F 3128 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science and Engineering

FILE STRUCTURES AND ALGORITHMS (R)

(Improvement/Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. What are File Allocation Tables ?
2. How does the Retrieval mechanisms improve file operation complexity ?
3. What are the functions of Multilevel Indices ?
4. How do random searches differ from sequential searches ?
5. What is meant by Dynamic Hashing ?
6. Define Collision-Resolution.
7. How does file size and performance of a file related ?
8. Define a Threaded Binary Tree.
9. Differentiate B-Trees and B+ trees.
10. What is the disadvantages in dynamic memory allocation ?

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Explain the basis file operations in an Indexed sequential file and how can we merge two indexed files.

Or

12. Discuss the uses of seconary keys in data retrieval.

13. Compare Binary search with sequential search in indexed file structures.

Or

14. Explain the uses of the indices on multiple keys and interpolation searching.

Turn over

15. What are the various types of hash functions ?

Or

16. How does the searching and hashing related ? Compare the two methods.

17. What are multi-way search trees ?

Or

18. Explain the operations possible with threaded binary trees.

19. Discuss Garbage collection and compaction strategies.

Or

20. Make a comparative analysis of static and dynamic storage management.

(5 × 12 = 60 marks)

F 3139 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

LANGUAGE PROCESSORS (RT)

(Improvement/Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 4 *marks.*

1. Explain the data structures used in assembler.
2. Explain how declarations are processed in assembler.
3. Write a note on finite state automata.
4. List the drawbacks of top down parsing.
5. Explain how reuse of memory is possible in heap allocation.
6. Write a note on quadruples.
7. Write a note on common subexpression elimination.
8. Write a short note on control flow analysis.
9. Write a note on object module.
10. Explain self-relocating programs.

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*
Each question carries 12 *marks.*

11. Explain the design of single pass assembler.

Or

12. (a) Explain the design of a macro-assembler.

    (b) Explain how nested macro expansion is done.

Turn over

13. Define LL (1) grammar. Check whether the following grammar is LL (1) :—

$E \rightarrow TE'$

$E \rightarrow TE'/\in$

$T \rightarrow VT'$

$T' \rightarrow * VT' / \in$

$V \rightarrow id$

Or

14. Compare various bottom up parsing techniques.

15. Explain memory allocation in block structured languages.

Or

16. Explain code generation for expressions.

17. Explain various parameter passing mechanisms.

Or

18. (a) Write a note on compiler writing tools.

(b) What is meant by incremental compiler ?

19. Explain the design of a linker.

Or

20. Explain relocation loaders and linking process.

(5 × 12 = 60 marks)

F 3147 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

DATA COMMUNICATION (R T)

(Improvement / Supplementary / Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. An AM signal has carrier $A_c(t) = 10 \sin(2\pi \times 10^7 t)$ and modulating signal $A_m(t) = 5 \cos(2\pi \times 10^3 t)$. Find the modulation index and draw the spectrum of the modulated signal.
2. An analog signal with maximum peak to peak amplitude of 1 volt is converted to digital signal using 8 bit PCM. What is the step size used and compute the average quantization noise power.
3. Explain phase-shift keying.
4. State Shannon's channel capacity theorem.
5. Define simplex, half duplex and full duplex transmission modes.
6. Explain packet switching of digital data.
7. For Hamming code, show that $GH^T = 0$, where G is the generator matrix and H is the parity check matrix.
8. For a linear block code, derive the relation between error correction capacity and minimum hamming weight.
9. Explain multidrop data transmission link.
10. Explain the function of data concentrators in communication networks.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) State sampling theorem for band limited signals. What is the relation between the spectrum of a band limited analog signal and that of corresponding sampled signal.

    (b) Define modulation index for FM signal. How the variations in modulation index of an PM signal affects its bandwidth and power?

(8 + 4 = 12 marks)

Or

Turn over

12. (a) An AM signal has carrier $A_c(t) = 2 \sin(2\pi \times 10^4 t)$ and modulating signal $A_m(t) = 0.8 \cos(2\pi \times 10^3 t)$. Draw the AM Waveform. Compute modulation index, band width, total power and side band power of the modulated signal.

(b) Can we get pulse position modulated (PPM) signal from pulse width modulated (PWM) signal? Explain.

(8 + 4 = 12 marks)

13. Explain the data multiplexing techniques used in digital communication systems.

Or

14. Compare the performance of ASK, FSK, PSK and DPSK with respect to bandwidth requirement, noise robustness, power requirement and circuit complexity.

15. With suitable examples, explain the synchronous data transmission and asynchronous data transmission of digital data.

Or

16. Explain circuit switching and packet switching schemes and compare the performance of these schemes when used in a noisy channel.

17. Discuss the methods used for the decoding of convolutional codes.

Or

18. Explain EBCDIC and ASCII encoding schemes.

19. Explain the data transmission through (a) twisted pair cable ; (b) co-axial cable ; and (c) fiber optic cable.

Or

20. Explain the working of the base station subsystem of GSM.

(5 × 12 = 60 marks)

F 3118 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science and Engineering / Information Technology

DATABASE MANAGEMENT SYSTEMS (R, T)

(Improvement / Supplementary / Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*

Part A

Each question carries 4 *marks.*

1. What is meant by data independence?
2. Explain the hierarchical data model.
3. Explain the terms relation and tuple in the context of a database.
4. What is meant by a nested SQL query? Explain with an example.
5. Define the term transaction in the context of a database.
6. What are the different types of locks used for concurrency control in a database?
7. What is meant by a functional dependency?
8. Differentiate between prime and non prime attributes in a relation schema.
9. What is meant by a distributed database? How is it different from a centralized database?
10. What is meant by data replication in a distributed database? Mention the advantages and disadvantages of the same.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Write notes on the entity relationship data model. Explain the different notations for expressing entity relationships using ER diagrams, with a suitable example.

Or

(b) Differentiate between Centralized and Client server architecture of DBMSs.

Turn over

12. (a) Explain, with suitable examples, the different unary operations on relational algebra.

Or

(b) List and explain the aggregate functions in SQL.

13. (a) Explain, with proper examples, the different problem scenarios that can arise in a database when transactions occur concurrently.

Or

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

14. (a) Write notes on the design guidelines for setting up relational databases.

Or

(b) Explain 1NF, 2NF, 3NF and BCNF normal forms. Consider the relation R = (A, B, C, D, E, F, G; H, I, J) and the set of functional dependencies F = [(A, B) → (C), (A) → (D, E), (B) → (F), (F) → (G, H), (D) → (I, J)]. Decompose R into 2NF and then into 3NF relations.

15. (a) Explain timestamping concurrency control scheme for distributed databases.

Or

(b) Write notes on distributed query processing. Discuss the different strategies used for join processing in distributed databases.

(5 × 12 = 60 marks)

F 3108 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science and Engineering

OPERATING SYSTEMS (R)

(Improvement / Supplementary / Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Answer all *questions.*

Part A

Each question carries 4 marks.

1. What are privileged instructions?
2. What do you mean by time sharing?
3. Explain context switching.
4. Explain the multilevel queue scheduling.
5. Explain binary semaphore and counting semaphore.
6. Explain the necessary conditions for the occurrence of deadlock.
7. Explain logical address space, physical address space and virtual address.
8. What do you mean by external fragmentation?
9. What are file attributes?
10. Draw the basic block diagram of I/O organization.

(10 × 4 = 40 marks)

Part B

Each full question carries 12 *marks.*

11. (a) Discuss about different types of Operating systems.

Or

(b) Explain the salient features of Windows operating systems.

12. (a) Explain the different process scheduling algorithms.

Or

(b) Explain the different process states with the help of a diagram. What are the two models of inter-process communication?

13. (a) What are semaphores? What are the different types of semaphores? How do they help in solving mutual exclusion problem?

Or

(b) Explain deadlock prevention mechanisms.

14. (a) Explain hardware support for implementing demand paging.

Or

(b) Explain how memory management is done in Unix operating system.

15. (a) What are the different file access methods?

Or

(b) Explain about different directory structures.

(5 × 12 = 60 marks)

F 3095 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science and Engineering

CS 010 506 – ADVANCED MICROPROCESSORS AND PERIPHERALS (CS)

(Regular – New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. List any three addressing modes of 8086, and give one example each.
2. What is the size of physical and virtual memory in 80286?
3. Explain merits of USB?
4. Differentiate between hard disk formatting and partitioning.
5. Explain the advantages of cache memory.

(5 × 3 = 15 marks)

Part B

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

6. Write an 8086 program to find the maximum number in a given string. The string is 32 bytes long and stored in the address starting from 0300. The maximum number should be stored in AL register after the execution of yours program.
7. How is the paging directory located by the 80386? Explain.
8. Explain the PCI bus architecture.
9. What is RAID? Explain various levels of RAID.
10. Explain different types of memory addressing modes, with suitable examples.

(5 × 5 = 25 marks)

Turn over

Part C

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

MODULE I

11. How the instruction set of 8086 has been classified? Explain each type with the help of examples.

Or

12. Write an 8086 ALP to find the even numbers in a given array and store them in a separate consecutive location.

MODULE II

13. Describe the 80386 memory system, and explain the purpose and operation of bank selection signals and also describe its features.

Or

14. Discuss the real and protected modes of operations in pentium IV. How memory paging is done in virtual mode?

MODULE III

15. With neat diagrams, describe the different parts and their functions, in a motherboard.

Or

16. Explain bus and different types of processor buses. Clearly explain their features.

MODULE IV

17. With a neat block diagram, describe the hard disk controller and disk drive operation.

Or

18. With a neat diagram, explain the three layer optical data storage system. Draw the block diagram of the optical disk assembly and describe the read and write operations.

MODULE V

19. With a neat diagram, describe the flash memory operation. What are its advantages?

Or

20. Explain the storage mechanism for a video memory and the different control signals used for displaying in an interlaced display.

(5 × 12 = 60 marks)

F 3085 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science/Information Technology

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

(Regular—New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Write notes on real time systems.
2. Draw the state transition diagram of pre-emptive process scheduling.
3. Write notes on race condition.
4. Explain about Belady's anomaly.
5. Explain about CSAN disk scheduling.

(5 × 3 = 15 marks)

Part B

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

6. Explain about multiprogramming and time sharing operating system strategies.
7. What is critical section problem and what are the requirements of its solution ?
8. Differentiate between User Level threads and Kernal Level threads.
9. Write notes on external fragmentation and internal fragmentation.
10. Explain about tree structured directories.

(5 × 5 = 25 marks)

Part C

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

11. (a) Consider following set of processes, with length of CPU burst time given in milliseconds.

Process	*Burst Time*	*Arrival Time*
P1	2	4
P2	1	10
P3	2	15
P4	3	20
P5	8	28

Calculate the following :—

(i) Average wait time.

(ii) Average turn around time.

(iii) Total CPU and time.

Or

(b) Consider following set of processes, with length of CPU burst time given in milliseconds :

Process	*Burst Time*	*Arrival Time*
P1	4	0
P2	5	5
P3	2	7
P4	1	2
P5	3	4
P6	1	6
P7	2	3

Use pre-emptive and non-preemptive shortest job next scheduling to find :

(i) Average turn around time.

(ii) Average wait time.

12. (a) Explain about various approaches of Operating System strategies.

Or

(b) Explain about :

(i) Microkernel.

(ii) Virtual machines.

13. (a) Explain about bounded buffer producer consumer problem and its solution using semaphore.

Or

(b) (i) What are necessary conditions for the occurrence of deadlock ? (4 marks)

(ii) Explain about Banker's Algorithm. (8 marks)

14. (a) (i) What is paging ? Explain about the hardware support for paging with a neat diagram. (6 marks)

(ii) Explain about any two methods for the implementation of page table. (6 marks)

Or

(b) (i) Explain about Least Recently Used (LRU) page replacement algorithm with an example. (6 marks)

(ii) What is thrashing ? Why it happens ? (6 marks)

15. (a) (i) Explain about free disk space management. (8 marks)

(ii) Explain about direct access method of file access. (4 marks)

Or

(b) Explain about any three disk scheduling schemes with suitable example.

[5 × 12 = 60 marks]

F 3062 (Pages : 2) Reg. No. 3 copies

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science and Engineering / Information Technology

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

(Regular—New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Differentiate database schemes and instances.
2. How the outer join operations differ from inner join operations ?
3. Distinguish between dense and sparse indices.
4. Describe the concept of partial functional dependency and explain how the concept is used to define second normal form.
5. Define lock. What are the two modes of locking ?

(5 × 3 = 15 marks)

Part B

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

6. Explain the concept of weak entity with an example. Define the terms owner entity type, weak entity type, identifying relationship and partial key.
7. Explain referential integrity constraint and its importance.
8. Explain assertions and triggers in ORACLE.
9. Explain the various update anomalies that can arise in a relational database with examples.
10. Explain the concept of shadow paging.

(5 × 5 = 25 marks)

Part C

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

11. (a) Explain the main characteristics of the database approach and how it differs from traditional file systems.

Or

(b) Explain the three-schema architecture of DBMS. What is data independence and why is it important ?

12. (a) Consider the following relation schema for the SALES database :

CUSTOMER (Cust No, CName, City)

ORDER (Order No, Order Date, Cust No, Amount)

ORDER–ITEM (Order No, Item No, Quantity)

ITEM (Item No, Unit Price)

Write the following queries in Relational Algebra.

(i) Retrieve the number and date of orders placed by customers residing at "Chennai".

(ii) Retrieve the number and unit price of items for which an order of quantity greater than 50 is placed.

(iii) Retrieve the order number, date and item number for the order of items having a unit price greater than 20.

(iv) Retrieve details of customers who have placed an order for the item number I 021.

Or

(b) Explain the following SQL commands with examples.

(i) INSERT. (ii) UPDATE.

(iii) DELETE. (iv) ALTER TABLE.

13. (a) What are hashing functions ? Explain the commonly used hash functions.

Or

(b) Explain the different types of single-level indices.

14. (a) Consider two sets of functional dependencies :

$F_1 = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$ and

$F_2 = \{A \rightarrow CD, E \rightarrow AH\}$. Are they equivalent ?

Or

(b) What is normalisation ? Explain INF, 2NF, 3NF and BCNF with examples.

15. (a) Highlight the need for concurrency control with detailed examples.

Or

(b) Explain ARIES algorithm in detail.

(5 × 12 = 60 marks)

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F 3049 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

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

(Regular—New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. Evaluate $\Delta x \log x$, the interval of differencing being h.
2. Find the z-transform of $(t+\mathrm{T})\, e^{-(t+\mathrm{T})}$.
3. Find the coefficient of X^{16} in $(1+\mathrm{X}^4+\mathrm{X}^8)^{10}$.
4. Find p such that the function $f(z)$ expressed in polar co-ordinates as $f(z) = r^2 \cos 2\theta + ir^2 \sin p\theta$ is analytic.
5. State and explain Little's theorem.

(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. Given $Z(u_n) = \dfrac{2z^2+3z+4}{(z-3)^3}, |z| > 3$. Show that $u_1 = 2, u_2 = 21, u_3 = 139$.
8. Solve the recurrence relation :

   $\mathrm{F}_{n+2} = \mathrm{F}_{n+1} + \mathrm{F}_n$ where $n \geq 0$ and $\mathrm{F}_0 = 0, \mathrm{F}_1 = 1$.
9. Evaluate $\oint_c \dfrac{\sin \pi z^2 + \cos \pi z^2}{(z-1)^2(z-2)}\, dz$, where C is the circle $|z| = 3$.
10. Derive an expression for the average queue occupancy and average time delay through the queue for state dependent queues.

(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. Distance in nautical miles of the visible horizon for given heights in meters above the surface of the earth are given by the following table :

x (heights) :	100	150	200	250	300	350	400
y (distance) :	12	15	21	28	36	50	71

Find the value of y when $x = 275$ meters.

Or

12. (a) Using Simpson's rule, taking five ordinates, to find an approximate value of $\int_1^2 \sqrt{\left(x-\frac{1}{x}\right)}\,dx$ to two decimal places.

(b) Evaluate $\int_0^1 \left(\frac{dx}{1+x}\right)$ correct to 3 decimals by Trapezoidal rule with h = 0.5, 0.25 and 0.125.

Module 2

13. (a) Find the convolution of $\cos\frac{n\pi}{2} * \sin\frac{n\pi}{2}$.

(b) Find the inverse Z-transform of $\frac{4z^{-1}}{(1-z^{-1})^2}$.

Or

14. (a) Solve $y_{n+3} + y_{n+2} - 8y_{n+1} - 12y_n = 0, y_0 = 1, y_1 = y_2 = 0$.

(b) Show that $z(\cosh n\theta) = \frac{z(z-\cosh\theta)}{z^2 - 2z\cosh\theta + 1}$.

Module 3

15. (a) Find discrete numeric function corresponding to the generating function $A(z) = \frac{2}{1-4z^2}$.

(b) Solve the recurrence relation $a_r = a_{r-1} + a_{r-2}$, $r \geq 2$ and $a_0 = 1, a_1 = 1$.

Or

16. (a) Express the generating function for the sequence 1, 0, 1, 0, 1, 0,.... in a simpler form.

(b) Find a particular solution of $a_r - 2a_{r-1} = 7r$.

Module 4

17. (a) Expand $\frac{1}{z^2-4z+3}$, for $1 < |z| < 3$ in Laurent's series.

(b) If $f(z)$ is an analytic function of z, prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|Rf(z)|^2 = 2|f'(z)|^2$.

Or

18. (a) Show that the function $f(z)=\frac{x^2y^3(x+iy)}{x^6+y^{10}}$, $z\neq 0$, $f(0)=0$, is not analytic at the origin even though it satisfies Cauchy-Riemann equations at the origin.

(b) Evaluate by contour integration $\int_0^{2\pi}\frac{d\theta}{(5-3\cos\theta)^2}$.

Module 5

19. Customers arrive in a hotel at a rate of 5 per minute and wait to receive their order for an average of 5 minutes. Customers eat in the hotel with probability 0.5 and carry out their order without eating with probability 0.5. A meal requires an average of 20 minutes. What is the average number of customers in the hotel ?

Or

20. Derive the expression for the average number of customer's queue in an M/M/1 queuing system, from first principles.

(5 × 12 = 60 marks)

F 3051 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Aeronautical Engineering/Computer Science/Electrical and Electronics Engineering

EN 010 502 – PRINCIPLES OF MANAGEMENT (AN, CS, EE)

(Regular – New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Define span of control. List the factors affecting it.
2. Mention the operative functions of HR management.
3. List the different stages of a product life cycle.
4. What are the objectives of financial management?
5. Write down the importance of marketing research.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain MBO process using flow-chart. What are the advantages and limitations of MBO process?
7. What are the objectives of recruitment? List and describe the sources of recruitment.
8. What is meant by network? What purposes are served by including dummy activities in network analysis?
9. Explain different types of variances? How they are used in costing?
10. Define advertising. What are the different steps to be followed while choosing the advertising message?

(5 × 5 = 25 marks)

Turn over

Part C

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

MODULE I

11. (a) Explain the elements of directing.

(b) What are the benefits of delegation? Explain.

Or

12. Explain different organisational structures. Describe the matrix organisation in detail and comment on its merits and demerits.

MODULE II

13. Explain the effects of industrial fatigue. Explain any two cases of causes and elimination of fatigue.

Or

14. Define training. What are the needs for training? Explain different types of training?

MODULE III

15. Explain the concept and objectives of network analysis. What are its different stages? Discuss its advantages and limitations.

Or

16. (a) Explain the different factors of production.

(b) Explain PERT and its importance in network analysis?

MODULE IV

17. Clearly explain the functions of financial management? Describe the challenges faced by a finance manager.

Or

18. The financial details of a company is as below:

Variable cost per unit is Rs. 30

Selling price per unit is Rs. 40

Fixed expenses are Rs. 1,00,000

Calculate (i) the break-even point units ; (ii) the selling price per unit, if BEP is brought down to 8000 units.

MODULE V

19. Explain four different types of markets in which organisations operate. Explain the major decisions in sales promotion?

Or

20. (a) What are the different strategies used in stimulating demand in the market? Explain with examples.

(b) Discuss the different steps in marketing research.

(5 × 12 = 60 marks)

Module V

9. (a) Explain the difference between Transportation problem and Assignment problem. (5 marks)

(b) Using MODI method, solve the following transportation problem.

	A	B	C	Supply
E	2	7	4	5
F	3	3	1	8
G	5	4	7	7
H	1	6	2	14
Demand	7	9	18	34

(15 marks)

Or

10. (a) Describe the Hungarian method of solving an assignment problem. (6 marks)

(b) A computer centre has three programmers (A, B and C) and the following table gives the time that a programmer takes to complete application programmes (I, II and III). Assign the programmers to the programmes so that the total computer time is minimum.

	A	B	C
I	120	100	80
II	80	90	110
III	110	140	120

(14 marks)

F 3102 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Computer Science and Engineering/Information Technology

ENGINEERING MATHEMATICS—IV (R, T)

(Improvement/Supplementary/Mercy Chance)

Time : Three Hours Maximum : 100 Marks

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

Module I

1. (a) Define the following terms : (i) Pure birth process and (ii) Pure death process. (6 marks)

(b) Patients arrive at a clinic according to a Poisson distribution at the rate of 30 patients per hour. The waiting room does not accommodate more than 14 patients. Examination time per patient is exponential with mean rate of 20 per hour.

(i) Find the effective arrival rate at the clinic.

(ii) What is the probability that an arriving patient will not wait ?

(iii) What is the expected waiting time until a patient is discharged from the clinic ?

(14 marks)

Or

2. (a) A television repairman finds that the time spend on his jobs has an exponential distribution with a mean of 30 minutes. If he repairs sets in the order in which they came in, and if the arrival of sets follows a Poisson distribution approximately with an average rate of 10 per 8-hour day, what is the repairman's expected idle time each day ? How many jobs are ahead of the average set just brought in ?

(8 marks)

(b) A bank has two tellers working on savings account. The first teller handles withdrawals only. The second teller handles deposits only. It has been found that the service time distribution for both the deposits and withdrawals are exponential with mean service time 3 minutes per customer. Depositors and Withdrawers are found to arrive in a Poisson fashion throughout the day with a mean arrival rate of 16 per hour and 14 per hour respectively. What would be the effect on the average waiting time for depositors and withdrawers if each teller could handle both withdrawals and deposits ?

(12 marks)

Module II

3. (a) Find by Horner's method, the positive root of the equation $x^3 + x^2 + x = 100$. (12 marks)

(b) Find by Newton's method, the root of the equation $\log x = \cos x$. (8 marks)

Or

4. (a) Solve the system of equations :

$10x - 2y - z - w = 3$,

$-2x + 10y - z - w = 15$,

$-x - y + 10z - 2w = 27$,

$-x - y - 2z + 10w = -9$

by Gauss-Seidel iteration method.

(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) If $f(0.1) = 2.68$, $f(0.2) = 3.04$, $f(0.3) = 3.38$, $f(0.4) = 3.68$, $f(0.5) = 3.96$ and $f(0.6) = 4.21$ find $f(0.15)$ using Newton's interpolation formula.

(10 marks)

(b) Evaluate :

$\int_0^2 \sqrt{\sin\theta}\, d\theta$ by using (i) Simpson's rule taking 11 ordinates ; and (ii) Trapezoidal rule.

(10 marks)

Or

6. (a) Given that :

x	:	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	:	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at (i) $x = 1.0$; and (ii) $x = 1.5$.

(12 marks)

(b) The following data gives corresponding values of pressure (p) and specific volume (v) of a superheated steam.

v	:	2	4	6	8	10	12	14
p	:	105	42.7	25.3	16.7	13	10	7.5

Find the rate of change of pressure when the volume $v = 2$.

(8 marks)

Module IV

7. (a) Use graphical method to solve the following LPP :

Maximize $Z = 2x + 3y$

subject to the constraints $x + 2y \le 10$,

$x + y \le 6$,

$x - y \le 2$,

$x - 2y \le 1$, with $x, y \ge 0$.

(8 marks)

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

Maximize $Z = 3x + 5y + 4z$

subject to the constraints $2x + 3y \le 8$

$2y + 5z \le 10$

$3x + 2y + 4z \le 15$

and $x, y\, z \ge 0$.

(12 marks)

Or

8. (a) Use Big M method to

Maximize $Z = 6x_1 + 4x_2$

subject to $2x_1 + 3x_2 \le 30$

$3x_1 + 2x_2 \le 24$

$x_1 + x_2 \ge 3$

$x_1, x_2 \ge 0$.

Is the solution unique ? Why ?

(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 $x, y, z \ge 0$.

(3 + 7 = 10 marks)