Total number of printed pages-6

3 SEM BCA (CBCS) 2

2018

(December)

COMPUTER APPLICATION

Paper : 3·2

(FLA)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks : 1×5=5

   (a) The automata associated with regular language is _____ .

   (b) A PDA can't function if the _____ is empty.

   (c) A _____ automata has two tapes.

   (d) A recursive enumerable language is recognized by _____ .

   (e) The output of a Moore machine depends on _____ .

Contd.

2. Answer the following questions : 2×5=10

(a) What are closure properties of regular set ?

(b) Write the conditions that a tree must satisfy to be a derivation tree.

(c) Write *two* applications of finite automata.

(d) Define useless variable with example.

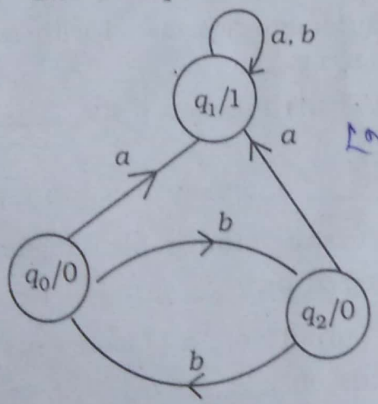
(e) Describe in English the languages associated with the following RE's :

(i) $\left(a^*(a+bb)^*\right)^*$

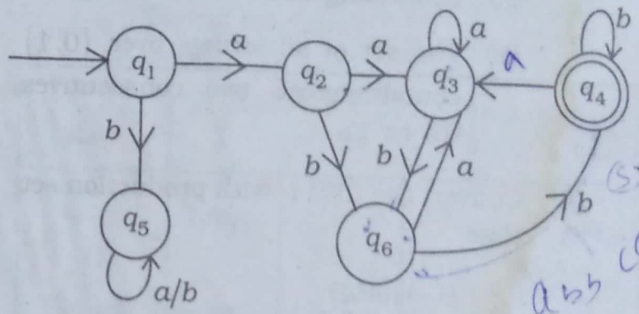
(ii) $((a+b)a)^*$

3. Answer ***any five*** of the folloing : 3×5=15

(a) Convert the following Moore machine into an equivalent Mealy machine :



(b) Consider the following transition diagram :



Construct a minimum state automata for the above diagram.

(c) Draw the transition diagram for the following regular expression :

$$ab\,(a+b)^*\,ba$$

(d) Show that the grammer is ambiguous

$S \rightarrow SbS$

$S \rightarrow a$

(e) Find out the regular expression :

(i) The set of all strings over $\{0, 1\}$ containing odd number of characters.

(ii) The set off all strings over $\{a, b\}$ containing *bbbb* as substring.

(iii) The set of all strings over $\{0, 1\}$ containing no two consecutives 0's or 1's.

(f) Convert the CFG *G* with production set *P* as

$S \rightarrow aAbB$
$A \rightarrow Ab/b$
$B \rightarrow Ba/a$
to CNF.

4. Answer ***any three*** of the following : 10×3=30

(a) Describe variations of Turing machines with suitable diagram. 10

(b) Describe the functioning of the following automata with a diagram : 10

(i) PDA

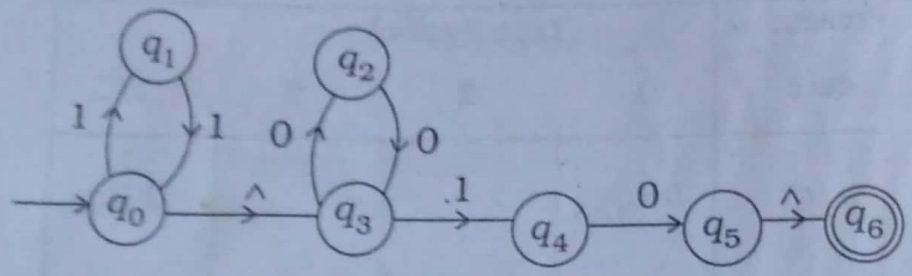
(ii) LBA

(c) Construct the computation sequence for string 1213, 2133 for the given Turing machine 10

Present State	Tape Symbol 1	2	3	b/□
$\rightarrow q_1$	bRq_2			bRq_1
q_2	$1Rq_2$	bRq_3		bRq_2
q_3		$2Rq_3$	bRq_4	bRq_3
q_4			$3Lq_5$	bLq_7
q_5	$1Lq_6$	$2Lq_5$		bLq_5
q_6	$1Lq_6$			bRq_3
$\rightarrow q_7$				

(d) Consider the DFA with $\wedge$-moves.

(i) Obtain an equivalent automaton without $\wedge$-moves.



(ii) What is the use of $\wedge$ moves ?

(iii) Write down various ways of removing $\wedge$ moves with suitable examples.