

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.SC. THIRD SEMESTER EXAMINATION, DECEMBER 2011

SECOND YEAR

COMPUTER SCIENCE (Honours)

Date : 16/12/2011

Time : 11am – 2pm

Paper : III

Full Marks : 75

Answer **any five** out of the following questions

1. a) Write a regular expression for all those binary strings which include either 00 or 11 as a substring at least once. Hence design a NFA for that regular expression.
- b) Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:–

Process	Burst time	Priority
P ₁	10	3
P ₂	1	1
P ₃	2	3
P ₄	1	4
P ₅	5	2

(Assume 1 is the Highest priority, 4 is the lowest priority)

The processes are assumed to have arrived in order P₁, P₂, P₃, P₄, P₅ all at time 0. What is the waiting time of each process for Round-Robin Scheduling (quantum = 1) algorithm?

8+7

2. a) Consider following grammar and identify its language.

$S \rightarrow AB$

$A \rightarrow A1 \mid 0$

$B \rightarrow 2B \mid 3$

- b) Consider following NFA and find its equivalent DFA:

States	a	b
$\rightarrow q_0$	q_0, q_1	q_2
q_1	q_0	q_1
q_2	–	q_1, q_0

- c) (i) What is virtual memory?
- (ii) What is process control block?

5+6+(2+2)

3. a) Describe Chomsky classification of grammars.
b) Describe different phases of compilation. 7+8
4. a) Write a regular expression for following:
The set of all binary strings not containing three consecutive zeros.
The set of all binary strings representing even natural numbers.
The set of all binary strings whose lengths are multiple of three.
The set of all binary strings which starts with a zero but does not end with a zero.
b) What do you mean by operating system, assembler, loader and linker? (4x2)+(2+2+2+1)
5. a) What do you mean by state minimization of a DFA? Illustrate with an example.
b) Why are page sizes always power of 2?
c) Consider a system with a 32 bit logical address space. If the page size is 2^9 bytes and page table entry is of 4 bytes, then calculate the number of level of page table hierarchy.
d) What do you mean by binder? 7+1+5+2
6. a) Illustrate with an example, the working of two pass assembler.
b) What do you mean by state of a process? Illustrate with state transition diagram.
c) Define phase structure grammar. 9+4+2
7. Write short notes on (**any three**): 3x5
a) Mealy and Moore Machine
b) Turing Machine
c) Paging and Segmentation
d) Push Down Automata and Linearly Bounded Automata
e) Boot Strap Loader and Spin lock
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