M (Printed Pages 4)

(21214) Roll No. .....

B.Tech.-III Sem.

TU-354

B. Tech. Examination, Dec. 2014

C S Branch

Cyber Security

BT-322(N)

Time : Two Hours] *[Maximum Marks : 50*

Note : Attempt any **five** questions. Marks are indicated against each question.

1. (a) What are the basics of information system? Give the architecture of information systems. 5

   (b) Provide a scheme for classifying threats to information systems and resulting damages. 5

2. (a) Explain the crucial role of the Internet and Web Services in Global Information System. 5

(b) Discuss information system security, is threats and attacks. 5

3. (a) Distinguish between information-level threats and network-level threats. 5

(b) Why are computer viruses considered as one of the major threats to computer systems? 5

4. (a) What are the approaches and considerations in Information Security and Risk Analysis? 5

(b) Explain the need for physical security. 5

5. (a) Explain the role of intrusion detection system in physical security. 5

(b) What is meant by biometrics data? Explain with illustrative example. 5

6. (a) What are the three main types of networks that must be considered when defining a security policy. 5

(b) Explain the various methods of attack on a network. 5

7. (a) Describe the challenges faced by intrusion detection systems. 5

(b) Using suitable diagrams explain what virtual private networks are and why do organizations need them? 5

8. (a) Explain how electronic mails can pose security threats to organizations information systems? 5

(b) Why is the Internet considered as a risky media for data transmission? 5

9. (a) Describe the salient features of the Indian IT Act 2000. 5

(b) Do you think intellectual property rights (IPR) laws have relevance in to days information assets. 5

10. Write short notes on any **two** : 10

(i) www policies

(ii) Semiconductor Law

(iii) Software License

(iv) IPR

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(21214) Roll No. .....

B.Tech. III Sem.

TU-68

B.Tech. Examination, Dec. 2014

CS, IT, Branch

Industrial Sociology

BT-323

Time : Two Hours] *[Maximum Marks : 50*

Note : Attempt any **five** questions. Each question carries equal marks.

1. Define industrial sociology. Explain its scope in present day context. 10
2. Briefly explain the different stages in the development of industry in India. 10
3. Discuss the essential features of a good grievance handling procedure. 10
4. What are the various problems associated with the industrialization in India. 10

P.T.O.

(14)

5. What do you understand by industrial disputs? What are the various forms in which industrial disputes emerge in the industry? 10

6. Discuss the role of industrial relations machinary in setteling industrial disputes in India. 10

7. What are the various tripartite committees set up in India for dealing with labour problems? 10

8. What do you understand by Industrial Discipline? Also discuss its main features. 10

9. Define Trade Union. What are the objectives and functions of trade unions? 10

10. Discuss the contributions made by Karl Marx in the development of industrial sociology. 10

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(21214) Roll No. .....

B.Tech.-III Sem.

TU-357

B.Tech. Examination, Dec. 2014

CS, IT Branches

Nano Science & Technology

BT-325(N)

Time : Three Hours] *[Maximum Marks : 100*

Note : Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Explain the basic process of VLS technique. 10

   (b) Describe various stages of Pulsed Laser Deposition (PLD) Process. 10

2. Considering that $NeNn=N_i^2$ in a given Semi Conductor. Find the ratio $\frac{Nn}{Ne}$ which yields minimum Conductivity. Assume that collision

P.T.O.

times for electrons and holes are equal and that $\frac{m_e^*}{m_h^*} = .5$ 20

3. (i) Determine the energy levels and the corresponding normalized eigen functions of a particle in one dimensional potential well of the form. 12

$V(x) = \infty$ for $x < 0$ and for $x > a$

$= 0$ for $0 < x < a$

(ii) Show that 8

$$(\Delta x)^2 = < x^2 > - < x >^2 = \frac{a^2}{12}\left(1 - \frac{6}{n^2\pi^2}\right)$$

4. (i) For nanomaterials fabrication, what are the important sputter-deposition parameters one should control precisely? 10

(ii) "Bottom up" technique is more Convenient for nano fabrication-Explain. 10

5. A substance shows a Raman linc at 4567Å when exciting line 4358Å is used. Deduce the positions of stokes and antistokes lines for the same substance when exciting line 4047Å is used. 20

6. (a) Describe some of the important applications of nanodiamond. 10

(b) Schematically describe the working of a nano Robots. 10

7. (a) Define a bucky ball? What are the methods for producing bucky balls. 10

(b) Explain the working of Scanning microscopy (SEM) with a neat sketch. 10

8. What is an electron microscope and how is it superior to optical microscope. Name different types of electron microscopes and how do (TEM) differ from SEM.? 20

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9. Discuss in detail about atomic force microscope (AFM) addressing instrumentation Paramcters measured imaging modes. 20

10. (a) Define Carbon nanotube? What are the types of Carbon nanotubes. 10

(b) List the methods for producing Carbon nanotubes and explain any of the method with a diagram. 10

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B.Tech. III Sem.

TU-69

B.Tech. Examination, Dec. 2014

C.S. / I.T.

MATHEMATICS - III

(BT-305)

Time : Three Hours] *[Maximum Marks : 100*

Note: Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Determine the analytic function whose real part is

$e^x [(x^2 - y^2) \cos y - 2xy \sin y]$

(b) Expand $f(z) = \frac{1}{(z-1)(z-2)}$ in the region-

(i) $|z| < 1$

(ii) $1 < |z| < 2$

P.T.O.

(iii) $|z| > 2$

(iv) $0 < |z-1| < 1$

2. (a) Evaluate $\int_C \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)^2(z-2)} dz$, where C is the circle $|z| = 3$.

(b) Prove that

$$\int_0^\infty \sin x^2 \, dx = \int_0^\infty \cos x^2 \, dx = \frac{1}{2}\sqrt{\frac{\pi}{2}}$$

3. (a) Compute skewness and Kurtosis, if the first four moments of a distribution about the value x = 4 are respectively 1, 4, 10 and 45.

(b) According to a particular survey, 8% of the population has a lung disease. Of those having lung disease, 90% are smokers; of those not having lung disease, 25% are smokers. Find the probability that a randomly selected smoker

has lung disease.

4. (a) The table given below shows ages x and systolic blood pressure y of 12 men.

x	56	42	72	36	63	47	55	49	38	42	68	60
y	147	125	160	118	149	128	150	145	115	140	152	155

(i) determine the least squares regression equation of y on x.

(ii) estimate the blood pressure of a man whose age is 45 years.

(b) Calculate the correlation coefficient for the following heights (in inches) of fathers (x) and their sons (y).

x	65	66	67	67	68	69	70	72
y	67	68	65	68	72	72	69	71

5. (a) The number of male mates of a queen bee was found to have a Poisson distribution with parameter $\lambda = 2.7$. Find the probability that the number, N, of male mates of a queen bee is :

(i) exactly 2

(ii) at most 2

(iii) between 1 and 3, inclusive

(iv) on average, how many male mates does a queen bee have?

(b) The Diameter of a metal shaft for a precision instrument is assumed to be normally distributed with a mean of 0.5 mm and a standard deviation of 0.025 mm.

(i) What is the probability that shaft diameter is greater than 0.31 mm?

(ii) What is the probability that shaft diameter is between 0.235 and 0.315 mm?

(iii) The diameter of 90% of samples is below what value?

6. (a) When a coin is tossed 198 times, it should heads 118 times. Is the coin biased in favour of heads? Conduct the test of hypothesis at the 5% level of significance.

(b) A college claims that the tutoring service it offers significantly increases the test scores of students in mathematics. The following table gives the scores out of 120 of 8 students before and after they took the tutorial help.

Before	82	75	89	91	66	70	91	69
After	97	72	94	111	80	72	117	76

Using 5% level of significance, can you conclude that taking tutorial service increases the test scores of the students? Assume that the population of paired differences is approximately normally distributed.

7. (a) Find a real root of the equation $xe^x = \cos x$ using Newton-Raphson method correct to four decimal places.

(b) With usual notations, show that

(i) $\delta = 2\sinh\left(\frac{hD}{2}\right)$

(ii) $\Delta = \frac{1}{2}\delta^2 + \delta\sqrt{1+\frac{1}{4}\delta^2}$

(iii) $\delta(E^{1/2} + E^{-1/2}) = \Delta E^{-1} + \Delta$

8. (a) Apply Bessel's formula to obtain y_{25}, given $y_{20} = 2854$, $y_{24} = 3162$, $y_{28} = 3544$, $y_{32} = 3992$.

(b) Apply Lagrange's formula inversely to obtain the root of the equation $f(x) = 0$, given that $f(30) = -30$, $f(34) = -13$, $f(38) = 3$, $f(42) = 18$

9. (a) Apply Crout's method to solve the equations :

$3x + 2y + 7z = 4$; $2x + 3y + z = 5$; $3x + 4y + z = 7$.

(b) A slider in a machine moves along a fixed straight rod. Its distance x cm along the rod is given below for values of the time t seconds. Find the velocity of the slider and its acceleration when $t = 0.3$ second.

t :	0	0.1	0.2	0.3	0.4	0.5	0.6
x :	30.13	31.62	32.87	33.64	33.95	33.81	33.24

10. (a) Integrate numerically $\int_0^{\pi/2} \sqrt{\cos\theta}\, d\theta$.

(b) Using Runge-Kutta method of fourth order solve

$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$; $y(0) = 1$

at $x = 0.2, 0.4$

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Roll No. .....

B.Tech.-III Sem.

TU-70

B. Tech. Examination, Dec. 2014

CS & IT

Digital Logic Design

BT-306

Time : Three Hours] *[Maximum Marks : 100*

Note : Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Express the following numbers in decimal : 1×5=5
   (i) (10001.0101)
   (ii) $(AFCD.F)_{16}$
   (iii) $(22.4)_{16}$
   (iv) $(79.78)_{8}$
   (v) $(BBAA)_{16}$
   (b) Obtain 1's and 2's complement of these binary numbers : 1×5=5
   (i) 0101 1000
   (ii) 00011100
   (iii) 1111 0000

P.T.O.

(iv) 1110 1110
(v) 00 11 0011

(c) Multiply binary 10 11 11 with 100111 2

(b) Divide 101 001 by 101 3

(e) What is gray Code? Why is it used? Use a table to show the gray code values of any 8 numbers. 5

2. (a) Simplify boolean function using K-Maps →

$F(x,y,z) = \Sigma(3,4,5,7)$ 4

(b) Simplify boolean function using K-Maps → 6

$F(w,x,y,z) = \Sigma(0,1,2,4,6,8,10,11,12,13,14)$

(c) Implement boolean function with NAND gates. 4

$F(x,y,z) = (1,2,3,4,5,6)$

(d) Implement the boolean function 6

$F(A,B,C,D) = \Sigma(2,4,6,10,12)$

together with don't care conditions d, using no more than two NOR gates. Assume that both normal and complement inputs are available.

3. (a) Design a combinational circuit that compares two 4-bit numbers to check if they are equal. Circuit output is 0 if two numbers are equal otherwise 1. 10

(b) Design a combinational circuit to generate 9^{th} and 10^{th} complement of a BCD digit. 5

(c) Construct a 16×1 multiplexer with two 8×1 and one 2×1 multiplexers. 5

4. (a) Explain the difference among boolean equation, state equation, characteristic equation and a flip flop input equation. 10

(b) Construct a JK flip flop using a D flip-flop, a 2-to-1 line multiplexer, and an inverter. 10

5. (a) Show that a BCD ripple counter can be constructed from a 4 bit binary ripple counter with asynchronous clear and a NAND gate that detects the occurance of count 1010. 10

(b) Design a 4 bit synchronous counter with D-flip flops. 10

6. (a) Design a sequence detector using shift register for 00110. 10

(b) Explain the diagram of a 4 bit binary counter with parallel load. 10

7. (a) Explain the complete internal logic of a 32×8 ROM using diagram. 10

(b) Explain PAL with 4 inputs, 4 outputs and a 3-wide AND-OR structure. 10

8. (a) Explain ASMD timing sequence and datapath hardware design using examples. 10

(b) Draw and explain ASM chart with 4 control inputs. 10

9. Explain Implication Table and Implied states using diagrams. 20

10. Explain race free state assignment using 3 row flow table and 4 row flow table. Use diagrams to explain properly. 20

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B.Tech. III Sem.

TU-71

B.Tech. Examination, Dec. 2014

CS, IT Branch

Data Structure using 'C'

BT-307

Time : Three Hours] *[Maximum Marks : 100*

Note: Attempt any **Five** questions. **All** questions carry equal marks.

1. (a) What do you mean by data structures? Discuss the various types of data structures. 10

   (b) Write an algorithm or C program to Delete a node from singly linked list. 10

2. (a) What do you mean by array? Discuss the advantages of linked list over array. 10

P.T.O.

(b) What do you mean by sparse matrices? 10

3. (a) Write an algorithm or C function to implement a function which delete a node from Doubly linked list. 10

(b) Discuss an algorithm to implement the circular queue and also discuss the various operations related to circular queue. 10

4. (a) Write a C program to implement stack using linked list. 10

(b) Write short note on the following 10

(i) Dequeue

(ii) Priority Queue

5. (a) Write a Procedure to delete a node from Binary tree. 10

(b) What do you mean by Threaded Binary Tree. 10

6. (a) Write a procedure to delete a node from a circular queue. 10

(b) What do you mean by Tree traversal. Describe Inorder, Preorder and Post order tree traversal with an example. 10

7. (a) How we can represent a graph with the help of Adjacency Matrices and Adjacency list, describe with an example. 10

(b) What do you mean by Minimum cost spanning tree. Discuss Kruskal algorithm with an example. 10

8. (a) Short the following elements using Heap sort. 10

4,1,3,2,16,9,10,14,8,7

(b) Describe the procedure of insertion sort. 10

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9. (a) What do you mean by Hashing, discuss various hashing functions. 10

(b) Describe the basic properties of B Tree. 10

10. (a) Discuss the Binary search and compare time complexity of Binary search with the sequential search. 10

(b) Write the short note on the following: 10

(i) AVL Tree

(ii) B^+ tree

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B.Tech.-III Sem.

TU-365

B.Tech. Examination, Dec. 2014

CS , IT Branches

Data Structures using 'C'

BT-307(N)

Time : Three Hours] *[Maximum Marks : 100*

Note : Attempt any **five** questions. **All** questions carry equal marks.

1. (a) (I) Discuss linear and non linear data structures with examples. 5

(ii) What is Asymptotic notation? Explain the Big oh(O) notation. 5

(b) (i) Derive and explain in brief a formula to obtain an address of any element in two dimensional array stored in row major and column major order. 6

P.T.O.

(ii) Explain. Time-space Trade off with example. 4

2. (a) What is singly linked list? Write down the algorithm for 10

(i) insertion of an element in the beginning

(ii) Delection of an element from the end

(b) Explain the following with example :10

(i) Doubly linked list

(ii) Circular linked list

3. (a) Define stack. Write an algorithm to evaluate a positfix expression. using a stock. 10

(b) (i) Using the algorithm given by you in question 3(a) evaluate the following postfix expression 5

5, 6, 2, +, *, 12, 4, 1

(ii) Convert following expression into postfix notation 5

a + (b + c * d + e) + f/g

4. (a) Define circular Queue. Write algorithm for insertion and deletion on circular queue. Also explain Tail Recursion. 10

(b) (i) State the Towers of Hanoi problem. Write Recursive algorithm to solve the problem. 5

(ii) Define the following 5

(x) Priority Queue

(y) Dequeue

5. (a) (i) What is complete. Binary tree? Draw all possible binary tree with 3 nodes. 5

(ii) What is threaded binary tree? Draw all possible binary trees T where T is a 2 tree with 4 external nodes. 5

(b) A Binary Tree T has 9 nodes. The inorder and preorder traversals yield the following sequence of nodes : 10

Inorder : E A C K F H D B G

Preorder : F A E K C D H G B

Construct the tree T.

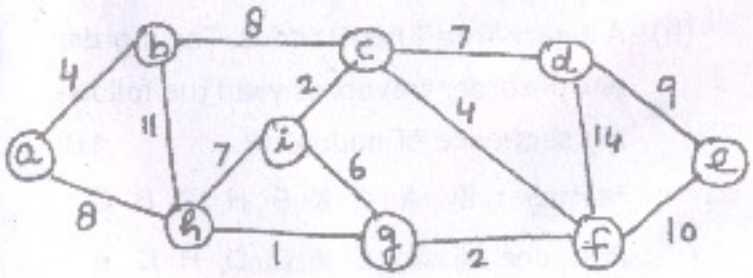
6. (a) Write algorithms for inorder and post order traversal of a binary tree. 10

(b) Discuss Huffman algorithm with example and its significance. 10

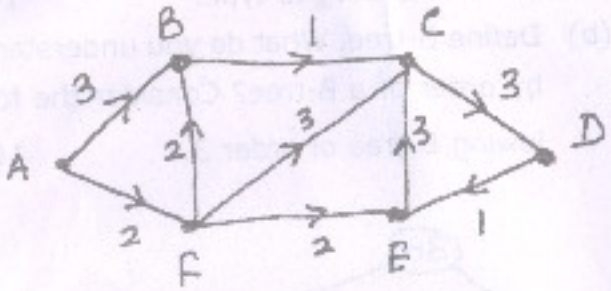
7. (a) What is minimum spanning tree? Explain Kruskal's algorithm to find minimum spanning tree with example. 10

(b) Write and explain BFS graph traversal algorithm with example. What data structure do you use here? 10

8. (a) Find the minimum spanning tree of the following graph by Prim's algorithm and compute the value of MST. 10



(b) Apply Dijkstra's algorithm to find shortest path between node A and D.



9. (a) (i) What do you understand by Hashing? Explain the collision resolution strategies used in Hashing. 6

(ii) Explain the term garbage collection and compaction. 4

(b) (i) Give the algorithm for Binary search. What is its time complexity? 5

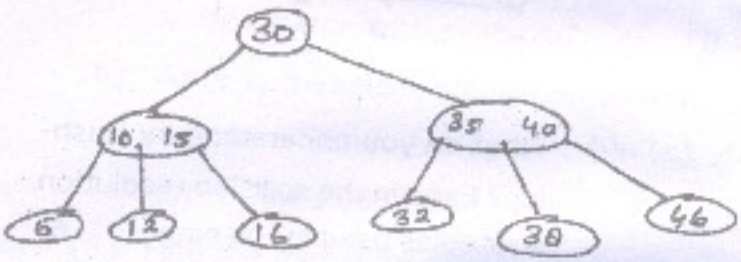
(ii) Write an algorithm for insertion sort. What is its time complexity? 5

10. (a) What is an AVL tree? Show at each step the AVL tree built from following sequence of insertions :

8, 15, 1, 19, 16, 4, 25, 12, 23, 20, 17

Start with empty tree. Label the rotations according to type. 10

(b) Define B-tree. What do you understand by order of a B-tree? Consider the following B-tree of order 3. 10



Show the B-tree after the following sequence of operations :

(i) Insert 43

(ii) Insert 50

(iii) delete 15

(iv) delete 35

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B.Tech. III Sem.

TU-72

B.Tech. Examination, Dec - 2014

C.S. / I.T.

Discrete Mathematical Structures

BT-308

Time : Three Hours] *[Maximum Marks : 100*

Note: Attempt **all** questions as per Instructions.

1. Attempt any **two** parts of the following : 10×2=20

(i) If A, B and C are any three sets then prove that

$A - (B \cup C) = (A - B) \cap (A - C)$

P.T.O.

(ii) Find the matrix of relation R on A relative to the ordering given

$R = \{(a,b), (b,c), (c,d), (d,e)\}$

ordering $A = \{a, b, c, d, e\}$.

(iii) Suppose $A = R \times R$ (R is the set of real numbers) and define the following relation on A :

(a, b) R (c, d) if and only if $a^2 + b^2 = c^2 + d^2$

Prove that (A, R) is an equivalence relation.

2. Attempt any **two** parts of the following : 10×2=20

(i) If f and g are two mapping from R to R given by

$f(x) = x^2 + 3x + 1$ and $g(x) = 2x - 3$

then obtain fog and gof.

(ii) Define order of a group and show that the set

$G = \{0, 1, 2, 3, 4\}$

is a finite abelian group of order 5 under addition modulo 5 as composition.

(iii) Find the solution of the equation abxax = cbx in a group G, where a, b and c are given elements of G.

3. Attempt any **two** parts of the following : 10×2=20

(i) Decompose the Permutation f into transpositions, where

$$f = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 6 & 5 & 2 & 4 & 3 & 1 & 7 \end{pmatrix}$$

Also prove that

$(1.2.3.4....n-1.n)^{-1} = (n.n-1.....4.3.2.1)$

(ii) Define cyclic group and find all the generators of the cyclic group of order 8.

(iii) Is the set

$R = \{0, 1, 2, 3, 4\}$

is a commutative ring with unity with respect to compositions +5 (addition modulo 5) and X_5 (multiplication modulo 5)? Prove that.

4. Attempt any **two** parts of the following : $10 \times 2 = 20$

(I) Use a Karnaush map to find a minimal form of the function

2.

$f(x,y,z,w)=xyzw+xyzw'+xy'zw'+x'y'zw+x'y'zw'$

(ii) construct a circuit using gates to realize the Boolean expression

$f = (x_1 + x_2)(x_1' + x_3) + (x_3 + x_4)'$

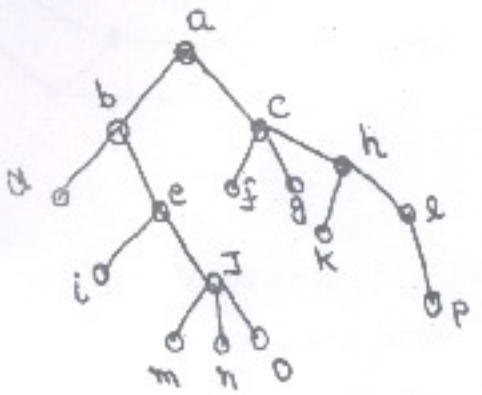
(iii) Constract a truth-table for the function

$[(p \to q) \wedge (q \to r)] \to (p \to r)]$

and show that it is a tautology.

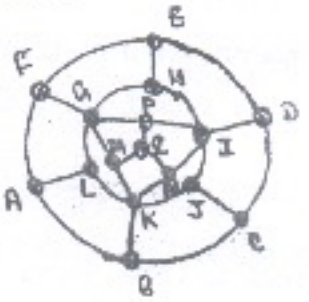
5. Attempt any **two** parts of the following : $10 \times 2 = 20$

(i) Define an inorder traversal of an ordered rooted tree. Determine the order in which an inorder traversal visit the vertices of the ordered traversal visit the vertices of the ordered rooted tree T :

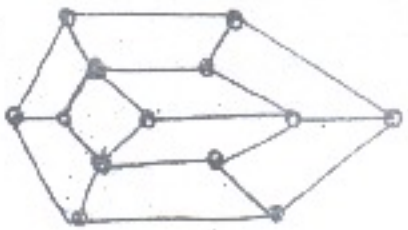


(ii) Show that the following graph is not Hamiltoman.

(a)



(b)



(iii) Define generating function and use the same to solve the recurrence relation,

$a_r - 5a_{r-1} + 6a_{r-2} = 2^r + r, r \geq 2$ and $a_0 = 1$ and $a_1 = 1$.

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B.Tech.-III Sem.

TU-367

B. Tech. Examination, Dec. 2014

CS, IT Branches

CBNST

BT-309(N)

Time : Two Hours] *[Maximum Marks : 50*

Note : Attempt any **five** questions. **All** question carry equal marks.

1. (a) Find the rate of convergence of Newton-Raphson method. 5

   (b) If $u = \frac{x^2y^3}{z^4}$ and errors in x, y, z, be 0.001. Compute relative maximum errors in u, when x=y=z=1. 5

2. (a) Find real root of $x^3 - x - 1=0$ between 1 and 2 by Reguala-Falsi-method. 5

P.T.O.

(b) Find absolute, relative and percentage errors, if 0.333 is the approximate value of $\frac{1}{3}$. 5

3. (a) Prove that $\Delta = \frac{1}{2}\delta^2 + \delta\sqrt{1+\frac{\delta^2}{4}}$, where Δ is forward difference operator and δ is central difference operator. 5

(b) Find missing te rm of following data: 5

x :	1	2	3	4	5
f(x) :	7	10	13	-	37

4. (a) Find the value of 48^0 from following table : 5

θ :	45^0	50^0	55^0	60^0
$\sin\theta$:	0.707	0.766	0.819	0.866

(b) Compute the value of f(x) for x=2.5 from the following table : 5

x :	1	2	3	5
f(x)	3	7	11	34

5. Find $\int_0^1 \frac{1}{1+X}\,dx$ using : 10

(i) Simpsons $\frac{1}{3}$ rule

(ii) Simphsons $\frac{3}{8}$ rule.

6. Find f'(x) and f''(x) at x= 4.5, given that

x :	4	5	6	7	8
f(x) :	9	12	16	21	32

10

7. Apply Runge - Kutta fourth order method to solve $10\frac{dy}{dx} = x^2 + y^2$, y(0) = 0 for x=0.2.

10

8. Given $\frac{dy}{dx} - \frac{1}{2}(1+x^2)y^2$ and y(0)=1, y(0.1) = 1.06, y(0.2) = 1.12, y(0.3)=1.21, evaluate y(0.4) by Milne's Predictor-Corrector method. 10

9. The two regression equations of the variables x and y are $x = 19.13 - 0.87y$ and $y = 11.64 - 0.50x$. Find 10

(i) mean of x's

(ii) mean of y's and

(iii) correlation coefficient between x and y

10. Discuss the all quality control charts. 10

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(21214) Roll No. .....

B.Tech. III Sem.

TU-73

B.Tech. Examination, Dec. 2014

C.S./I.T.

IT Infrastructure and its management

BT-309

Time : Three Hours] *[Maximum Marks : 100*

Note: (i) Attempt any **five** questions.

(ii) **All** questions carry equal marks.

1. What should an IT organization do to identify the customer's requirement in an IT system? Discuss IT System Management Process. 10+10

2. What do you understand by ITIL? What is its significance? "ITIL has been criticized on several points." Explain 20

P.T.O.

3. What do you understand by IT service management? How does it impact the business IT relationship. 10+10

4. Explain the following : 10+10

   (i) Capacity Management

   (ii) Availability Management

5. What do you mean by service support process? Explain the objectives and benefits of configuration management. 20

6. What do you mean by disaster recovery process? Write down the various steps in disaster recovery process. 20

7. Explain Access Management and its activities. Also discuss how is it related with security management. 10+10

8. What do you know about computer and internet security? Explain identity management and its activities. 10+10

9. What do you understand by the term "Intellectual Property" in IT ethics? Explain computer forensics and its significance. 10+10

10. Write short notes on any **two** of the following: 10+10

    (i) Cyber ethics and Cyber crime

    (ii) E-commerce and EDI

    (iii) Smart cards and Expert Systems