

Roll No. ....

23

**M.Tech. 1st Semes  
Examination -  
MATHEMATICAL FOUNDATIONS  
SC**

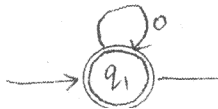
Paper : M

Time : Three hours ]

Before answering the questions  
have been supplied the correct  
complaint in this regard, will be

**Note :** Attempt any *five* of

- (a) Make a DFA that  
with aab.
- (b) Construct a regular  
the state diagram.



**Computer Engg.)  
December, 2013  
QUESTION OF COMPUTER  
SC**

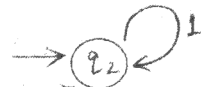
603 - A

[ Maximum Marks : 100

Candidates should ensure that they  
complete question paper. No  
changes should be made  
after examination.

ns.

- all the strings that ends  
10
- expression corresponding to  
10



<https://www.ndppapers.com>

2. (a) Prove pumping lemma for regular language and also prove that a language  $L = \{0^s \mid s \text{ is a perfect square}\}$  is not regular. 10
- (b) Prove that the language  $L = \{0^n 1^n 2^n \mid n \geq 1\}$  is not a CFL. 10
3. (a) Design a top-down parser for the following CFG and parse the string 'aabba'. 14

$$S \rightarrow XY$$

$$X \rightarrow aX \mid b$$

$$Y \rightarrow bY \mid a$$

- (b) Explain LBA. 6
4. (a) Design a T.M. to implement proper subtraction. The machine computes  $m-n$  if  $m > n$  and the output is 0 if  $m < n$ . 14
- (b) Explain UTM. 6
5. (a) Explain T.M. as a counter. 8
- (b) Design a T.M. to accept the language of all strings of even and odd length. 12
6. (a) If two languages  $L_1$  and  $L_2$  are recursive enumerable then their union  $L_1 \cup L_2$  is also recursive enumerable. 12
- (b) Explain the Halting problem of T.M. 8

8. Write short notes on :

- |                         |                 |    |
|-------------------------|-----------------|----|
| (i) Primitive recursive | on with example | 10 |
| (ii) Multi-tape and mul | l T.M.          | 10 |