

2017**M.Sc.****2nd Semester Examination****COMPUTER SCIENCE****PAPER—COS-202***Full Marks : 50**Time ; 2 Hours**The questions are of equal value.**The figures in the right-hand margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Illustrate the answers wherever necessary.***Module—1****(THEORETICAL COMPUTER SCIENCE)***(Marks : 25)*Answer any two questions : 2×10

1. (a) Define a finite automation.
- (b) Construct a deterministic finite automaton accepting the set of all strings over $\{a, b\}$ ending in abb .

(Turn Over)

- (c) Construct a Moore machine equivalent to the Mealy machine defined by the following table :

Present State	Next State			
	a = 0		a = 1	
	State	Output	State	Output
→ q ₁	q ₁	1	q ₂	0
q ₂	q ₄	1	q ₄	1
q ₃	q ₂	1	q ₃	1
q ₄	q ₃	0	q ₁	1

2+4+4

2. (a) Find a grammar generating :

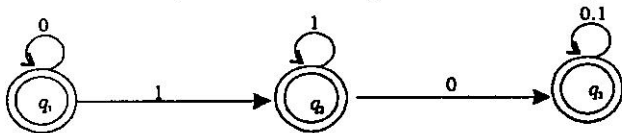
$$\{a^j b^n c^n \mid n \geq 1, j \geq 0\}.$$

- (b) Examine if the following two productions are type 1 productions or not :

(i) $AB \rightarrow AbBc$

(ii) $AB \rightarrow BCA$

- (c) Obtain the regular expression accepted by hte FA described by the following transition diagram :



4+2+4

3. (a) Show that $L = \{a^p \mid p \text{ is a prime}\}$ is not regular.

(b) Reduce the following grammar to CNF :

$S \rightarrow bBA, A \rightarrow aB \mid bAB$

$B \rightarrow c, D \rightarrow d$

5+5

4. (a) Construct a grammar in Breibach normal form equivalent to the following grammar :

$S \rightarrow AA \mid a, A \rightarrow SS \mid b$

(b) Construct a pda accepting $\{a^n b^m a^n \mid m, n \geq 1\}$ by null store.

5+5

[Internal Assessment : 5 Marks]

Module—2

(SOFTWARE ENGINEERING)

(Marks : 25)

Answer any two questions :

2×10

1. (a) With the help of a schematic diagram explain the major phases in the spiral model of software development.

(b) When does the project planning activity start and end in a software life cycle ? List the important activities

software project managers perform during project planning. 6+(2+2)

2. (a) As an analyst of a large software development project, discuss the aspects of the software product you would include in the SRS document? What would be the organization of your SRS documents.
- (b) Why is the SRS document also known as the black-box specification of a system? (3+4)+3
3. (a) What do you understand by the term system testing? What are the different kinds of system testing that are usually performed on large software products?
- (b) Assume that the size of an organic type software product has been estimated to be 45,000 lines of source code. Assume that the average salary of engineers is Rs.25,000 per month. Determine the cost of the software using Basic COCOMO. (2+3)+5
4. Short notes (any two) : 2×5
- (a) LOC ;
- (b) Feasibility study ;
- (c) Risk Management ;
- (d) Basic COCOMO ;
- (e) Define software 'Reliability' and 'Availability'.

[Internal Assessment : 5 Marks]