F 3055 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Information Technology

IT 010 502 – MICROPROCESSOR AND MICROCONTROLLERS (IT)

(Regular - New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*

Each question carries 3 *marks.*

1. What are the uses of $\overline{DEN}$ and $\overline{BHE}$ signals of 8086?
2. Name and briefly explain three special address transfer instructions.
3. What is the need for key debounce circuit in 8279?
4. Explain the instruction for multiplication in 8051 instruction set?
5. How does a serial line differ from a serial bus?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Draw the timing diagram of MOV [SI], AL instruction and explain signal flow.
7. Explain the following instructions:

   (i) LAHF (ii) LDS (iii) LEA (iv) DAA (v) TEST.

8. Draw and explain status word register of 8251.
9. Write into accumulator 98H and then execute RRC three times and then add with 70H. What will be the results in A and in the flags? Assume C = 0 to start with.
10. Draw an interface for 3 scan (encoded) lines and 5 return lines in a keypad.

(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. Draw and explain the minimum mode circuit connection of 8086. Explain the minimum mode bus timing for a memory read operation.

Or

12. (a) Explain the register organisation of 8086.

(b) Describe the memory segmentation in 8086. What are its advantages?

Module II

13. (a) Write a note on assembler directives and operators of 8086.

(b) Explain the interrupt cycle of 8086.

Or

14. Write an 8086 ALP to find the even numbers of a given array and store them in a separate consecutive locations.

Module III

15. Interface a 4 × 4 keyboard with 8086 using 8255 and write an ALP for detecting a key closure and return the key code in AL. The debouncing period for a key is 10 mS. Use software key debouncing technique. DEBOUNCE is an available 10 mS delay routine.

Or

16. With the help of a neat block diagram, explain the internal architecture of 8279. Also explain the different input (keyboard) modes and output (display) modes.

Module IV

17. Show the signals at the pins of 8051. Explain meaning of each signal. Also, indicate when a signal is input and when output. What are the signals multiplexed at the port PO and what at port P3?

Or

18. Describe the different types of data transfer instructions in 8051. Explain the differences between MOV, MOVC and MOVX instructions.

Module V

19. There is a mosquito trap which generates an active low transition on each trap of the mosquito. How will you use an 8051 timer to count the number of traps in one hour? Show the block schematics?

Or

20. Interface 8 digit seven - segment LED display using PPI to 8051. Draw the block circuit schematics and write the ALP routine to display the message on the above display.

(5 × 12 = 60 marks)

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

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 O21.

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)

F 3078 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Information Technology

IT 010 503 DATA COMMUNICATION (IT)

(Regular - New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions briefly.*

Each question carries 3 *marks.*

1. What are the functions of transport layer in OSI reference model?
2. Why is statistical TDM more efficient than a synchronous TDM?
3. Give one practical example for communication systems of simplex, duplex and half-duplex types.
4. List any *three* advantages of optical fibre communication, compared to copper wire communication.
5. What are the differences between TDM and FDM?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain the arrangement of a data communication network. Describe any one network topology?
7. State and explain Shannon's theorem on channel capacity of a Gaussian channel.
8. Explain the differences between datagram and virtual circuit operation?
9. With a neat block diagram, describe a digital subscriber exchange?
10. Explain the principle of CDMA? Compare it with TDMA and FDMA?

(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. Discuss LAN implementation using ETHERNET protocol. Explain MAC address?

Or

12. Describe any three different topologies in computer networks.

Module II

13. Explain the differences between a time division multiplexer and a statistical multiplexer. Produce a sketch showing the internal architecture of a time division multiplexer.

Or

14. With necessary diagrams explain DPSK transmitter and receiver and compare its performances with PSK?

Module III

15. (a) What types of delay are significant in assessing the performance of a packet switching network? Explain. (6 marks)

    (b) What are the major trade - off in the design of a routing strategy for a circuit switching network? (6 marks)

Or

16. (a) Explain the different methods of frame synchronization with examples. (5 marks)

    (b) Explain (i) Bit synchronization and (ii) Character synchronization with appropriate examples. (7 marks)

Module IV

17. With near diagrams, explain how the following guided media can be used in computer communication? (i) fibre optic cable (ii) coaxial cable and (iii) twisted pair cable.

Or

18. With neat block diagram, describe the principle of a cable TV network? Explain the function of different units used in it?

Module V

19. With neat diagrams, explain how a call is established using a GSM channel.

Or

20. (a) Describe different kinds of hand-off mechanisms. (6 marks)

    (b) How GPRS is utilised in computer communication? Explain. (6 marks)

[5 × 12 = 60 marks]

F 3098 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Information Technology

IT 010 505—LANGUAGE TRANSLATORS (IT)

(Regular—New Scheme)

Time : Three Hours Maximum : 100 Marks

Part A

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

1. What is a Regular expression ? What is its role in lexical analysis ?
2. What are ambiguous grammars ? Give an example.
3. Give the applications of syntax-directed translation.
4. What is back patching ?
5. What is global data flow analysis ?

(5 × 3 = 15 marks)

Part B

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

6. What are tokens, patterns and lexemes ?
7. What is meant by panic mode error recovery ? Explain.
8. What are S-attributed and L-attributed definitions ? Explain.
9. Translate the expression $a := -b / (c - d) * e$ into quadruple and triple representations.
10. Give the algorithm for live variable analysis.

(5 × 5 = 25 marks)

Part C

Each full question carries 12 *marks.*

11. (a) Explain the role of input buffering in lexical analysis

Or

(b) Using Thompson's construction technique, construct an NFA the regular expression :

$(a/b)^* b\, b\, (a/b)^*$.

Turn over

12. (a) Show that the following grammar is not LL (1) :

$S \rightarrow i\,Ac\,S \mid i\,A\,c\,Se\,S \mid a$

$A \rightarrow b.$

Or

(b) Explain the algorithm to make an ACTION and GOTO entry in SLR parsing table.

13. (a) Explain the procedure for constructing a syntax tree with an example.

Or

(b) What are the different storage allocation strategies ? Explain.

14. (a) Explain the different methods for translating a Boolean expression into three-address code.

Or

(b) What is a DAG ? Explain its construction.

15. (a) Explain the principal sources of optimisation.

Or

(b) Explain the various loop optimisation techniques.

(5 × 12 = 60 marks)

F 3110 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Information Technology

OPERATING SYSTEM CONCEPTS (T)

(Improvement / 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 pre-emptive scheduling?
4. Explain the necessary conditions for the occurrence of a deadlock.
5. What do you mean by external fragmentation?
6. Explain translation look-aside buffer.
7. Explain storage area networks.
8. What are file attributes?
9. What is the difference between Process migration and Computation migration?
10. Write a short note on clustering.

(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 Windows 2000.

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

Or

Turn over

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

13. (a) Explain the hardware support required for paging.

Or

(b) Explain how memory management is achieved in Solaris.

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

Or

(b) With a neat schematic diagram, explain about file organization and access.

15. (a) Compare Networking Operating System and Distributed System OS.

Or

(b) Discuss about the cluster computer architectures. Explain the features of Win2000 cluster server.

(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 3130 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, DECEMBER 2012

Fifth Semester

Branch : Information Technology

MICRO PROCESSORS (T)

(Improvement / Supplementary / Mercy Chance)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. What are the types of interrupts available in 8086?
2. What is segmented memory? Mention its advantages.
3. Explain the role of ALE and DEN signals in 8086.
4. Draw the read cycle timing diagram of 8086.
5. Explain the function of the following instructions in 8086 : (a) LOOP ; (b) DAA.
6. Write short notes on MASM and TASM used with 8086 system.
7. What is meant by minimum and maximum mode of operation?
8. Write an ALP to move a byte string, 16 byte long, from location 2000_H to 3000_H.
9. Compare the specifications of 80286, 80386 and 80486 processors.
10. What are the features of the 8279?

(10 × 4 = 40 marks)

Part B

Each full question carries 12 *marks.*

11. Explain the function of each pin/signal of 8086 in maximum and minimum mode of operation.

Or

12. Explain different types of addressing modes used in 8086 with suitable examples.
13. Explain the function of the following instructions in 8086 :

    (a) DAA ; (b) NEG Ax ; (c) LOOP NZ ; (d) INT N.

Or

Turn over

14. Briefly explain different types of program development tools used with 8086 system.

15. Describe memory mapped I/O and I/O mapped I/O. Give the advantages and disadvantages of each.

Or

16. Explain how a 4 KB ROM and 16 KB RAM can be interfaced to the 8086.

17. Compare the features of 8086 processor and Pentium processor.

Or

18. Draw and explain the internal structure of the Pentium Pro microprocessor.

19. Draw and explain the internal block diagram of 8255 and its operating modes.

Or

20. Explain the internal block diagram of 8254 Timer and its operating modes.

(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)

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 $f(0.6) = 4.2$ find $f(0.15)$ using Newton's interpolation formula.

(10 marks)

(b) Evaluate :

$\int_0^{\frac{\pi}{2}} \sqrt{\sin\theta}\, d\theta$ 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)

F 3085 (Pages : 3) Reg. No. 2 copies

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

Turn over

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 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)