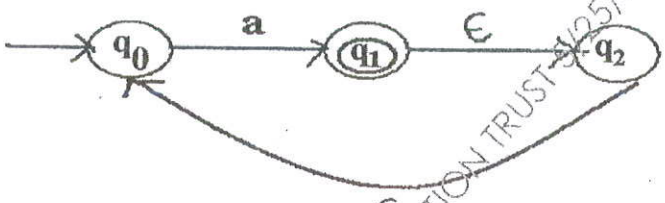
25/5/16

QP Code :549701

(3 Hours) [Total Marks : 80

NB : (1) Question no. 1 is compulsory.
(2) Solve any Three questions from remaining questions.
(3) Draw diagrams wherever necessary.

1 (a) What is the complement of the language accepted by the NFA shown below? Assume S ={a} and ϵ is the empty string. 2



(b) Definition of a language L with alphabet {a} is given as following 2
{ a^{nk} |k > 0, and n is a positive integer constant }
What is the minimum number of states needed in a DFA to recognize L?

(c) What is Multi-Tape Turing Machine ? 3

(d) Design Mealy Machine to convert each occurrence of substring 1000 by 1001 . 7

(e) State that whether a following Language is Regular or not.

1) $L=\{WW^R \mid |W|=2$ over $\Sigma=\{a,b\}\}$ 3

2) $L=\{WW^R \mid W \epsilon (a,b)^*\}$ 3

2 (a) Give formal definition of a Turing Machine . 5

(b) Write a regular expression for the following languages, over sigma={a,b}. 10

1. Seventh symbol from right must be *a*.
2. Every second character is *b*.
3. Exactly one *ab*.

(c) Explain Chomsky Hierarchy. 5

[Turn Over

3	(a)	Construct a TM for accepting Even palindromes.	10
	(b)	Design PDA For recognizing $L=\{a^n b^{2n+1} \mid n>=1\}$	10
4	(a)	Convert the following grammar to Chomsky Normal Form. Show all the relevant steps briefly. S --->bA | aB A --->bAA | aS | a B--->aBB | bS | b	10
	(b)	Give the technical strategy to convert CFG to GNF. Convert the following grammar to GNF. $S \rightarrow AA \mid a$ $A \rightarrow SS \mid b$	10
5	(a)	Enumerate the differences between finite automata and non-deterministic automata?	8
	(b)	Construct NFA,DFA for the regular Expression R=ab(a+b)+abb.Obtain minimized DFA.	7
	(c)	Give formal definition of a Push Down Automata(PDA) .	5
6		Write short notes on:- (Any Two)	20
	(a)	Unsolvable problems.	
	(b)	Recursive and Recursively enumerable languages.	
	(c)	Simplification Of CFG.	

IV - IT

31/5/16

COA

Q.P. Code : 549802

(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.

1. Solve any **four** out of **five :-** **20**
   (a) Explain the types of microinstruction formats.
   (b) Draw and explain the flowchart of Add and Shift method of integer multiplication.
   (c) What the functions of following registers ?
   (i) Z (ii) SP (iii) MAR (iv) MDR (v) Y
   (d) Compare SRAM and DRAM.
   (e) With the help of diagram, explain Von Neumann architecture.

2. (a) Multiply (-9) and (4) using Booth's algorithm. **10**
   (b) Explain different addressing modes with example. **10**

3 (a) Express $(28.75)_{10}$ in the IEEE 754 single and double precision standard of floating point representation. **10**
   (b) Explain design of control unit w.r.t. microprogrammed and hardwired approach. **10**

4. a) Explain different mapping techniques of Cache memory. **10**
   b) Explain Flynn's classification in detail. **10**

5 a) Draw and explain six stage instruction pipeline and the various hazards. **10**
   b) What is the need of DMA? Explain its various techniques of data transfer. **10**

6. a) Find out page hit and miss for the following string using FIFO, LRU and OPTIMAL page replacement policies considening a frame size of three. 2, 3, 3, 1, 5, 2, 4, 5, 3, 2, 5, 2. **10**
   b) Divide 15 by 4 using restoring division algorithm. **10**

S.E. IV (CBCS) I.T. Date 06/06/16
Sub - Web Programming

Q.P. Code : 549902

(3 Hours) **[Total Marks: 80**

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

1. (a) Explain Cross Browser Compatibility. **5**
   (b) Write a JavaScript code to change a background color using buttons. **5**
   (c) Explain PHP string functions. **5**
   (d) Explain all methods of session tracking in ASP.NET. **5**

2. (a) What is CSS? Explain the ways by which CSS is included in the web page. **10**
   (b) Write HTML code which includes table, Hyperlink, character formatting, ordered and unordered list to display your resume. **10**

3. (a) Write a PHP Program to insert a record into MYSQL database. **10**
   (b) Explain XML, XSL and XPATH with Example. **10**

4. (a) Explain Built in objects in JavaScript. **10**
   (b) Differentiate following. **10**
   i) GET and POST
   ii) JSP and SERVLET

5. (a) Explain JDBC drivers. **10**
   (b) Explain Servlet Life Cycle. **5**
   (c) Write HTML code to draw table given below: **5**

<table>
<tr><td colspan="2">Items</td><td>Price</td></tr>
<tr><td>Shirt</td><td>Trouser</td><td rowspan="2">Rs.1000/-</td></tr>
<tr><td>Rs. 400/-</td><td>Rs. 600/-</td></tr>
</table>

6. (a) What is JQUERY? Illustrate the use of JQUERY for FORM validation. **10**
   (b) Explain life cycle of ASP.NET application. **10**

S E. Sem. IV CBGS I.T. Dt: 10/06/16

Sub:- I.T.C.

QP Code : 30802

(3 Hours) [Total: 80 marks

Note: 1. Question no.**1** is compulsory
2. Answer three questions out of remaining five questions
3. Figures to right indicate marks
4. Answers of same questions to be grouped and written

1. a) write a note on convolution code. [4]
   b) State Fermat's little theorem and its applications [4]
   c) Define entropy and explain types of entropy [4]
   d) Explain cyclic codes. [4]
   e) What is compression. List different compression algorithm. [4]

2. a) Name the source coding technique used in the following types of files and Classify them as lossy or lossless. [10]
   i).Zip ii).jpg iii).mpg iv).bmp v).gif
   b) For(7,4) cyclic code, find out the generator matrix if $G(D)=1+D+D^3$ [10]

3 a) Explain Diffie-Hellman algorithm. Which attack is it vulnerable to? [10]
   b) Construct Huffman code for the given symbols{x1, x2...X8} with probabilities$P(x)$= {0.07, 0.08, 0.04, 0.26, 0.14, 0.09, 0.07, 0.25}
   Find coding efficiency. [10]

4. a) Explain LZW compression with example. [10]
   b)State Chinese Remainder theorem. Using it solve for X.
   X=1 MOD 2
   X=2 MOD 3
   X= 2 MOD 5 [10]

5 a) what do you mean by symmetric key cryptography? Explain DES in detail. [10]
   b) Define i)Hamming weight ii)Hamming Distance iii)Syndrome iv)Linear code properties v)Code Efficiency [10]

6. Write short notes on [20]
   a) RSA
   b) RLE
   c) Security Goals
   d) Digital signature.
