Signature of Invigilators

1. .....

2. .....

Roll No. | | | | | |

(In figures as in Admit Card)

COMPUTER SCIENCE AND APPLICATIONS

Paper III

Roll No. .....

.....

(In words)

D—1902

Name of Areas/Section (if any) .....

Time Allowed : $2\frac{1}{2}$ Hours]

[Maximum Marks : 200

Instructions for the Candidates

1. Write your Roll number in the space provided on the top of this page.
2. Write name of your Elective/Section if any.
3. Answer to short answer/essay type questions are to be written in the space provided below each question or after the questions in test booklet itself. No additional sheets are to be used.
4. Read instructions given inside carefully.
5. Last page is attached at the end of the test booklet for rough work.
6. If you write your name or put any special mark on any part of the test booklet which may disclose in any way your identity, you will render yourself liable to disqualification.
7. Use of calculator or any other Electronics Devices are prohibited.
8. There is no negative marking.
9. You should return the test booklet to the invigilator at the end of the examination and should not carry any paper outside the examination hall.

પરીક્ષાર્થીઓ માટે સૂચનાઓ :

૧. આ પૃષ્ઠના ઉપલા ભાગે આપેલી જગ્યામાં તમારી ક્રમાંક સંખ્યા (રોલ નંબર) લખો.

૨. તમે જે વિકલ્પનો ઉત્તર આપો તેનો સ્પષ્ટ નિર્દેશ કરો.

૩. ટૂંક નોંધ કે નિબંધ પ્રકારના પ્રશ્નોના ઉત્તર દરેક પ્રશ્નની નીચે આપેલી જગ્યામાં જ લખો. વધારાના કોઈ કાગળનો ઉપયોગ કરશો નહીં.

૪. અંદર આપેલી સૂચનાઓ ધ્યાનથી વાંચો.

૫. આ ઉત્તરપોથીને અંતે આપેલું પૃષ્ઠ કાચા કામ માટે છે.

૬. આ ઉત્તરપોથીમાં ક્યાંય પણ તમારી ઓળખ કરાવી દે એવી રીતે તમારું નામ કે કોઈ ચોકકસ નિશાની કરી હશે તો તમે આ પરીક્ષા માટે ગેરલાયક સાબીત થશો.

૭. કેલકયુલેટર અથવા ઈલેકટ્રોનિકસ સાધનો જેવા ઉપયોગ કરવો નહીં.

૮. નકારાત્મક ગુણાંક પદ્ધતિ નથી.

૯. પ્રશ્નપત્ર લખાઈ રહે એટલે આ ઉત્તરપોથી તમારા નિરીક્ષકને આપી દેવી. પરીક્ષાખંડની બહાર કોઈપણ પ્રશ્નપત્ર લઈ જવું નહીં.

FOR OFFICE USE ONLY
Marks Obtained

Question Number	Marks Obtained	Question Number	Marks Obtained	Question Number	Marks Obtained
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

Total Marks Obtained.....

Signature of the co-ordinator.....

(Evaluation)

COMPUTER SCIENCE AND APPLICATIONS

PAPER III

Note :—This paper has two parts (A) and (B). *All* questions are compulsory.

Part A

Note :—This part has *ten* short essay type questions of **16** marks each to be answered in about **300** words each.

1. (A) State the differences between maskable interrupts and non-maskable interrupts. Explain the SIM and RIM instructions. [6]

   (B) Draw the block diagram of 8085 microprocessor. Show the purpose of ALE pin. Show the address map of range 0000 to 0FFF memory block. [10]

Or

(A) Define the following instructions :

(*i*) XCHG

(*ii*) RST 5.5

(*iii*) PUSH PSW [6]

(B) Express the memory hierarchy. Explain the memory mapped I/O and I/O mapped I/O. [10]

2. (A) Given the instances of relation R as follows :

R	(a	b	c)
	1	2	5
	2	3	6
	2	3	8
	1	2	10
	3	5	8

Can you say that functional dependancy a → b exists ? Can you say that functional dependancy b → c does not exist ? Give reasons. [6]

(B) Compare and contrast the following :

(*i*) Primary, candidate and superkeys;

(*ii*) Generalization and specialization. [10]

Or

(A) What are the ACID properties of a transaction ? [6]

(B) Given the relational schema :

employee (ename, street, city)

works (ename, companyname, salary)

company (companyname, city)

manager (ename, managername)

Write the following queries in SQL :

(*i*) Find the names of all employees who live in the same city as the company for which they work.

(*ii*) Give all managers a raise of 10% in salary.

(*iii*) Find the names of all employees who do not work for State Bank of India.

Write relational algebra queries for the following :

(*i*) Find the names of all employees who live in the same city and on the same street as do their manager.

(*ii*) Find the names of all employees who earn more than every employee of State Bank of India. [10]

3. (A) List and briefly explain various 2D graphics primitive operations. [6]

(B) Explain the basic operations of Hard disk. [5]

(C) Explain the basic facilities available in graphic authoring tools. [5]

Or

(A) Explain the working principle of animation technique using simple example. [6]

(B) Briefly discuss GKS. [5]

(C) Discuss the working of Digitizer. [5]

4. (A) Differentiate between call by value and call by reference parameters. [6]

(B) What is virtual function ? Using virtual function how polymorphism can be achieved ? Explain with suitable example. [10]

Or

(A) What is a Horn Clause ? How is it different from normal clause ? [6]

(B) Write a simple LEX script to develop Lexical analyzer for evaluating expressions :

x + y, x − y, x * y, x/y. [10]

5. (A) Describe the synchronization issues. [8]

(B) Describe the OSI layers. [8]

Or

(A) Describe the different phases of circuit switching. [8]

(B) Describe the ATM LAN switch. [8]

6. (A) With suitable example, discuss Binary Search algorithm. [6]

(B) Discuss Branch and Bound method. [5]

(C) Briefly discuss theory of NP-complete. [5]

Or

(A) With the help of suitable example give a trace of Quick Sort. [6]

(B) Explain the following asymptotic notations :
big O, omega. [5]

(C) Differentiate between deterministic and non-deterministic problems. [5]

7. (A) Explain encapsulation and its purpose. [6]

(B) Explain the generalization as extension and restriction. [5]

(C) Explain CGI programming. [5]

Or

(A) Develop a simple object-oriented model for student's personal information system. [6]

(B) Differentiate between Inheritance and Aggregation. [5]

(C) How is the XML different from the HTML ? [5]

8. (A) How is the software engineering viewed as layered technology ? [6]

(B) Compare and contrast the following :

(*i*) Prototype model and concurrent model;

(*ii*) White box testing and black box testing. [10]

Or

(A) List the various categories of risks. [6]

(B) Explain the terms software configuration management, baselines and version control in Software Engineering. How are versions of Windows software controlled ? State briefly. [10]

9. Discuss various issues in Distributed Operating Systems. [16]

Or

(A) Distinguish between kernel non-interruptible and interruptible mode of UNIX. What do you mean by process againing ? [8]

(B) What is Threading ? How does it differ from a process ? Explain how threads can be created in Windows-NT. [8]

10. (A) Outline in brief the following search methods :

(*i*) Breadth-First search;

(*ii*) Best-First search. [8]

(B) What is an Expert System and Decision Support System ? State *two* similarities between them. [8]

Or

(A) Discuss A* algorithm. [8]

(B) Describe in brief the design criteria for Expert System Shell. [8]

Part B

Note :—This part has only *one* question of **40** marks to be answered in about **800** words.

11. (A) Justify the need of formal language for computational models. [10]

(B) Prove that for every NFA there exists a DFA. [10]

(C) Explain in brief multitape Turing Machine. [10]

(D) Differentiate between Recursive and Recursively enumerable language. [10]

Or

(A) What are the various methods for representing the boundaries of an object in an image ? State any *three* of the representation schemes. Explain *one* of them in detail. [10]

(B) Compare and contrast high pass and low pass filter techniques for image enhancement. State the situations when one technique is preferred over the other. [10]

(C) State the compression techniques using run length coding. How are these techniques modified for commercial applications ? Write briefly. [10]

(D) State and explain the terms Hamming code, Hamming distance. How are these used for correcting the codes ? [10]

Or

(A) What do you mean by a loop in transportation problem ? Explain with example. [10]

(B) Explain the degeneracy problem in transportation problem. [10]

(C) Maximize : $Z = x_1 + x_2$

Subject to : $x_1 + 5x_2 \leq 5$

$2x_1 + x_2 \leq 4$

Both $x_1, x_2 \geq 0$. [10]

(D) Write a 'nearest-neighbour' algorithm for the travelling salesman problem. [10]

Or

(A) Discuss Fuzzy Logic Controller. [10]

(B) With suitable block diagram explain perceptron. Discuss Hopfield Neural Network. [15]

(C) Design simple temperature controller using fuzzy logic. [15]

Or

(A) How system calls differ from built-in functions ? Explain at least *four* system calls related to process management. [10]

(B) What do the following UNIX commands do :

(*i*) ls –l ¦ grep '^d' ¦ wc –l

(*ii*) grep '.*' x|

(*iii*) rm x * && echo Deleted

(*iv*) (ls; date) > x|

(*v*) awk '{print $0}' x| [10]

(C) Giving example show how MDI can be implemented in Windows. Also discuss elements of MDI. [10]

(D) What is Unicode ? Discuss its advantages and disadvantages. [10]