

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

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

(3) Use of statistical 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 $\int_c^{1+i} (x^2 + iy) dz$ along the path $y = x$

5

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

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

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 Degenerate? 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

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

$$\text{Maximize } z = 10x_1 + 4x_2 - 2x_1^2 - x_2^2$$

$$\text{Subject to } 2x_1 + x_2 \leq 5; \text{ and } x_1, x_2 \geq 0$$



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

$$\text{Maximize } z = 4x_1 + x_2 + 3x_3 + 5x_4$$

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

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

$$-x_1 - 3x_2 + 7x_3 + 2x_4 \leq 20$$

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

6

- (b) If a random variable X follows the Poisson distribution such that

$$P(X = 1) = 2P(X = 2), \text{ find the mean, the variance of the distribution and}$$

$$P(X = 3)$$

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 L.P.P using the Dual Simplex method

$$\text{Maximise } z = -3x_1 - 2x_2$$

$$\text{Subject to } x_1 + x_2 \geq 1$$

$$x_1 + x_2 \leq 7$$

$$x_1 + 2x_2 \geq 10$$

$$x_2 \leq 3$$

$$x_1, x_2 \geq 0$$



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 | 13 | 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

EIT

Sub: - MP & MC

19/05/2016

Q.P. Code : 549001

(3 HOURS)

[TOTAL MARKS: 100]

Note: 1. Question number -1 is compulsory.2. Solve any **four** from remaining six questions.

3. Draw neat diagrams wherever necessary.

Q.1 Design 8086 based system with following specifications 20

- a) 8086 CPU operating at 5 MHz.
- b) 32 KB of RAM using 8 KB chips.
- c) 32 KB of EPROM using 8 KB chips
- d) Two 8-bit ADC's

Q.2 a) Discuss modes of serial port of 8051 10b) Explain Interrupt structure of 8051 with IE & IP SFR formats 10Q.3 a) Explain the advantages of segmentation in 8086 10b) Write a note on 'String Instructions' of 8086 10Q.4 a) Draw and explain 'Maximum Mode of 8086' 10b) Distinguish between 'I/O Mapped I/O & Memory Mapped I/O' 10Q.5 a) What are assembler directives list & explain ? 10b) Write a note on 'Timer/Counter- Modes' of 8051 10Q.6 Design 8051 based system with following specifications 20

- a) 8051 CPU operating at 8 MHz
- b) 24 KB of RAM using 8 KB chips
- c) 24 KB of EPROM using 8 KB chips
- d) One 8255(PPI)

Q.7 Write notes on (Any four) 20

- a) Single Step Operation in 8051
- b) Watch Dog Timer in PIC
- c) Power Saving Modes of 8051
- d) Multiprocessor Communication in 8051
- e) Minimum Mode of 8086

CN (IT) Sem IV (CBGS) 15/05/16

SE sem-IV

May-16

QP Code : 549602

IT

Sub:-CN

(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 IPV₄ Packet has arrived with the first "8 bits" as shown : 01000010. The receiver discards? Why? 4
4. (a) Draw and explain TCP segment header. 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 Connectionless 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.



SE (IV) / Old / IT / IP

25/5/2016

IT



Sub: - IP

(3 Hours)

May-16

QP Code : 549102

Total Marks : 100

- N.B.: (1) Question No.1 is compulsory.
(2) Attempt any four questions out of remaining six questions.
(3) Figures to the right indicate full marks.

1. a) Write Java script to validate a form consisting of Name, Age, Address, Gender (radio button), state and country. (Drop down menu). 10
b) What is the need of style sheets? Explain different cascading style sheets with example. 10
2. a) Explain the sequence of steps required to access a database from an ASP page with example. 10
b) Explain the in-built objects provided in JavaScript with their properties and methods. 10
3. a) Discuss various stages of request response life cycle in JSP. 10
b) Write a DHTML program to handle any three mouse events. 10
4. a) Explain SOA architecture. 10
b) Explain difference between 1) GET and POST HTTP method 10
2) XML and HTML.
5. a) What do you mean by session management? Explain various ways of session Management. 10
b) Explain three tier-architecture with advantages, disadvantages and applications. 10
6. a) Design a web page to maintain a CD catalogue. It should maintain the name of the music album, Songs in that album, composer, singer and year of release. Format it in the tabular manner using XSL. 10
b) Explain the different ASP objects in detail. 10
7. Write short notes on (Any four) 20
 - a) RSS
 - b) DOM
 - c) Web Services
 - d) E-commerce
 - e) JDBC

16445 SARASWATI

25/5/2016

QP Code : 549701

IT

Sub: AT

(3 Hours)

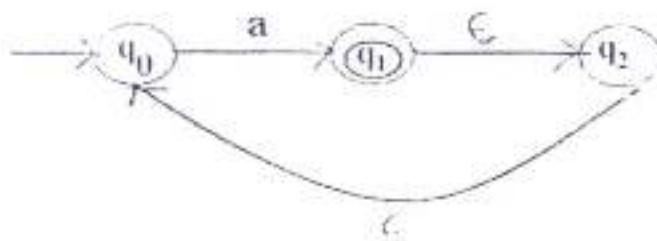
[Total Marks : 80]

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? 2
Assume $S = \{a\}$ and ϵ is the empty string.



- (b) Definition of a language L with alphabet $\{a\}$ is given as following 2
 $\{a^{nk} \mid k > 0, \text{ and } n \text{ is a positive integer constant}\}$
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) $L = \{WW^R \mid |W|=2 \text{ over } \Sigma = \{a,b\}\}$ 3
- 2) $L = \{WW^R \mid W \in (a,b)^*\}$ 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
- Seventh symbol from right must be a .
 - Every second character is b .
 - 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 $L = \{a^n b^{2n+1} \mid n \geq 1\}$ 10

- 4 (a) Convert the following grammar to Chomsky Normal Form. Show all the relevant 10
 steps briefly.

$S \rightarrow bA \mid aB$
 $A \rightarrow bAA \mid aS \mid a$
 $B \rightarrow aBB \mid bS \mid b$



- (b) Give the technical strategy to convert CFG to GNF. 10
 Convert the following grammar to GNF.

$S \rightarrow AA \mid a$
 $A \rightarrow SS \mid b$

- 5 (a) Enumerate the differences between finite automata and non-deterministic 8
 automata?

(b) Construct NFA/DFA for the regular Expression $R = ab(a+b)^+abb$. Obtain minimized 7
 DFA.

(c) Give formal definition of a Push Down Automata(PDA). 5

- 6 Write short notes on:- (Any Two) 20

(a) Unsolvability problems

(b) Recursive and Recursively enumerable languages.

(c) Simplification Of CFG

CoA IT Sem IV (BAS) 31/05/16

May -16

IT

Sub:- 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 a sample. 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 considering 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

SE sem - IV (old) May-16

Date: 31-5-16

Sub: - PCE

IT

Q.P. Code : 28887

(3 Hours)

[Total Marks : 100

- N.B. : (1) Question No. 1 is Compulsory.
(2) Attempt any four out of remaining six questions.
(3) Figures to the right indicate full marks.
(4) Allume suitable date it necessary.



1. Answer any four. 20
 - (a) Expalin Analog Communication System with neat diagram.
 - (b) Write a short note on TDM.
 - (c) Pre-emphasis and to emphasis.
 - (d) Quantization.
 - (e) Compare ASK, FSK, PSK.

2.
 - (a) Expalin any method to generation of SSB-SC AM. 10
 - (b) An amplifier has a bandwidth of 4 MHz with $10k\Omega$ as the input resistor, calculate the rms noise voltage at the input to this amplifier if the room temperature is $25^\circ C$. 5
 - (c) Derive friss formula. 5

3.
 - (a) Explain Foster-Seelay discriminator with neat block diagram. 10
 - (b) A single tone FM signal is given by, $V_{FM} = 10 \sin (16\pi \times 10^4 t + 20 \sin 2\pi \times 10^4 t)$ volts. Find the modulation index, modulating frequency deviation, Carrier frequency and power of the FM signal. 10

4.
 - (a) State and prove sampling theorem. 10
 - (b) Explain PWM generation and detection method. 10

5.
 - (a) Expalin different types of Communication Channels and their characteristics. 10
 - (b) Derive the expression of AM signal. 10

6.
 - (a) Explain any method to Demodulation of DSB-SC AM with neat block diagram. 10
 - (b) State and prove the following Properties of Fourier Transtorm. 10
 - (i) Time shifting
 - (ii) Differentiation in Time domain

7. Write short notes on Any four 20
 - (i) Satellite Communication
 - (ii) ISB Transmitter
 - (iii) Image frequency and rejection
 - (iv) Companding in PCM
 - (v) FDM

IT

Q.P. Code : 549302

(3 Hours)

[Total Marks : 100]

- N.B. : (1) Question number 1 is **compulsory**
 (2) Solve any 4 from remaining
 (3) Assume Suitable data wherever necessary



- | | | |
|----|--|----|
| 1. | Attempt the following - | 20 |
| | (a) Compare circuit switching, Packet switching. | |
| | (b) Explain sliding window protocol. | |
| | (c) Explain working of RPC. | |
| | (d) List types of failures in message passing system and how to overcome them. | |
| 2. | (a) Explain Distance vector routing algorithm with example | 10 |
| | (b) Draw & explain IPv4 Header format. What is need of fragmentation of IP packets. | 10 |
| 3. | (a) Explain following with example: | 10 |
| | i. IP Address ii. Port Number iii. URL | |
| | iv. MAC Address v. Socket | |
| | (b) Write the steps to compute the checksum for CRC code. Calculate checksum and transmitted frame if generator is x^4-x+1 and data to transmit is 11011011. | 10 |
| 4. | (a) Explain various transparencies need to achieve in Distributed system | 10 |
| | (b) Explain CSMA/CA with an example. | 10 |
| 5. | (a) Explain desirable features of a good message passing system. | 10 |
| | (b) Explain process of TCP connection establishment and closing mechanism. | 10 |
| 6. | (a) What is multiplexing? What are different kinds of multiplexing. | 10 |
| | (b) Explain various congestion control policies. | 10 |
| 7. | Write notes on following. - (Any four) | 20 |
| | (a) BGP. | |
| | (b) Classful IP Addressing. | |
| | (c) CRC | |
| | (d) Bridges, Switches, Hubs and gateways. | |
| | (e) Bluetooth Technology. | |

IT - Sem IV CBGS (WP)

6/6/16

Mar-16

IT

Sub:- WP

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



| Goods | | Price |
|-----------|-----------|-----------|
| Shirt | Trouser | Rs 1000/- |
| Rs. 400/- | Rs. 600/- | |

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

(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 $\{x_1, x_2, \dots, x_8\}$ 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. [40]
- b) State Chinese Remainder theorem. Using it solve for X.
 $X = 1 \text{ MOD } 2$
 $X = 2 \text{ MOD } 3$
 $X = 2 \text{ MOD } 5$ [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.

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