**Plagiarism is strictly prohibited.**

**If found guilty, both offender and supporters will be penalized.**

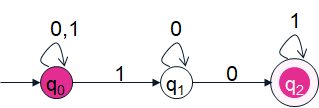
**Section: A (Answer any 2 Questions)**

1. (a) Draw FSA that accepts the set of Natural numbers **Marks: 6.5+6+5**

divisible by 2

(b) Show which one of 52536 and 35327 is acceptable and rejectable,

(c) For the following DFA define the equivalent Regular Expression (RE)



1. (a) Construct the Context-Free Grammar over {a, b, c} which consists of strings with at least two “a” and one “c” **Marks: 4+8+5.5**

(b) Give 2 examples of the Grammar in Q2(a)

(c) Given the following Regular Expression,

**0\*1(0+1)\*1(0+1)\***

Draw the corresponding expression **ε-NFA**

1. Given L(**F**) = {a, b, d} and L(**N**) = {1, 2, 3} **Marks: 5+3+5+4.5**
2. Find L(F).L(N) that is Concatenation.{a2, b3}
3. What is the length of L(F) ∪ L(N).L(N) Union and then concatenation

(c) What is the length of

(i) and (ii)

(d) we define a Language over the given Alphabet T .

**G2 = { < {a, b}>, < {X, Y}>, X, F2}**

where F2 is given by the rules 1. X → aYa 2. Y → aYa and 3. Y → b

Consider the Grammar Generates anban where n > 0

Deduce the string aaaaaabaaaaaa

**Section: B (Answer any 2 Questions)**

1. (a) Design a code which corrects One error & have 8 code words. **Marks: 8.5+5+2+2**

(b) Give 2 examples of data received and corrected.

(c) What will be the minimum hamming distance for error checking

(d) What will be the minimum hamming distance for error correction

1. Following is the Annual Development Program (ADP) data of for a Country **Marks: 12.5+2.5+2.5**
2. Construct Huffman's algorithm for Optimal Code.
3. Find the Price Incurred by Huffman’s code.
4. Find the Price incurred by normal binary coding.

| Financial Year | Amount in Crore Tk. |
| --- | --- |
| 2011-12 | 70,600 |
| 2012-13 | 105,400 |
| 2013-14 | 119,300 |
| 2014-15 | 125,700 |
| 2015-16 | 132,200 |
| 2016-17 | 140,500 |
| 2017-18 | 145,700 |
| 2018-19 | 170,600 |
| 2019-20 | 215,600 |
| 2001-21 | 245,700 |

1. Construct a FSR for a Language over **A** = {a, b, c, d} which consists of strings that include ‘dbaa’. **Marks: 5.5+4+4+4**
2. Make a diagram
3. a transition matrix
4. Regular Grammar.
5. Show 2 examples.