

PGDCA / MCA (I Year) / BCA
Term-End Examination
December, 2006

CS-01(S) : COMPUTER FUNDAMENTALS

Time : 3 hours

Maximum Marks : 75

Note : Question number 1 is **compulsory**. Answer any **three** questions from the rest.

1. (a) The contents of four 8-bit registers AL, BL, CL and DL in hexadecimal notation are F2, FF, B9 and EA respectively. What will be the values of these registers after executing the following micro-operation sequence :

$$AL \leftarrow AL + BL$$

$$CL \leftarrow CL + 1, BL \leftarrow BL + 1$$

$$AL \leftarrow AL - CL$$

Note : If you have taken any assumptions, mention them.

- (b) Write a program in assembly language (8086) that calculates the sum of

$$2^0 + 2^2 + 2^4 + 2^6 + \dots + 2^{14}$$

and stores the sum of the above series in a user defined data item.

- (c) What is a multiplexer ? Design and explain the functioning of a 4×1 multiplexer by giving its truth table, logic diagram and block diagram. 6
- (d) Design a 4 bit arithmetic circuit using 4 full adders and 4 multiplexers for carrying out the following micro-operations : 10
- (i) Add
 - (ii) Add with carry
 - (iii) Subtract
 - (iv) Subtract with borrow
 - (v) Transfer
 - (vi) Increment

Note : Mention the assumptions made, if any.

2. (a) Draw the block diagram of INTEL 8086 microprocessor and explain the two functional units (Bus Interface Unit and the Execution Unit). 8
- (b) With the help of a block diagram explain the polling implementation of a system bus. 7
3. (a) Define Vector processing and Vector computers. Mention at least 4 applications of vector processing. Explain the vector instruction format with the help of an example. 8
- (b) Write a program in 8086 assembly language to sort a given list of 'n' integers. 7

4. (a) With the help of an example, explain RISC pipelining. 7
- (b) With the help of the truth-table and logic diagram, explain the functioning of a D-flip-flop. 8
5. Explain the following along with their usage : $5 \times 3 = 15$
- (i) Hypercube interconnection
 - (ii) Cache coherence
 - (iii) SPARC architecture
 - (iv) Wilkes Control Unit
 - (v) Decoder



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CS-02 (S) : INTRODUCTION TO SOFTWARE

Time : 2 hours

Maximum Marks : 60

Note : Question number 1 is **compulsory**. Answer any **three** questions from the rest.

1. (a) Design an algorithm and draw a flowchart to reverse the given number 'n' and also print the sum of digits. 7
- (b) Write a shell program that accepts a "name" from the user, check whether it is a file or folder and display an appropriate message accordingly. 7
- (c) Explain the important qualities of software product and process that one should consider for the software development. 8
- (d) Draw a parse tree for the following expressions : 4
 - (i) $a * b - c + d$
 - (ii) $a + b * c * d - e$
 using the following productions :
 List \rightarrow list + digits
 List \rightarrow list - digits
 List \rightarrow list * digits
 List \rightarrow digits
 digit is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

- (e) Write a shell program to sort the given filenames in alphabetical order. 4
2. (a) What are the two main issues that should be considered during allocating the space to the files ? Explain any two disk allocation methods in detail. 6
- (b) Explain the following commands of UNIX with an example for each : 4
- (i) cut
 - (ii) grep
 - (iii) tee
 - (iv) tail
 - (v) ps
 - (vi) kill
 - (vii) tr
 - (viii) ln
3. (a) What is a deadlock situation ? What are the essential conditions that characterise deadlocks ? Explain with the help of a resource allocation graph. 5
- (b) List the UNIX commands for the following : 5
- (i) To sort the numbers in descending order in a data file.
 - (ii) To count the number of users who are currently logged-in.
 - (iii) To display last four lines of a given text file.

- (iv) To kill a process with process identification number 3022.
 - (v) To change all the characters of a file to its lower case.
4. (a) Explain the features of Network Operating System and Distributed Operating System. 5
- (b) Explain the following loader schemes : 5
- (i) Absolute loader
 - (ii) Dynamic loader
5. (a) Write short notes on the following w.r.t. the WINDOWS GUI : 5
- (i) Desktop Metaphor
 - (ii) Pull-down Menu
 - (iii) Bit-mapped displays
 - (iv) Icons
 - (v) Pointing devices
- (b) Explain all the phases of System Investigation. 5

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CS-03 (S) : FILE STRUCTURE AND
PROGRAMMING IN COBOL

Time : 2 hours

Maximum Marks : 60

Note : Question number 1 is **compulsory**. Answer any **three** questions from the rest.

1. (a) A two dimensional table is to be represented in COBOL. Explain how it can be done, with an example. How can this table be searched for some specific value ? 5
- (b) What is the purpose of STRING and UNSTRING verb in COBOL ? Explain with the help of an example for each. 5
- (c) Write COBOL statements for the following : 7
- (i) Add DA to BASIC_PAY.
- (ii) Subtract INCOME_TAX from GROSS_PAY to get the NET_PAY.

- (iii) Subtract INCOME_TAX and PROVI_FUND from GROSS_PAY to get the NET.
 - (iv) Make the value of the data name TOTAL_MARKS equal to 76.
 - (v) Make the content of A be the character EXAMINATION.
 - (vi) Make the DAYS equal to WEEK multiplied by WEEK_NO.
 - (vii) Divide DAYS by 30 to get NO_OF_MONTHS and the remainder as DAYS.
- (d) A university library has two types of membership, one is academic and other is student. The records of all its members are stored in a single file. The only difference in the data of academic and student members is that for an academic the date of joining in the university is recorded, whereas for students the date of membership and fee amount paid is recorded. Write a program in COBOL for printing the details of all its members.

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Note : Make suitable assumptions, if needed, and mention them.

- (e) Why do you need INSPECT verb in COBOL ? Explain the usage of this verb with the help of an example.

5

2. Describe index-sequential file organisation. Give an example situation where index-sequential file organisation can be used. Write a suitable program that demonstrates the usage of index-sequential file organisation. 10
3. (a) How can you find a value in a single-dimensional array represented in COBOL ? Explain with an example. 5
- (b) Write a program in COBOL which will take a 2-digit number from the keyboard and display the equivalent words on the screen. 5
- e.g. If program takes 92 as an input then output should be "ninety two".
4. (a) "The best way to solve a problem is to modularise it." Comment on this statement. How can modularisation be achieved in COBOL ? Explain with the help of an example. 5
- (b) A university has 120 students in its MCA programme. To successfully complete this programme each student has to pass at least 15 courses out of 18 courses. Write a program in COBOL to store the data in memory as an array and declare the result as successful or unsuccessful. 5

Note : Make suitable assumptions, if any are needed and mention them.

5. Explain the use and syntax format of each of the following COBOL statements/verbs/clauses with the help of an example :

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- (a) SYNCHRONIZED clause
- (b) REDEFINES clause
- (c) SIZE ERROR option
- (d) PERFORM statement
- (e) SET statement

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CS-04(S) : DATA STRUCTURES THROUGH
"C" & "PASCAL"

Time : 2 hours

Maximum Marks : 60

Note : Question number 1 is **compulsory**. Answer any **three** questions from the rest. All algorithms should be written nearer to 'C' & 'PASCAL' language.

1. (a) Write a program in C/PASCAL to create a doubly linked list in ascending order of information. The information field is of type integer. (Assume the value of integer yourself). 10
- (b) Write a program and algorithm to sort a given list using "Heap Sort" method. 10
- (c) Develop a program which reads a hexadecimal digit and returns its decimal equivalent number. 10
2. Write a function to evaluate the postfix expression using stack. Explain how priorities of the operators are taken care of during the process of converting an infix to postfix form. 10

3. (a) How do you represent a stack and a queue by using one-dimensional array ? 2
- (b) Write a function for pushing into or popping from a stack. 4
- (c) Write a function for adding an element to a Queue and removing an element from a Queue. 4
4. (a) Build a B-tree for the following data : 5
- DHKZBPOQEASWTCLNYM
- (b) Write a 'C' program to count the number of words and lines in a text file, whose name is supplied in the command line. 5
5. (a) Write a 'C' language program to print a file backwards. 5
- (b) Differentiate between sequential and indexed sequential file organisation. 5

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**CS-05 (S) : ELEMENTS OF SYSTEMS
ANALYSIS & DESIGN**

Time : 3 hours

Maximum Marks : 75

Note : Question number 1 is **compulsory**. Answer any **three** questions from the rest.

1. (a) What is Requirements Analysis ? Arrive at the SRS for Hospital Management System. 7
- (b) What is Quality Assurance ? Explain the different levels of Quality Assurance. 4
- (c) Write short notes on the following : 6
- (i) Software Related Crime
- (ii) Transaction Processing Systems
- (iii) Decision Tree
- (d) Discuss Interviewing as a method of fact finding. Comment on its usefulness. 3