Name : ……………………………………………………

Roll No. : …………………………………………………

Invigilator's Signature : …………………………………

CS/M.Tech/MBIN/SEM-1/MBIN-105/2012-13
2012
COMPUTATIONAL TECHNIQUES – I

Time Allotted : 3 Hours   *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Objective Type Questions)

1.   Answer any *ten* of the following :   10 × 1 = 10

   A)   Answer very briefly the following questions :

   i)   What is the maximum number of primary partitions that can be created on a single Hard Disk ?

   ii)   State the difference between REGEXP and LIKE.

   iii)   What would the following command do ?

```
chmod 671 filel.txt
```

40973   [Turn over

B) Choose the correct alternative for the following :

iv) You attempt to remove a directory using the command line, but Linux won't allow you, what is the most likely problem ?

    a) The directory name contains illegal characters

    b) You are not logged in as super user

    c) The directory is not empty

    d) It cannot be done using commands.

C) Answer very briefly the following question :

v) If `$refVar1` is the reference to the scalar `$Var1`, how can the value of `Var1` be obtained from this reference ?

vi) What is the utility of the shebang line in perl ?

vii) What pattern does the following match ?

```
m/\w+:(\w+)\s*\d+/;
```

viii) Correct the following statement :

```
push $AoA [0], "wilma", "betty";
```

ix) How can you define a local variable in perl ?

x) What is the output of the following perl program ?

```
$x = "abcde";

$x = chop ($x);

print "$x";
```

D) State whether the following statements are True or False :

xi) Application programs and terminal activities may be logically impaired whenever any changes are made in access method.

E) Answer very briefly the following question :

xii) What is the difference between Entity and Attributes ?

GROUP – B

2. Describe the role of kernel in Operating Systems. What is the significance of inode block. Differentiate between absolute and relative paths. Write a bush script / command which counts the number of lines in the file "filel.txt" that contains the word "example". **3 + 3 + 2 + 2**

3. Write a bash script that reads two numbers given by the user and performs simple arithmatic operations like addition, multiplication, subtraction and division indicated by the user on the read in numbers.

    Why is swap space necessary in Linux OS.   6 + 4

GROUP – C
Answer any *two* of the following.

4. Write a perl program that reads a string and a number and prints the string the number of times indicated by a number on separated lines. Enumerate on passing arguments to subroutines by value and by reference with example. Write a perl program to read in a sequence and checks if it is a palindrome *i.e.* the sequence is identical to the reverse of the same sequence.   3 + 2 + 5

5. Write a perl program to read in a file and count the number of occurrences of each word in the file. Define only the construct for an object "Student" which would contains information about the first name, last name, stream and roll number of the student.   6 + 4

6. Construct a regular expression that matches :

   a) at least one a followed by any number of b's

   b) any number of backslashes followed by any number of asterisks (any number might be zero)

   c) Write a subroutine which accepts a DNA sequence and returns the first ORF. Define a method to retrieve the first name from the object `Student` in the previous question. 2 + 5 + 3
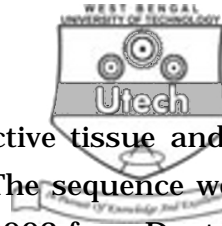
GROUP – D

7. Design logical and physical database from the following data : 10

The iron and oxygen binding single chin protein Myoglobin found in all vertebrates. The first sequence was submitted by Dr John Hoffman on 11. 10. 1999 from Dept. of Chemistry, University of California and the modified sequence by Dr. Sara Brodsky on 12. 11. 2004 from Dept. of Chemistry, National University of Singapore.

The iron-containing double chain oxygen-transport metalloprotein Haemoglobin found in the RBC of all vertebrates. The both the sequence were submitted by Prof. Richard Berman on 10. 03. 2000 from Dept. of Biochemistry, Oxford University.

Collagen is the main component of connective tissue and is the most abundant protein in mammals. The sequence were submitted by Dr. Max Yonath on 21. 06. 2002 from Dept. of Zoology, Stanford University, Prof. Barbara Rich on 08. 05. 2008 from Dept. of Bioinformatics, University of Toronto and Dr. Sara Hey on 04. 04. 2009 from Dept. of Biochemistry, National University of Singapore.

Elastase is an enzyme from the class of proteases (*peptidases*) that break down proteins. The chain sequence was submitted by Prof. Barbara Rich on 05. 08. 2008 from Dep. of Bioinformatics, University of Toronto.

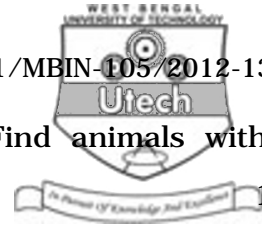8. Define Codd's rule 0, 5, 6, 12.   4

Create MySQL user of your name at MySQL server and grant permission for all of MySQL command for working.

Name of the following table is "pet"   2

Id	Name	Owner	Species	Sex	Birth	Death
1	Fluffy	Harold	Cat	F	1993-02-04	
2	Claws	Gwen	Cat	M	1994-03-17	
3	Buffy	Harold	Dog	F	1989-05-13	
4	Fang	Benny	Dog	M	1990-08-27	
5	Bowser	Diane	Dog	M	1979-08-31	1995-07-29
6	Chirpy	Gwen	Bird	F	1998-09-11	
7	Whistler	Gwen	Bird		1997-12-09	
8	Slim	Benny	Snake	M	1996-04-29	

Answer the following :

i)   Sort by type of animal in ascending order, then by birth date within animal type in descending order (youngest animals first).   1

ii) The current month is November. Find animals with birthdays in the upcoming month. **1**

iii) Find the number of animals per sex only for animals whose sex is known. 1

iv) Find breeding pairs among the pets. 1

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