JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2021
FORMAL LANGUAGES AND AUTOMATA THEORY
(Common to CSE, IT)

Time: 3 Hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

1.a) Convert the following Mealy Machine in to an equivalent Moore Machine. (figure 1)
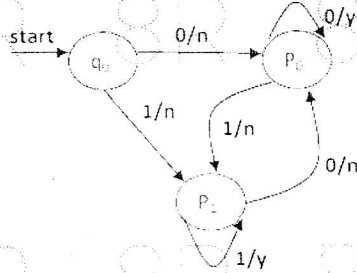

Figure 1

b) Convert the following NFA into equivalent DFA. [8+7]

δ	0	1
$\rightarrow q_0$	$\{q_0, q_1\}$	q_1
$\textcircled{q_1}$	Φ	$\{q_0, q_1\}$

2.a) Construct Moore for the input from $(0+1)^*$ that give residue modulo 4 of input treated as binary.

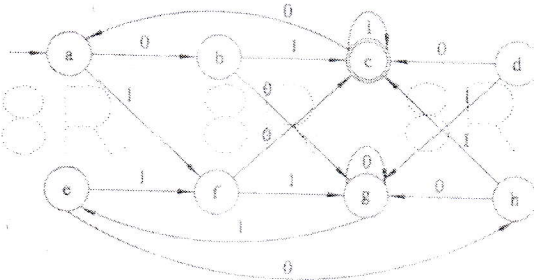b) Construct the minimum state automata equivalent to the following. (figure 2) [7+8]

Figure 2

3.a) Describe the following sets by regular expressions.
i) The set of all strings of a's and b's beginning with 'aa'
ii) The set of all strings of a's and b's beginning with 'b' and ending with 'aa
iii) The set of all strings of a's and b's with atleast two consecutive a's

b) State pumping lemma for regular languages. Prove that the following language $\{a^n \mid n$ is a prime number$\}$ is not a regular. [8+7]