Signature of Invigilators

1. .....

2. .....

Roll No. | | | | | |

(In figures as in Admit Card)

COMPUTER SCIENCE AND APPLICATIONS

Paper III

Roll No. .....

.....

(In words)

J—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 any calculator is 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 માટેની સૂચનાઓ :

૧. આ પાનાની ટોચમાં દર્શાવેલી જગ્યામાં તમારો રોલ નંબર લખો.

૨. જો કોઈ વિકલ્પ/વિભાગ પસંદ કર્યા હોય તો તે યોગ્ય જગ્યાએ દર્શાવો.

૩. ટુંકા પ્રશ્નો/નિબંધ વિષેના જવાબો એ પ્રશ્નની નીચે અગર બાજુમાં આપેલી જગ્યામાં લખો. વધારાના કોઈ પાનાનો ઉપયોગ કરશો નહી.

૪. અંદર આપેલી સૂચનાઓ કાળજીપૂર્વક વાંચો .

૫. બુકલેટની પાછળ આપેલું છેલ્લુ પાનું રફ કામ માટે છે.

૬. બુકલેટ કોઈપણ ઠેકાણે તમારું નામ કે કોઈ ચોકકસ સંજ્ઞા કરવી નહીં કે જે તમારી ઓળખ પૂરી પાડે. આ તમને પરીક્ષા માટે ગેરલાયક ઠેરવશે.

૭. કેલ્કયુલેટર નો ઉપયોગ કરાશે નહી.

૮. નકારાત્મક માર્કીંગ નથી.

૯. પરીક્ષા સમય પૂરો થઈ ગયા પછી આ બુકલેટ જે તે નીરીક્ષકને સોંપી દેવી. કોઈપણ પેપર પરીક્ષા રૂમની બહાર લઈ જવું નહી.

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. Simplify the following Boolean function using Karnaugh's map and also draw the circuit using standard gates :

$$f(A, B, C, D) = \Sigma(0, 4, 6, 10, 11, 13)$$

where A, B, C, D are boolean variables.

Or

Discuss use of interrupt in computer architecture. Explain the terms interrupt latency, interrupt priority and interrupt service routine. Also list the interrupts available in 8085 microprocessor.

2. (*a*) What is the difference between COUNT, COUNT DISTINCT, and COUNT (*) in SQL ? What same results and what different results are generated by these commands ?

(*b*) Draw the E-R diagram for the following :
XYZ university has a large number of courses in its catalog (say 500 courses). Attributes of course include Course-Number, Course-Name, and Number-of-Units. Each course may have one or more different courses as prerequisites, or may have no prerequisites. Similarly, a particular course may be a prerequisite for any number of courses, or may not be prerequisite for any other course.

Or

(*a*) List the reasons for implementing a client/server database architecture.

(*b*) Distinguish among data definition commands, data manipulation commands, and data control commands.

3. (*a*) Explain briefly any *two* graphics strorage formats, mentioning devices which can be used along.

(*b*) Explain Bresenham mid point circle algorithm. Illustrate it by digitizing the first Quarter of the circle $(x - 1)^2 + y^2 = 9^2$.

Or

(*a*) Explain briefly Window, Viewport, Viewing transformation (Do not derive) and normalized device coordinate system, with reference to Computer Graphics.

(*b*) What is Clipping ? Explain Cohen-Sutherland algorithm for clipping a line against the rectangular window.

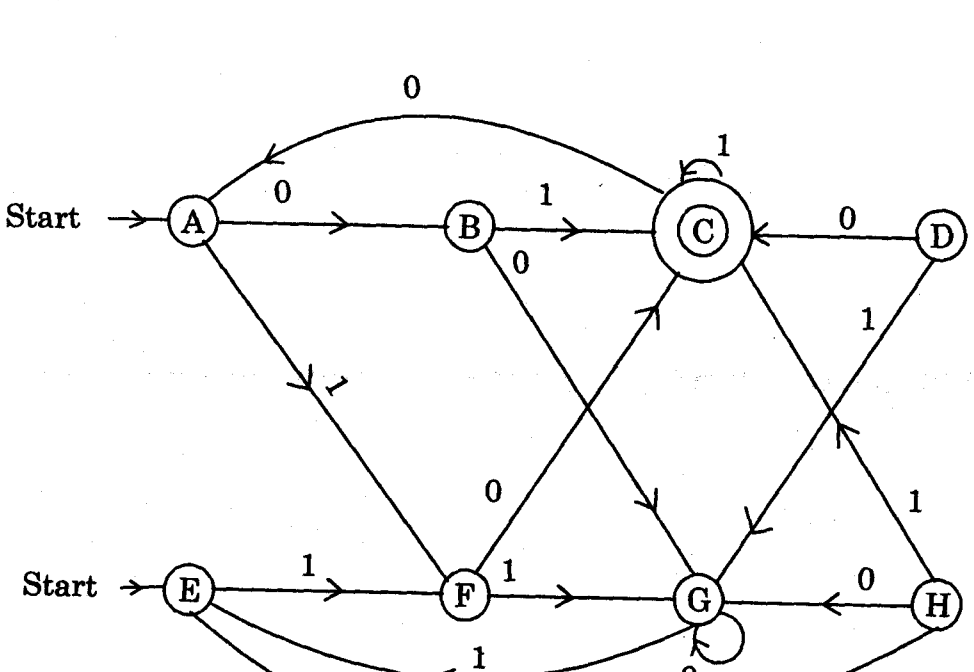
4. How is PROLOG program different from other language programs ? Write PROLOG program to

(*a*) concatenate two lists;

(*b*) obtain permutations of a given list.

Or

What do you understand by minimizing ? Describe the algorithm for minimizing DFA. Minimize the DFA given by the diagram.



5. Describe TCP service model, TCP protocol and TCP connection management.

Or

Discuss what is Authentication and explain in detail Kerberos method of authentication.

6. (*a*) Write an algorithm to merge two given lists A and B to form a list C.

(*b*) Describe briefly Merge Sort algorithm.

Or

(*a*) Describe through an example, the inorder, preorder and postorder traversal schemes of a binary tree.

(*b*) Describe briefly Heap Sort algorithm.

7. (*a*) Prepare an object diagram for a graphical document editor that supports grouping. State your assumptions, if any.

(*b*) What do you mean by static page and dynamic page ? Describe their use.

Or

(*a*) Prepare a portion of an object diagram for a library book checkout system that shows the data, a book is due and the late charges for an overdue book as derived books.

(*b*) Explain the following terms to the point :

Overriding for extension;

Overriding for restriction;

Overriding for optimization;

Overriding for convenience.

8. (*a*) Write a short note on Planning Project Tasks and Staffing the Project Team in context of software project management.

(*b*) Describe briefly Cohesion and the following types of Cohesion :

(*i*) Functional Cohesion;

(*ii*) Sequential Cohesion

(*iii*) Communication Cohesion

(*iv*) Logical Cohesion

(*v*) Procedural Cohesion.

Or

(*a*) Write a short note on critical path.

(*b*) Describe briefly :

(*i*) Regression testing;

(*ii*) Version Control.

9. Discuss the concept of virtual memory in multiprogramming, multitasking operating system and describe various implementation methods with their pros and cons.

Or

Analyse advantages and disadvantages of disk swapping in multitasking system. Describe in detail the disk swap management.

10. (*a*) Describe the algorithm to convert any well-formed formula (wff) to clause form.

(*b*) Describe briefly AI shell, inference engine, forward chaining and backward chaining.

Or

(*a*) Describe unification algorithm.

(*b*) Describe briefly the problem reduction algorithm called AO* algorithm.

PART B

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

11. (*a*) Explain a Turing Machine

$$M = (Q, \Sigma, \Gamma, \delta, q_0, B, F)$$

giving meanings of each of these seven components.

(*b*) Design a Turing machine to accept the language $\{0^n\ 1^n \mid n \geq 1\}$.

(*c*) Give transition diagram of the Turing Machine designed in (*b*).

Or

Describe JPEG Compression technique in detail.

Or

(*a*) What are slack and surplus variables with reference to a LPP ? What is a basic solution, and a basic feasible solution to LPP ?

(*b*) Explain Big M method for solving LPP. When does it become necessary to use it ? Illustrate it by solving

Minimize : $Z = 4x_1 + x_2$

Subject to : $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 4$

$x_1, x_2 \geq 0$

Or

Describe the architecture of multilayered feed forward networks and derive necessary expressions to train this type of network having one hidden layer. Choose necessary transfer functions. Give also the computer algorithm for training.

Or

(*a*) Write a shell script to print the number of subdirectories in the given directory.

(*b*) Write an *awk* script to print all lines between the line whose first word is UGC and the line whose last word is INDIA.

(*c*) Write brief note on importance and use of Child Window Controls.

(*d*) Explain with example, the following :

(*i*) How to create Child Windows;

(*ii*) How to create the Radio Buttons;

(*iii*) How to change the Button Text.