2018

M.Sc.

2nd Semester Examination

COMPUTER SCIENCE

PAPER—COS-202

Subject Code—26

Full Marks : 50

Time : 2 Hours

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) Construct DFA accepting all strings over {0, 1} containing the substring 010.

(b) Consider the grammar G :

$S \rightarrow as/bs/a/b.$

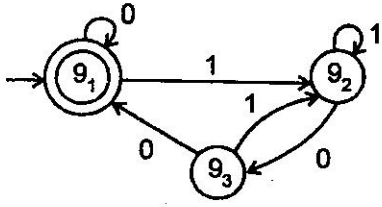
Find the language L(G) generated by the given grammar.

(c) Find a grammar generating

$L = \{a^m b^n \mid m > n;\ m, n \geq 1\}$. 4+2+4

2. (a) Prove that $(a + b)^* = a^* (ba^*)^*$

(b) Construct the regular expression corresponding to the state diagram described below :



(c) Construct the regular grammar G generating the regular set represented by R.E.= $a^*b(a + b)^*$

2+5+3

3. (a) Show that the language $L\left\{a^{i^2} \mid i \geq 1\right\}$ is not regular.

(b) Find an equivalent grammar without any null production :

$S \rightarrow as / AB$

$A \rightarrow \wedge$

$B \rightarrow \wedge$

$E \rightarrow a$

(c) Reduce the following grammar into CNF :

$S \rightarrow aAbB$

$A \rightarrow aA / a$

$B \rightarrow bB / b$ 5+2+3

4. (a) Consider the following grammar :

$S \rightarrow SS$

$S \rightarrow 0S1 / 01$

Find an equivalent grammar in GNF.

(b) Construct a PDA accepting by empty store for the following language.

$$L = \left\{ a^h \ b^{2h} \mid n \geq 1 \right\}$$

5+5

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 evolutionary model of software development.

(b) Compare the different life cycle models based on the types of software development. 6+4

2. (a) What is SRS ? Why do we need SRS ?

Briefly mention the organizational structure of a SRS ? 2+2+4

(b) What do you mean by the term 'phase containment of error'. 2

3. (a) What is Cohesion and Coupling ? Is it good to have high Cohesion and low Coupling in software design ? Give reason for your answer ? 1+4

(b) What do you understand by the term software testing ? What are the different kinds of software testing that are usually performed on large software products ? 1+4

4. Write short notes (any *two*) : 2×5

(a) Feasibility study ;

(b) Characteristics of good design ;

(c) Phase entry and exit criteria ;

(d) Black box and White box testing.

[Internal Assessment : 10 Marks]

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