

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

SECOND YEAR

B.A./B.SC. THIRD SEMESTER (July – December), 2012

Mid-Semester Examination, September 2012

COMPUTER SCIENCE (Honours)

Date : 10/09/2012

Time : 2 pm – 4 pm

Paper : III

Full Marks : 50

Group - A

Answer any three questions from the following questions: -

10 × 3

1. a) State and explain different process states. 4
b) Explain with suitable diagram layered operating system structures. 3
c) What is short, long and medium-term scheduling? 3
2. a) What is single threaded and multithreaded process? 3
b) Assume that a process has the following CPU bursts: 8,32,16,8,8 microseconds. Compute the estimated length of the next CPU burst using exponential average with parameter 0.5 and past CPU burst of 10 microseconds. 3
c) What is Throughput, Turn around time, waiting time & response time? 2
d) What is mutual exclusion? 2
3. a) Which system softwares are involved to make the executable file from a given .c file. Write down about their roles in that fact. 2+4
b) Explain briefly the different phases of the synthesis part of the compiler. 4
4. a) What is buffering and spooling? 2
b) Consider the dining philosophers problem with n philosophers but with $(n+1)$ chopsticks. The extra chopstick is in the middle of the table and can be used by any philosopher (but only by one of them at a time). Is deadlock possible? Explain your answer. 3
c) What is the difference between interpreter and compiler? 2
d) Give the diagrammatic representation of the different phases of a compiler. 3

Group - B

Answer any two questions from the following questions: -

10 × 2

5. a) Design a DFA for a language accepting set of binary strings which when converted into decimal will be divisible by 5. 5
b) Convert the following DFA to a regular expression, using the state-elimination technique:

	0	1
→ *p	s	p
q	p	s
r	r	p
s	q	r

5

6. a) The set of 0's and 1's that are of the form ww^R , that is, some string followed by its reverse. Prove that the above language is not Regular.

6

b) Convert the following NFA to a DFA:

	0	1
$\rightarrow p$	$\{p, q\}$	$\{p\}$
q	$\{r, s\}$	$\{t\}$
r	$\{p, r\}$	$\{t\}$
*s	$\emptyset$	$\emptyset$
*t	$\emptyset$	$\emptyset$

4

7. a) Prove or disprove that DFA and NFA are equivalent.

5

b) What do you mean by ambiguous grammar?

2

c) The set $\{0^n 1^n \mid n \geq 1\}$, that is, the set of all strings of one or more 0's followed by an equal number of 1's. Design a context free grammar for the above language.

2

d) What are the abstract models of regular language?

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