SE- SEM IV (CBSG) - I.T. Dec 2019

I.T & Cyber

QP Code :12601

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

N. B. : (1) Question **No.1** is **compulsory.**
(2) Solve any **three** questions out of the remaining questions.
(3) Figures to the right indicate **full** marks.

1. (a) Define Chinese Remainder Theorem and its application **5**
(b) Explain Term Entropy in Information Theory and its significance **5**
(c) Describe Fermat's Little Theorem. And its Application **5**
(d) Explain Cyclic Codes **5**

2. (a) Explain Adaptive Huffman encoding technique. Encode the data Pattern "accabbcdaad" using Above technique. **10**
(b) Compare Symmetric and Asymmetric Cryptography **5**
(c) Explain various Security Goals **5**

3. (a) Explain convolution code in Brief. **10**
(b) Consider the source probabilities **10**
{0.20, 0.20, 0.15, 0.15, 0.10, 0.10, 0.05, 0.05,}
(i) Determine the efficient fixed length code for the source.
(ii) Determine Huffman code for this source.
(iii) Compare the two codes and comment.

4. (a) Explain DES and give an outline of the algorithm. **10**
(b) Which of the following g (x) values guarantees that a single-bit error is caught? **10**
In each case, what is the error that cannot be caught?
(i) $x+1$ (ii) x^3

5. (a) Describe with example Modular Arithmetic, Expontiation and Congruences. **10**
(b) Define - (i) Hamming Weight **10**
(ii) Hamming Distance
(iii) Syndrome
(iv) Linear Code Properties
(v) Code Rate

6. Write Short notes on: **20**
(i) RSA
(ii) RLE
(iii) Speech Compression
(iv) Random Number Generation

GN-Con.:12108-14.

SE - SEM IV (CBGS) IT

web programming

Dec 2014

QP Code :12567

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

N.B. : (1) Qquestion no. **1** is **compulsory.**
(2) Solve any **three** out of **remaining.**
(3) **Assume** suitable data wherever **necessary.**

1. (a) Differentiate between HTML and XML. **5**
   (b) Explain 3 tier architecture of web application **5**
   (c) Explain links in HTML **5**
   (d) Explain PHP string functions. **5**

2. (a) Explain following HTML tags **10**
      (i) <form>
      (ii) <table>
      (iii) <iframe>
      (iv) <doctype>
   (b) Write the HTML program to display class timetable. **10**

3. (a) Write JavaScript program to validate a form which accepts Name, Age, Email and Phone Number of a student. **10**
   (b) Explain control structures in PHP. **10**

4. (a) Write an ASP.NET program to insert a new record in the database using C#. **10**
   (b) What is CSS? Explain the ways by which CSS is included in the web page. **10**

5. (a) Explain any two built in objects in JavaScript. **10**
   (b) Write a JSP program to read the students data like roll number, name, email and marks from the database and display in tabular format on web page. **10**

6. (a) What is session? Explain session handling in PHP. **10**
   (b) Explain web services. **5**
   (c) Write a JavaScript program to display todays date and time. **5**

S.E.I.T Sem IV (CBGS). 9/12/14

Answer Key

QP Code : 12527

Duration : 3 hours Total marks : 80

Note.(1) Question No. 1 is compulsory

(2) Attempt any three questions from remaining questions

(3) Draw suitable diagrams wherever necessary

(4) Assume suitable data, if necessary.

Q1.(a)Explain Chomsky hierarchy (10)

(b) Let G be the grammar . Find the leftmost derivation, rightmost derivation and parse (10)

tree for the string 001222

G: $S \rightarrow 0S \mid 1A \mid 2B \mid \epsilon$

$A \rightarrow 1A \mid 2B \mid \epsilon$

$B \rightarrow 2B \mid \epsilon$

Q2. (a)Design a DFA that rejects any string over { 1, 2, 3 } where 2 is immediately preceded (10)

by a 0. It should accept all other strings.

(b) Design a DFA for the regular expression (a+b)*aba (10)

Q3. (a Design a Mealy machine to accept all strings ending with 00 or 11 (10)

(b) Convert the following NFA to a reduced DFA (Final state is marked with *). (10)

δ	0	1
p	p , q	p
q	r	r
r	s	--
*s	s	s

Q4. (a) Using pumping lemma prove that the following language is not regular (10)

$L = \{ ww \mid w \in \{0, 1\}^* \}$

(b) Design a Turing machine to generate the language given by a regular expression (10)

00^*

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Q5 (a) (i) Convert the following CFG to CNF (05)

S →aAbB

A →aA | a

B →bB|b

(ii) Construct a CFG over { a ,b } to accept a set of all palindromes. (05)

(b) Design a PDA corresponding to the grammar S →aSa |bSb |ϵ (10)

Q6. Write short notes on (any two) (20)

(a) Turing Machines
(b) Post Correspondence Problem
(c) Halting Problem
(d) Pumping Lemma for Regular languages

S.E. I.T. Sem IV (CBGS)
CN.

27/11/14

Q.P. Code : 12452

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

N.B. (1) Question No.**1** is **compulsory**.
(2) Attempt any **3** questions out of remaining questions.
(3) Total **4** questions need to be **solved.**

1. (a) Explain collision detection procedure in CSMA/CD. **5**
   (b) Consider a message 11010011101100, divisor 1011. Compute n bit binary CRC. **5**
   (c) Compare circuit switched and pachet switched networks. **5**
   (d) Differentiate between connection oriented and connectionless services. **5**

2. (a) What are the three main functions performed by network layer ? What is routing. Explain distance vector counting. **10**

   (b) What is IP address ? Why it is required ? What is subnet mask ? Explain is subnetting and supernetting with Explain. **10**

3. (a) Explain TCP conquestion control. **10**
   (b) Explain connection establishment and termination in TCP with neat diagram. **10**

4. (a) Explain HDLC protocol with sutiable diagram. **10**
   (b) Explain TCP sliding window with neat diagram in detail. **10**

5. (a) Explain TCP timer management and transaction TCP. **10**
   (b) A IP header from an IP packet received at destination 4500003c1c4640004006b1e6ac100a63ac100a0c. Map these values to IP header and explain all bits. **10**

6. Write short note (any **four**) :- **20**
   (i) Network topology
   (ii) GSM operation subsystem (OSS)
   (iii) Link state routing
   (iv) Framing at data link layes.
   (v) Networking using windows and LINUX operating system
   (vi) Static channel allocation of LAN & MAN.

GN-Con.:8581-14.

S.E. Comps & I.T
AM - IV (K.T.)
(CBGS)

21/11/14

QP Code : 12413

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

N.B. (1) Question No. **1** is **compulsory**.
(2) Answer any **three** questions from Question Nos. **2** to 6.

1. (a) Evaluate $\int_C (z - z^2)$ where Cis the upper half of the circle $|z| = 1$. What is the value of the integral for the lower half of the same circle ? **5**

(b) If $A = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix}$. Find the eigen values of $A^3 + 5A + 8I$. **5**

(c) The regression lines of a sample are $x + 6y = 6$ and $3x + 2y = 10$. Find (1) mean of x and y and (2) coefficient of correlation between x and y. **5**

(d) A machine is claimed to produce nails of mean length 5 cm. and standard deviation of 0·45 cm. A random sample of 100 nails gave 5·1 cm. as average length. Does the performance of the machine justify the claim ? Mention the level of significance you apply. **5**

2. (a) Show that the matrix $A = \begin{bmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & -4 \end{bmatrix}$ is derogatory. **6**

(b) Evaluate $\int \frac{z+3}{z^2+2z+5} dz$, where Cis the circle (i) $|z| = 1$. (ii) $|z + 1 - i| = 2$. **6**

(c) The mean inside diameter of a sample of 200 washers produced by a machine is 0·502 cm and the standard deviation is 0·005 cm. The purpose for which these washers are intended allows a maximum tolerance in the diameter of 0·496 to 0·508 cm, otherwise the washers are considered defective. Determine the percentage of defective washers produced by the machine, assuming the diameters are normally distributed. **8**

3. (a) A continuous random variable X has the following probability law $f(x) = kx^2e^{-x}$, $x \geq 0$. Find k, mean and variance. **6**

(b) Solve the following LPP by Simplex method :— **6**

Max $z = x_1 + 4x_2$
Subject to $2x_1 + x_2 \leq 3$
$3x_1 + 5x_2 \leq 9$
$x_1 + 3x_2 \leq 5$
$x_1, x_2 \geq 0$

(c) Find Laurent's series which represents the function $f(z) = \frac{2}{(z-1)(z-2)}$ when **8**

(i) $|z| < 1$ (ii) $1 < |z| < 2$ (iii) $|z| > 2$.

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4. (a) The means of two random samples of size 9 and 7 are 196·42 and 198·82 respectively. The sums of the squares of the deviation from the means are 26·94 and 18·73 respectively. Can the samples be considered to have been drawn from the same population ? **6**

(b) Calculate the correlation coefficient from the following data : **6**

X :	23	27	28	29	30	31	33	35	36	39
Y :	18	22	23	24	25	26	28	29	30	32

(c) Show that the following matrix is Diagonalizable. Find the transforming matrix and the Diagonal matrix. **8**

$$\begin{bmatrix} -9 & 4 & 4 \\ -8 & 3 & 4 \\ -16 & 8 & 7 \end{bmatrix}$$

5. (a) The average of marks scored by 32 boys is 72 with standard deviation 8 while that of 36 girls is 70 with standard deviation 6. Test at 1% level of significance whether the boys perform better than the girls. **6**

(b) Evaluate the following integral by contour integration **6**

$$\int_{-\infty}^{\infty} \frac{x^2\,dx}{(x^2+1)(x^2+4)}.$$

(c) Use Kuhn Tucker method to solve the NLPP :— **8**

$$\text{Max } Z = -x_1^2 - x_2^2 - x_3^2 + 4x_1 + 6x_2$$

$$\text{St} \quad x_1 + x_2 \le 2$$
$$2x_1 + 3x_2 \le 12$$
$$x_1, x_2 \ge 0.$$

6. (a) For special security in a certain protected area, it was decided to put three lighting bulbs on each pole. If each bulb has a probability p of burning out in the first 100 hours of service, calculate the probability that at least one of them is still good after 100 hours. **6**

If p = 0·3, how many bulbs would be needed on each pole to ensure 99% safety that atleast one is good after 100 hours ?

(b) Use Duality to solve the following LPP : **6**

$$\text{Max } Z = 2x_1 + x_2$$
$$\text{Subject to} \quad 2x_1 - x_2 \le 2$$
$$x_1 + x_2 \le 4$$
$$x_1 \le 3$$
$$x_1, x_2 \ge 0$$

(c) The number of car accidents in a metropolitan city was found to be 20, 17,12, 6, 7, 15, 8, 5, 16 and 14 per month respectively. Use χ^2 test to check whether these frequencies are in agreement with the belief that occurrence of accidents was the same during 10 months period. Test at 5% level of Significance. **8**
