F 6407 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

DATABASE MANAGEMENT SYSTEM (R, T)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Define the terms : database schema, schema intension and schema extension.
2. Differentiate between Logical and Physical data independence.
3. Define the terms : Superkey, candidate key and primary key with suitable examples.
4. Explain the concept of a view in SQL.
5. Write a note on cost based query optimization.
6. What is meant by a schedule of transactions ? Differentiate between Recoverable and Non-recoverable schedules.
7. What are the different integrity constraints applicable to a RDBMS ?
8. What is the need for normalization in a database ?
9. Distinguish between Homogeneous and Heterogenous distributed databases.
10. Explain the concept of data transparency in the context of a distributed database. What are the different kinds of transparencies ?

(10 × 4 = 40 marks)

Part B

Each full question carries 12 *marks.*

11. (a) Write notes hierarchical and network data models.

Or

(b) Construct an ER diagram for a bank database. A bank is identified by its name and code. Every bank can have a number of branches. Every branch of a bank is identified by a branch code and an address. A bank branch maintains a number of accounts and also has a number of customers. Each customer can hold multiple accounts in the branch. Also, an account can be associated with multiple customers. An account is identified by the account number, account

type and the current balance. Information to be stored about a customer includes his/her social security number, name and address. A bank branch can also issue a number of loans. A loan is identified by a loan no, loan amount and the loan type. A customer can avail multiple loans from the same branch. Similarly, a loan can be associated with more than one customer. The bank has many employees, and each employee is assigned to a set of customers. A group of employees report to a manager, who is also an employee of the branch. An employee is identified by his/her employee id and name. Identify the primary key for each entity.

12. (a) Explain the salient features of a relational database.

Or

(b) Write notes on the different join operations possible in relational algebra.

13. (a) Write notes on PL/SQL programming in Oracle with suitable examples. Illustrate the use of cursors in the above context.

Or

(b) Write notes on the two phase locking protocol. How are deadlock situation handled in this protocol ?

14. (a) List and prove the six rules of inference rules for functional dependencies. What is meant by the closure of a set of functional dependencies ?

Or

(b) Explain the concept of a multivalued dependency. Write notes on 4NF and illustrate the same with a suitable example.

15. (a) Explain the concept of data replication in distributed database. What are the various replication schemes possible ?

Or

(b) Write notes on deadlock handling in a distributed database.

(5 × 12 = 60 marks)

F 6417 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering

FILE STRUCTURES AND ALGORITHMS (R)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*

Part A

Each question carries 4 *marks.*

1. Define primary key and secondary key.
2. Distinguish between text and binary files.
3. Give the advantages of interpolation search.
4. What is indexing ? How it is done ?
5. What is meant by extendible Hashing ? Explain.
6. What is static hashing ? Explain.
7. Distinguish between B-Trees and B^+ Trees.
8. Explain height balanced trees.
9. Bring out the advantages of best fit over first fit.
10. Explain the use of garbage collection.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Explain different file organisation methods.

Or

(b) Explain the structure of Heap files.

12. (a) Describe in detail why multiple keys are used in indexing.

Or

(b) Write an algorithm for binary search and explain its complexities and advantages.

Turn over

13. (a) Briefly explain any two Collision Resolution Techniques.

Or

(b) Describe with necessary details about different Hashing functions.

14. (a) Explain with algorithm how balancing is done in a height balanced tree.

Or

(b) With algorithms, explain how insertion and deletion takes place in a B tree.

15. (a) Explain the concept of dynamic storage management.

Or

(b) Briefly explain how Garbage collection and compaction is done in storage management.

(5 × 12 = 60 marks)

F 6428 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

LANGUAGE PROCESSORS (RT)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. Discuss the advantages of assembly languages.
2. Explain two kinds of macro expansion.
3. Define parse tree and abstract syntax tree.
4. Write a note on bottom up parsing.
5. Explain static and dynamic memory allocation.
6. Discuss the use of register descriptors.
7. Write a note on control structures.
8. Write a note on frequency reduction.
9. What is meant by program relocation ?
10. Explain how external references are resolved in linking process.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the design of a two pass assembler.

Or

12. Explain micro expansion algorithm. How nested macro calls are handled ?
13. Explain recursive descend parser, with an example.

Or

14. Write a note on LALR parsing.

Turn over

15. Discuss about array allocation and access.

Or

16. Explain how expression trees can be used to find the best evaluation order for its operators.

17. Explain optimizing transformations.

Or

18. Explain local optimization. Explain the use of value numbers.

19. Explain linking for overlays.

Or

20. Explain in detail about the design of linkage editor or dynamic loading.

(5 × 12 = 60 marks)

F 6436 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

DATA COMMUNICATION (RT)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. An analog signal band limited to 4 kHz is sampled at Nyquist rate and converted to 8 bit PCM. Compute the data rate of the resulting digital signal.
2. An angle modualted signal is represented by $\phi(t) = 10\cos(2\pi 10^8 t + 10\cos 2\pi 1000t)$. Compute the power and maximum deviation of the modulated signal.
3. Explain frequency division multiplexing of sampled signals.
4. Define Channel capacity.
5. What are the merits of asynchronous data transmission ?
6. Explain message switching of digital data.
7. Comment on the error detection and correction capacity of (7, 4) Hamming code.
8. Define free distance and free length of convolutional codes.
9. Compare the data transmission through twisted pair link and co-axial cable link for a computer network.
10. Differentiate between point-to-point connection and multidrop connection.

(10 × 4 = 40 marks)

Part B

Each full question carries 12 *marks.*

11. (a) An AM signal has carrier $A_c(t) = 10\sin(2\pi \times 10^7 t)$ and modulating signal $A_m(t) = 2\cos(2\pi \times 10^3 t) + 3\cos(3\pi \times 10^3 t)$. Draw the spectrum of the AM waveform. Compute modulation index, band width, total power and side band power of the modulated signal.

(8 marks)

Turn over

(b) An amplitude modulated signal has total power of 12 kW. If the average modulation index is 0.8, compute the carrier power and side band power.

(4 marks)

Or

12. (a) Compare AM and FM system performances. (4 marks)

(b) Write the expression for PM signal for a sinusoidal modulating signal and define modulation index.

(4 marks)

(c) A sinusoidal signal $A_m(t) = 2\cos(2\pi \times 10^3 t)$ is modulated using a 10 kHz pulse train to obtain PAM, PWM and PPM. Draw the corresponding modulated signal waveforms.

(4 marks)

13. Explain ASK and FSK and compare them with respect to bandwidth requirement, noise robustness, power requirement and circuit complexity.

Or

14. (a) Why multiplexing is done for digital signal transmission ? Explain time division multiplexing technique.

(8 marks)

(b) State and explain Shannon's channel capacity theorem. (4 marks)

15. Explain the different data transmission modes used for digital data transmission.

Or

16. Explain the different switching methods used for digital data transmission.

17. (a) Define generator matrix, parity check matrix and syndrome for a linear block code. Give examples for them.

(6 marks)

(b) Explain ASCII encoding scheme. (6 marks)

Or

18. Give the generator matrix and parity check matrix for (7, 4) Hamming code. Show that the columns of the generator matrix are linearly independent.

19. Explain the data transmission and interfacing done when a fiber optic link in used for computer communication network. What are the advantages of fiber optic links over other data transmission links ?

Or

20. Explain the working of the network switching subsystem of GSM.

[5 × 12 = 60 marks]

F 6397 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering

OPERATING SYSTEMS (R)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What is a real time OS ? Give an example for a real time OS.
2. Compare symmetric multiprocessing and asymmetric multiprocessing.
3. What do you mean by starvation ?
4. Explain multithreading.
5. What are monitors ?
6. Explain multilevel segmentation with paging.
7. Explain virtual memory concept.
8. What is a Process Control Block ?
9. What are the functions of a hash table ?
10. Write a short note on tertiary storage devices.

(10 × 4 = 40 marks)

Part B

Each full question carries 12 *marks.*

11. (a) Discuss in detail about the evolution of OS and also explain about its subsystems.

Or

(b) Explain the salient features of Linux Operating System.

12. (a) Explain briefly the need for process scheduling and the different scheduling criteria.

Or

(b) Explain how process creation, deletion and scheduling is done under a UNIX environment.

13. (a) What are deadlocks ? Explain the different deadlock detection methods.

Or

(b) What are semaphores ? Explain the difference between binary semaphores and counting semaphores. How semaphores are used for solving mutual exclusion problem ?

14. (a) Explain the hardware support required for segmentation with paging.

Or

(b) Explain how memory management is achieved in UNIX operating system.

15. (a) Explain the different disk scheduling algorithms.

Or

(b) Discuss about direct access devices and serial access devices.

(5 × 12 = 60 marks)

F 6390 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Common to all branches except Computer Science and Engineering/ Information Technology

ENGINEERING MATHEMATICS–IV (CMELPASUF)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer any **one** *question from each module.*
All questions carry equal marks.

Module I

1. (a) State Cauchy's integral formula and integral theorem. Use it to evaluate $\int_C \frac{\cos \pi z}{z^2-1}$ where C is the rectangle with vertices $2 \pm i$, $-2 \pm i$. (12 marks)

(b) Find the Laurent's series expansion of $\frac{1}{z-z^3}$ in $1 < |z+1| < 2$. (8 marks)

Or

2. (a) If $f(a) = \int_C \frac{4z^2+z+5}{z-a} dz$ where C is the ellipse $9x^2+4y^2=36$ find $f(3)$, $f'(1)$ and $f''(-1)$. (10 marks)

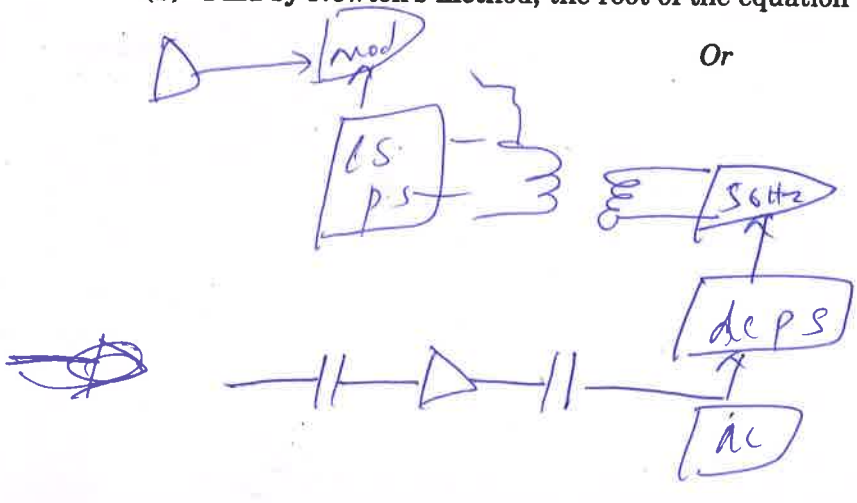
(b) Find the Taylor's series expansion of $f(z) = \frac{2z^3+1}{z^2+1}$ at $z = i$ and $z = -i$. (10 marks)

Module II

3. (a) Using method of false position, find a root of the equation $x^3 - x - 4 = 0$ lying between 1 and 2 correct to four decimal places. (10 marks)

(b) Find by Newton's method, the root of the equation $\log x = \cos x$. (10 marks)

Or



4. (a) Apply Gauss-Seidel method to solve the equations :

$$10x - 2y + z = 12,$$
$$x + 9y - z = 10,$$
$$2x - y + 11z = 20.$$

(12 marks)

(b) Find a root of the equation $x^3 - x = 11$ which lies between 2 and 3, using bisection method.

(8 marks)

Module III

5. (a) Use Taylor's series method to find $y(0.1)$ and $y(0.3)$ correct to four decimal places, given that $\frac{dy}{dx} = y^2 - x$, $y(0) = 1$.

(10 marks)

(b) Using Milne's Predictor-Corrector method find $y(1.2)$ taking $h = 0.1$, given $\frac{dy}{dx} = xy - x^2$, $y(1) = 1$.

(10 marks)

Or

6. (a) Use Euler's modified method to compute $y(0.4)$, given that $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 3$ taking $h = 0.2$. correct to four decimal places.

(10 marks)

(b) Apply Runge-Kutta method order four to find an approximate value of y at $x = 0.1$ if $\frac{dy}{dx} = xy + y^2$ and $y(0) = 1$.

(10 marks)

Module IV

7. (a) Prove Shifting rules and hence show that $Z\left(\frac{1}{n!}\right) = e^{\frac{1}{z}}$. (8 marks)

(b) Using Z-transform solve $6y_{n+2} - y_{n+1} - y_n = 0$ with $y(0) = y(1) = 1$. (12 marks)

Or

8. (a) Solve $u_{n+2} - 2u_{n+1} + u_n = 2^n$ with $u_0 = 2, u_1 = 1$. (12 marks)

(b) Find $Z^{-1}\left[\frac{2z}{(z-1)(z^2+1)}\right]$. (8 marks)

Module V

9. (a) Using graphical method solve the following L.P.P.

Minimize $Z = 3x + 2y$

subject to the constraints,

$5x + y \geq 10$,

$x + y \geq 6$,

$x + 4y \geq 12$ with

$x, y \geq 0$.

(8 marks)

(b) How will you identify unbounded solution of an L.P.P. from its simplex table ? Using simplex algorithm, solve the following L.P.P.

Maximize $Z = 3x + 2y + 5z$

subject to the constraints,

$x + 2y + z \leq 430$,

$3x + 2z \leq 460$,

$x + 4z \leq 420$ with

$x, y, z \geq 0$.

(12 marks)

Or

10. (a) Use Big-M method to solve the following L.P.P. :

Maximize $Z = x_1 + 2x_2 + 3x_3 - x_4$

subject to the constraints,

$x_1 + 2x_2 + 3x_3 = 15$,

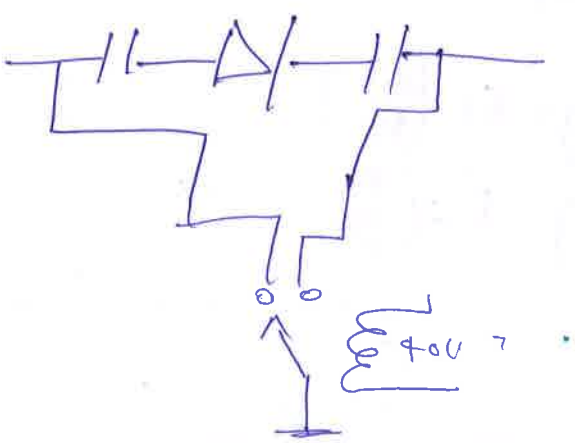
$2x_1 + x_2 + 5x_3 = 20$,

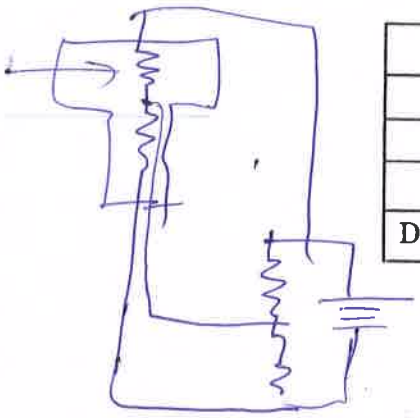
$x_1 + 2x_2 + x_3 + x_4 = 10$ with

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

(10 marks)

(b) The following table gives the cost matrix of transporting one unit of a product from the sources F, G and H to the destinations A, B and C. Compute the optimum allocations and minimum cost of transportation using MODI method.

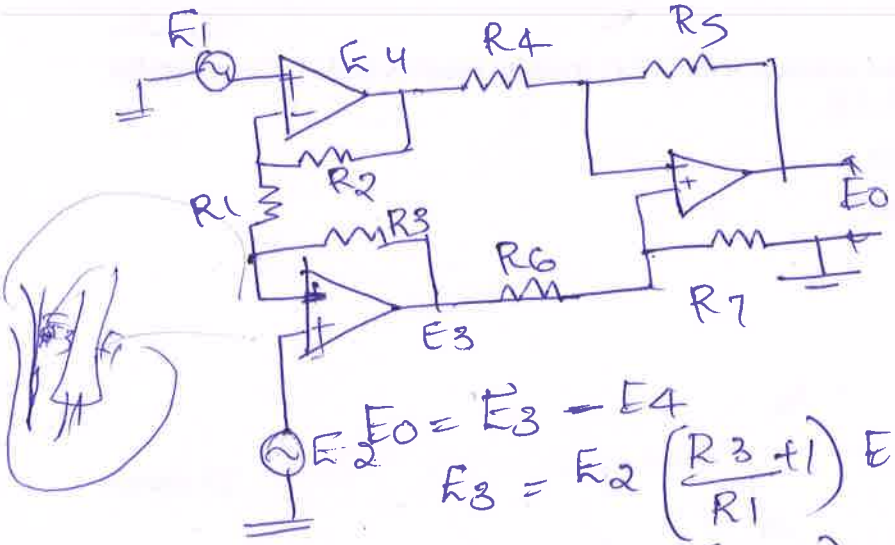




	A	B	C	Supply
F	16	20	12	200
G	14	8	18	160
H	26	24	16	90
Demand	180	120	150	450

(10 marks)

[5 × 20 = 100 marks]



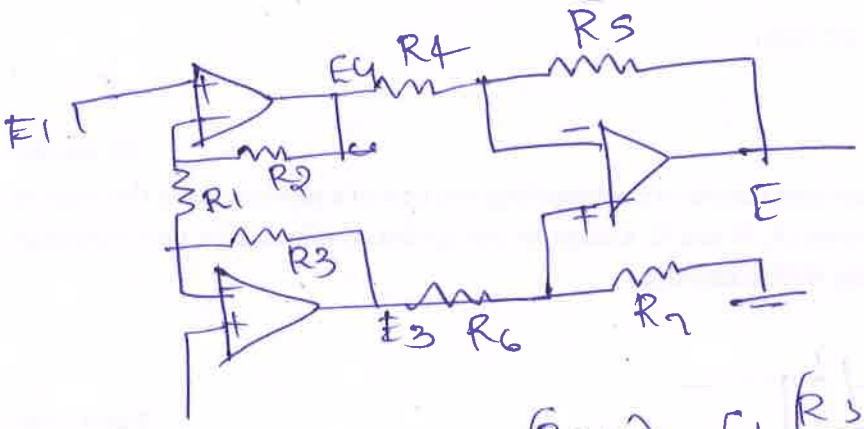
$E_0 = E_3 - E_4$

$E_3 = E_2\left(\frac{R_3}{R_1}+1\right) - E_1\left(\frac{R_3}{R_1}\right)$

$E_4 = E_1\left(\frac{R_2}{R_1}+1\right) - E_2\left(\frac{R_2}{R_1}\right)$ $\quad R_2 = R_3$

$E_3 - E_4 = (E_2 - 1)\left(\frac{R_2}{R_1} + 1 + \frac{R_2}{R_1}\right)$

$V = \frac{\Delta\phi C}{\cancel{t}\ 2b\cos\theta}$



$E_3 = E_2\left(\frac{R_3}{R_1}+1\right) - E_1\left(\frac{R_3}{R_1}\right)$

$E_4 = E_1\left(\frac{R_2}{R_1}+1\right) - E_2\left(\frac{R_3}{R_1}\right)$

F 6374 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

CS 010 505 / IT 010 504 OPERATING SYSTEMS (CS, IT)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. What is time-sharing systems ? Explain.
2. Explain the shortest process Next type process scheduling policy.
3. Distinguish between Dead lock and Starvation.
4. Explain the concept of virtual memory.
5. Explain the different components of Linux system.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the various factors influencing the OS design.
7. Distinguish between pre-emptive and non-pre-emptive scheduling strategies.
8. Describe the different methods of recovery from deadlock.
9. Explain the methods of partitioning in contiguous storage allocation.
10. What are typical operations on a byte-stream file with respect to low-level files ?

(5 × 5 = 25 marks)

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

Module I

11. Explain clearly the operating system services and the system programs.

Or

12. Describe the basic implementation mechanisms used in the operating system design.

Module II

13. Distinguish between (i) Multiprogramming system ; (ii) Multitasking system ; (iii) Multiprocessor system ; and (iv) Multithreading system.

Or

14. (a) Explain various operating system services for process management. (7 marks)

(b) Describe the "round-robin" scheduling algorithm. (5 marks)

Module III

15. (a) Describe how the producer-consumer problem is solved using Semaphores. (7 marks)

(b) Explain the need for interprocess synchronization. (5 marks)

Or

16. (a) Explain the dead-lock detection with (i) one-resource of each type ; and (ii) multiple resource of each type. (8 marks)

(b) Explain critical section and critical section problem. (4 marks)

Module IV

17. (a) Explain any *two* page-replacement algorithm with example. (6 marks)

(b) What do you mean by fragmentation ? Explain fixed partition memory strategies. (6 marks)

Or

18. Describe (i) first fit ; (ii) best fit ; and (iii) worst fit allocation policies and placement algorithm.

Module V

19. (a) With the help of examples, explain two different methods of specifying file names. (6 marks)

(b) Explain the symbolic file directory and basic file directory. (6 marks)

Or

20. (a) Describe the linked list file allocation strategy. (6 marks)

(b) What are the three well-known techniques for organizing the physical storage blocks for a file ? Explain any one in detail. (6 marks)

[5 × 12 = 60 marks]

F 6362 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering

CS 010 504—DIGITAL SIGNAL PROCESSING (CS)

(New Scheme—Regular/Improvement/Supplementary)

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

Part A

Answer **all** *questions briefly.*
Each question carries **3** *marks.*

1. What are the differences between continuous time and discrete time signals ? Give examples.
2. Find the DTFT of $x(n)=\left(\frac{1}{2}\right)^n u(n)$.
3. State *three* desirable characteristics of window.
4. Write the mapping procedure between s-plane and z-plane in the method of mapping of differentials. What is its characteristics ?
5. Explain any *two* special instructions for DSP operations.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries **5** *marks.*

6. Evaluate the frequency response for the LTI system represented by :

$$h(n)=(-1)^n\left[u(n+2)-u(n-3)\right].$$

7. From the definition of z-transform, find the z-transform of $x(n)=\cosh(w_o n)$, for $n \geq 0$.
8. Obtain the parallel realization of a discrete causal system whose transfer function is given by :

$$H(z)=\frac{1-z^{-1}}{1-0.2z^{-1}-0.15z^{-2}}.$$

9. Explain the impulse invariance method of transforming analog to digital filter.
10. Write a note on on-chip memory of a TMS 320 C 54 XX processor.

(5 × 5 = 25 marks)

Turn over

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

Module 1

11. (a) Perform the convolution of $x(n)$ and $h(n)$ where $x(n)=\left\{\underset{\downarrow}{1},2,3,4\right\}$ and $h(n)=\left\{\underset{\downarrow}{2},3,1,1\right\}$.

(b) Find the z-transform with ROC $x(n)=3e^{-2n}u(n)+2\left[4^n u(-n)\right]+5\delta(n)$.

(6 + 6 = 12 marks)

Or

12. (a) Find the frequency response of the system having system function $H(z)=\dfrac{1-2z+3z^2}{3-2z+z^2}$.

(b) An LTI system is characterized by an impulse response $h(n)=\left(\dfrac{2}{3}\right)^n u(n)$. Find the step response of the system. Also evaluate the output of the system at $n=\pm 5$.

(6 + 6 = 12 marks)

Module 2

13. (a) State and prove linearity property of DFT.

(b) Find the 10 point DFT of $X(k)=\begin{cases}3 & k=0\\ 1 & 1\le k\le 9\end{cases}$.

Or

14. Given $x(n)=\{0,1,2,3,4,5,6,7\}$, find X (k) using DIT – FFT algorithm.

Module 3

15. A discrete time filter with generalized linear phase is to be designed with Kaiser window to meet the following specifications :

$$\left|H\left(e^{jw}\right)\right|\le 0.01, \qquad 0\le|w|\le 0.25\,\pi$$

$$0.95\le\left|H\left(e^{jw}\right)\right|\le 1.05,\ 0.35\pi\le|w|0.6\pi$$

$$\left|H\left(e^{jw}\right)\right|\le 0.01, \qquad 0.65\pi|w|\le\pi$$

(a) Determine the minimum length (M + 1) of the impulse response and the value of the Kaiser window parameter for the filter.

(b) What is the delay of the filter ?

(c) Determine the ideal impulse response $h_d[n]$ to which the Kaiser window should be applied.

Or

16. Obtain the direct form I and direct form II realisations of a discrete time system represented by transfer function :

$$H(z) = \frac{8z^3 - 4z^2 + 11z - 2}{\left(z - \frac{1}{4}\right)\left(z^2 - z + \frac{1}{2}\right)}.$$

Module 4

17. Design a Digital Butterworth filter that satisfies the following constraint using bilinear transformation. Assume T = 1 sec :

$$0.9 \le |H(e^{jw})| \le 1 \qquad 0 \le W \le \pi/2$$
$$|H(e^{jw})| \le 0.2 \qquad \pi/2 \le W \le \pi$$

Or

18. Design a digital Chebyshev I filter that satisfies the following constraints :

$$0.8 \le |H(w)| \le 1, \quad 0 \le w \le 0.2\pi$$
$$|H(w)| \le 0.2, \qquad 0.6\pi \le w \le \pi$$

Use impulse invariant transformation.

Module 5

19. With help of neat block diagram, explain the internal architecture of Tiger SHARC processor. Describe its special features.

Or

20. With a neat block diagram, explain how digital processing of the audio signals can be done. Explain any *one* compression method also.

(5 × 12 = 60 marks)

Module 5

19. The arrival rate of telephone calls at a telephone booth are according to Poisson distribution, with an average time of 9 minutes, between two consecutive arrivals. The length of telephone call is assumed to be exponentially distributed, with mean of 3 minutes.

(a) Determine the probability that a person arriving at the booth will have to wait.

(b) Find the average queue length that is formed from time to time.

(c) The telephone company will install a second booth when convinced that the arrival would expect to have to wait at least four minutes for the phone. Find the increase in flow rate of arrivals which will justify a second booth.

(d) What is the probability that an arrival will have to wait for more than 10 minutes before the phone is free ?

(e) What is the probability that he will have to wait for more than 10 minutes before the phone is available and the call is also complete ?

(f) Find the fraction of a day that the phone will be in use.

Or

20. (a) In a supermarket, the average arrival rate of customers is 10/hr. The average time taken at the bill and cash desk is 4.5 min. This time is exponentially distributed :

(i) How long will the customer expect to wait for service at the cash desk ?

(ii) What is the chance that the queue length will exceed 5 ?

(iii) What is the probability that the cashier is working ? (7 marks)

(b) Explain the different service disciplines in the case of a queuing system ? (5 marks)

[5 × 12 = 60 marks]

F 6338 **(Pages : 4)** **Reg. No.....**

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

EN 010 501 B—ENGINEERING MATHEMATICS—IV (CS, IT)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. Evaluate $\Delta\left(\frac{e^x}{e^x+e^{-x}}\right)$. Take interval of differencing as unity.

2. Find the z-transform of $n(n-1)$.

3. Find a_{12} if $a_{n+1}^2 = 5a_n^2$, where $a_n > 0$ for $n \geq 0$ and $a_0 = 2$.

4. Evaluate $\oint_C \frac{e^{-z}}{z+1} dz$, where C is the circle, $|z| = 2$.

5. Explain M | M | 1 | N queue.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Express $f(u) = u^4 - 3u^2 + 2u + 6$ in terms of factorial polynomials. Hence show that $\Delta^4 f(u) = 24$.

7. Using $z(n) = \frac{z}{(z-1)^2}$, show that $z(n\cos n\theta) = \frac{\left(z^3+z\right)\cos\theta - 2z^2}{\left(z^2 - 2z\cos\theta + 1\right)^2}$.

8. If $a_n, n \geq 0$ is a solution of the recurrence relation $a_{n+1} - da_n = 0$ and $a_3 = \frac{153}{49}, a_5 = \frac{1377}{2401}$, what is d ?

9. Expand $f(z)=\dfrac{(z-2)(z+2)}{(z+1)(z+4)}$ in the region $1<|z|<4$.

10. State and explain Little's formula ? What are its applications ?

(5 × 5 = 25 marks)

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

Module 1

11. (a) Use Newton's divided difference formula to find $f(7)$ if :

$f(3)=24, f(5)=120, f(8)=504, f(9)=720$ and $f(12)=1716$.

(b) Find the value of $\int_1^2 \dfrac{dx}{x}$ by Simpson's rule. Hence find approximate value of $\log_e^2$.

(6 + 6 = 12 marks)

Or

12. (a) From the following table, calculate $\dfrac{dy}{dx}$ and $\dfrac{d^2y}{dx^2}$ at $x = 1.35$.

x :	1.1	1.2	1.3	1.4	1.5	1.6
y :	– 1.62628	0.15584	2.45256	5.39168	9.12500	13.83072

(b) Apply Trapezpoidal rule to find $\int_{-3}^{3} x^4 dx$ by taking six equal sub-intervals.

(6 + 6 = 12 marks)

Module 2

13. (a) Using long division method, find the inverse z-transform of :

$\dfrac{z^2+z}{(z-1)^2}$. (6 marks)

(b) Solve $u_{n+2}-4u_{n+1}+4u_n=0$, given $u_0=1, u=0$. (6 marks)

Or

14. (a) Find the convolution of $n(n-1)$ and 5^n.

(b) Find the z-transform of $\dfrac{1}{n(n+1)}$.

(c) By partial fraction method, find the inverse z-transform of :

$\dfrac{4-8z^{-1}+6z^{-2}}{\left(1-2z^{-1}\right)^2\left(1+z^{-1}\right)}$.

(3 + 3 + 6 = 12 marks)

Module 3

15. Find the generating function for the sequence :

$a_0, a_1, a_2, \ldots$, where $a_n=\sum_{k=0}^{n}\left(\dfrac{1}{k!}\right), n\in \mathrm{N}$.

Or

16. (a) Find a particular solution of $a_r-2a_{r-1}=5_r$.

(b) Solve the recurrence relation $a_r-9a_{r-1}+8a_{r-2}=0$, where $a_0=0, a_1=2$.

(6 + 6 =12 marks)

Module 4

17. (a) Expand as a Taylor's series $\sin z$ about $z=\dfrac{\pi}{4}$.

(b) Evaluate by contour integration $\int_{-\infty}^{\infty} \dfrac{x^2-x+2}{x^4+10x^2+9}dx$.

(6 + 6 = 12 marks)

Or

18. (a) Explain in Laurent's series $\dfrac{1-\cos z}{z^3}$ about $z=0$.

(b) Find the sum of the residues of the function $f(z)=\dfrac{\sin z}{z\cos z}$ at its poles inside the circle $|z|=2$.

(6 + 6 = 12 marks)

Turn over

F 6351 (Pages : 3) **Reg. No**.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

CS 010 503 / IT 010 506—DATABASE MANAGEMENT SYSTEMS (CS, IT)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Explain mapping in three schema architecture.
2. What is the role of join operations in relational algebra ?
3. What are assertions ? Why are they necessary ?
4. What do you mean by multivalued dependency ?
5. Write the different phases for validation concurrency control technique.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Differentiate between total participation and partial participation constraints with the help of an example.
7. Explain DIVISION operation in relational algebra an example. What are the requirements of numerator and denominator ?
8. Explain the different methods for resolving collision in hashing.
9. Consider a relation schema R (A, B, C) with a set of FDs $\{AB \rightarrow C,\ C \rightarrow A\}$. Show that R is in 3NF but not in BCNF.
10. Differentiate between horizontal and vertical fragmentations with examples.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **either** *(a)* **or** *(b) from each question.*
Each full question carries 12 *marks.*

11. (a) Define a data model. Explain the main categories of data models.

Or

(b) Explain the various types of attributes of an entity type with examples.

12. (a) Explain the following :

(i) Referential integrity constraint and foreign key.

(ii) Aggregate functions and grouping in SQL.

Or

(b) Explain the following SQL commands with examples :

(i) INSERT. (ii) UPDATE.

(iii) DELETE. (iv) ALTER TABLE.

13. (a) What are the advantages of having an index on a file ? Describe the different types of single-level indices available.

Or

(b) Differentiate between static hashing and dynamic hashing. Explain how insertions are performed in dynamic hashing.

14. (a) Consider the following relation :

SALE (Item #, Date Sold, Salesman # , Commission %, Discount Amt.)

Assume that an item may be sold by multiple salesmen, and hence {Item #, Salesman #} is the primary key. Additional FDs are

Datesold → Discount Amt and

Salesman # → Commission %

Based on the given primary key, is this relation in 1 NF, 2 NF, or 3NF ? Why or why not ? Apply normalisation until you cannot decompose it further. State reason behind each decomposition.

Or

(b) Discuss join dependencies and fifth normal form with examples.

15. (a) Explain basic timestamp ordering. How is it different from strict timestamp ordering protocol ?

Or

(b) What are distributed databases ? Explain the types of distributed database systems and issues related to it.

(5 × 12 = 60 marks)

F 6384 (Pages : 3) Reg. No. 11616798

Name. Chaitra paul

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering

CS 010 506—ADVANCED MICROPROCESSORS AND PERIPHERALS (CS)

(New Scheme—Regular/Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*
Each question carries 3 *marks.*

1. Find the contents of flag register after the execution of the following instructions :

   MOV AL, OFFH

   INC AL

2. How many memory locations are accessed in the real and protected modes of 80386 ?
3. How many IDE devices are supported by the South Bridge of Intel 430 TX chipset ?
4. What are the interfaces available in a PC for attaching CD-ROM drives to the PC ?
5. Describe the data retrieval from Pen drive.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Classify the instruction set of 8086. Give one example in each class.
7. Explain the special Pentium registers and their functioning.
8. Describe the sequence of a USB transaction.
9. Distinguish between the data encoding techniques in hard disks and CD-ROM discs.
10. Explain the working of a video memory.

(5 × 5 = 25 marks)

Part C

Answer any **one** *full question from each module.*
Each full question carries 12 *marks.*

MODULE I

11. (a) What are the various registers in 8086 ? Explain the function of each of them. (6 marks)

Turn over

(b) What are the various addressing modes used in 8086 ? Give examples of each one. (6 marks)

Or

12. (a) Write an 8086 Assembly level language program to move a block of 100 eight-bit data from one memory to another location in the same data segment. (6 marks)

(b) Explain the following instructions with reference to 8086 :—

(i) RCR ; (ii) IRET ;

(iii) CBW ; (iv) CMP.

(4 × 1½ = 6 marks)

MODULE II

13. (a) Using block diagram explain the Pentium CPU architecture and superscalar organisation. (6 marks)

(b) Write a note on enhanced instruction set of 80386 microprocessor. (6 marks)

Or

14. (a) Explain the structure of an 80386 descriptor. (6 marks)

(b) Explain branch prediction with reference to Pentium. Also list some enhanced instructions of Pentium. (6 marks)

MODULE III

15. (a) List the features of PCI local bus. (4 marks)

(b) What is the function of PCI controller IC on PCI expansion boards ? Explain. (5 marks)

(c) Explain the purpose of C/$\overline{BE}$ signals on the PCI bus ? (3 marks)

Or

16. (a) Explain the purpose of AGP slops in a PC. (4 marks)

(b) List the names of major ICs found on the Pentium motherboard. (4 marks)

(c) What are the different types of connectors and their functions, found on modern motherboards ? (4 marks)

MODULE IV

17. (a) What are the disadvantages of stepper-motor actuators in hard disks ? (3 marks)

(b) What are the interfaces available in a PC for attaching CD-ROM drives to the PC. (3 marks)

(c) Describe the working principle and merits of Blu-ray disks ? (6 marks)

Or

18. (a) Describe the arrangements in hard disks for parking the read/write heads when power fails suddenly. (6 marks)

(b) Describe how will you install a hard disk drive and CD-ROM drive in a modern PC ? (6 marks)

MODULE V

19. With neat diagrams, explain the principle of working with relevance to data writing and reading from a flash memory ? Discuss how it is used in a PC to enhance its speed of computation ?

Or

20. Discuss the different kinds of memory used in a modern PC. Show clearly how they are organised ? [5 × 12 = 60 marks]

10. Describe the Hungarian method of solving an assignment problem and use it solve the following problem :

	I	II	III	IV	V
A	5	11	10	12	4
B	2	4	6	3	5
C	3	12	5	14	6
D	6	14	4	11	7
E	7	9	8	12	5

(8 + 12 = 20 marks)
[5 × 20 = 100 marks]

F 6391 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2013

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

ENGINEERING MATHEMATICS–IV (R, T)

(Old Scheme—Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer any **one** *question from each module.*
All questions carry equal marks.

Module I

1. (a) In a (M/M/1) : (∞/FIFO) queueing model, prove that the probability that there are n arrivals at any time is given by $P_n = (1-\rho)\rho^n, \rho < 1$.

(8 marks)

(b) A super market has two sales girls at the sales counters. If the service time for each customer is exponential with a mean of 4 minutes, and if people arrive in a Poisson fashion at the rate of 10 an hour, the compute the

(i) probability of having to wait for service ?

(ii) expected percentage of idle time for each sales girl ?

(iii) if a customer has to wait, what is the expected length of his waiting time ?

(12 marks)

Or

2. (a) On an average 96 patients per 24 hour-day require the service of an emergency clinic. Also on an average, a patient requires 10 minutes of active attention. Assume that the facility can handle only one emergency at a time. Suppose that it costs the clinic Rs. 100 per patient treated to obtain an average servicing time of 10 minutes, and that each minute of decrease in this average time would cost Rs. 10 per patient treated, how much would have to be budgeted by the clinic to decrease the average size of the queue from $\frac{4}{3}$ patients to $\frac{1}{2}$ patient ?

(12 marks)

(b) In a service department manned by one server, on an average one customer arrives every 10 minutes. It has been found out that each customer requires 6 minutes to be served. Find (i) the average queue length ; (ii) the average time spend in the system.

(8 marks)

Module II

3. (a) Using bisection method, find a real root of the equation $x^3 - 2x = 5$ correct to four decimal places.

(10 marks)

(b) Using Newton's iterative method, find a real root of the equation $x \log_{10} x = 1.20$ correct to four decimal places.

(10 marks)

Or

4. (a) Using method of false position, find the fourth root of 32 correct to four decimal places.

(10 marks)

(b) Using Gauss-Seidel Iteration method, solve the system of equations

$$54x + y + z = 110,\ 2x + 15y + 6z = 72,\ -x + 6y + 27z = 85.$$

(10 marks)

Module III

5. (a) Use Simpson's rule to find

$$\int_0^{0.6} e^{-x^3}\, dx$$

by taking seven ordinates.

(10 marks)

(b) Find the polynomial $f(x)$ with the following data, using Newton's divided difference formulae.

x :	−4	−1	0	2	5
$f(x)$:	1245	33	5	9	1335

(10 marks)

Or

6. (a) In the table given below, the values of y are consecutive terms of a series of which 23.6 is the 6^{th} term. Find the first and tenth terms of the series :

x :	3	4	5	6	7	8	9
y :	4.8	8.4	14.5	23.6	36.2	52.8	73.9

(10 marks)

(b) Evaluate :

$$\int_0^2 \frac{x^2 dx}{1+x^3}$$

using Trapezoidal rule taking $h = \frac{1}{4}$ and hence find an approximate value of *log* (9).

(10 marks)

Module IV

7. (a) Solve the following L.P.P. by graphical method.

Minimize $z = 3x_1 + 2x_2$

subject to

$7x_1 + 2x_2 \geq 30$

$5x_1 + 4x_2 \geq 20$

$2x_1 + 8x_2 \geq 16$

$x_1, x_2 \geq 0$.

(8 marks)

(b) Use simplex method to solve the following LPP :

Maximize $Z = 3x + 5y + 4z$ subject to the constrains $2x + 3y \leq 8, 2y + 5z \leq 10, 3x + 2y + 4z \leq 15$ and $x, y, z \geq 0$.

(12 marks)

Or

8. (a) Describe artificial variable technique to find an initial basic feasible solution. Using Charnes penalty (Big-M) method solve the following problem :—

Maximize $Z = 3x + 2y$ subject to the constraints $2x + y \leq 2,\ 3x + 4y \geq 12$ with $x,\ y \geq 0$.

(4 + 6 = 10 marks)

(b) State the fundamental theorem of duality and find the dual of the following LPP : Maximize $Z = x - 2y + 3z$ subject to the constraints $-2x + y + 3z = 2,\ 2x + 3y + 4z = 1$ with $x, y, z \geq 0$.

(3 + 7 = 10 marks)

Module V

9. (a) Write a short notes on the differences and similarities between Transportation Problem and Assignment Problem.

(8 marks)

(b) The following table gives the cost matrix of transporting one unit of a product from the sources F, G and H to the destinations A, B and C. Compute the optimum allocations and minimum cost of transportation using MODI method

	A	B	C	*Supply*
F	16	20	12	200
G	14	8	18	160
H	26	24	16	90
Demand	180	120	150	450

(12 marks)

Or

Turn over