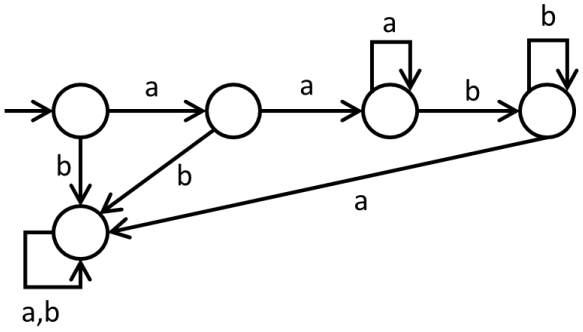
Charotar University of Science and Technology [CHARUSAT]
Faculty of Technology and Engineering
U & P U. Patel Department of Computer Engineering

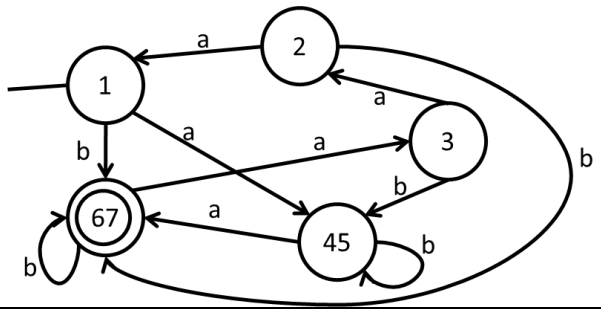
Subject: CE 349 Theory of Computation
Unit Test-I solution

Semester: 6th B.Tech. (CE) **Maximum Marks: 30**
Date: 21/01/2020 (Tuesday) **Time: 09:10 to 10:10 a.m.**

Q:2	**Answer following questions**	**[10]**
(a)	Print addition of current bit and previous bit	**[02]**
(b)	**Attempt Any TWO Questions.**	**[08]**
1	(i) b* | b* a b* | b* a b* a b* OR b* a? b* a? b* (ii) (aa|bb) (a|b)* (aa|bb) (iii) b* (ab*a)* b* OR b*(ab*ab*)* (iv) (b|abb)*	
2	P(n) : 7 + 13 + 19 + … + (6n+1) = n(3n+4) for n>=1 Basic step: For n=1 P(1) : 6(1)+1 = 1(3(1)+4) LHS = 6(1)+1 = 6+1 =7 RHS = 1(3(1)+4) = 3+4 = 7 LHS =RHS For P(1) is true Induction hypothesis: P(k) : 7 + 13 + 19 + … + (6k+1) = k(3k+4) is true for every k where 1<=k<=n Statement to be prove in induction step: P(k) : 7 + 13 + 19 + … + (6(k+1)+1) = (k+1) (3(k+1)+4) Proof of induction step: LHS = 7 + 13 +19 + … + (6(k+1)+1) = 7 + 13 +19 + … + (6k+1) + (6(k+1)+1) = k(3k+4) + (6(k+1)+1) = 3k2+4k + 6k + 6 +1 = 3k2+10k +7 RHS = (k+1) (3(k+1)+4) = 3(k+1)2 + 4(k+1) = 3(k2+2k+1) + 4k + 4 = 3k2 + 6k + 3 + 4k + 4	

	=3k2 + 10k + 7 So LHS =RHS So P(K+1) is true So P(n) is true for all n>=1	
3		
4		

	0	1
→ {q0}	{q0, q3}	{q0, q1}
{q0, q3}	{q0, q3, q4}	{q0, q1}
{q0, q1}	{q0, q3}	{q0, q1, q2}
* {q0, q3, q4}	{q0, q3, q4}	{q0, q1, q4}
* {q0, q1, q2}	{q0, q2, q3}	{q0, q1, q2}
* {q0, q1, q4}	{q0, q3, q4}	{q0, q1, q2, q4}
* {q0, q2, q3}	{q0, q2, q3, q4}	{q0, q1, q2}
* {q0, q1, q2, q4}	{q0, q2, q3, q4}	{q0, q1, q2, q4}
* {q0, q2, q3, q4}	{q0, q2, q3, q4}	{q0, q1, q2, q4}

Q:3	**Answer following questions [Any Two]**	**[10]**
1	0-equivelant [1 2 3 4 5] [6 7] 1-equivelant [1 2] [3] [4 5] [6 7] 2-euivelant [1] [2] [3] [4 5] [6 7] 	

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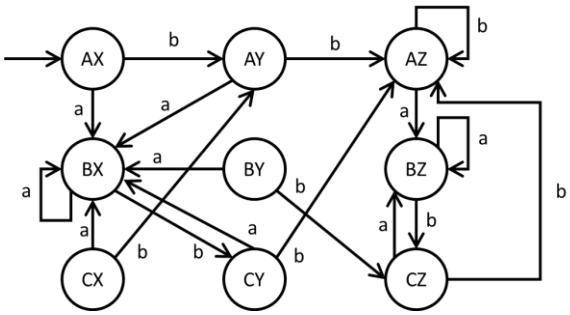
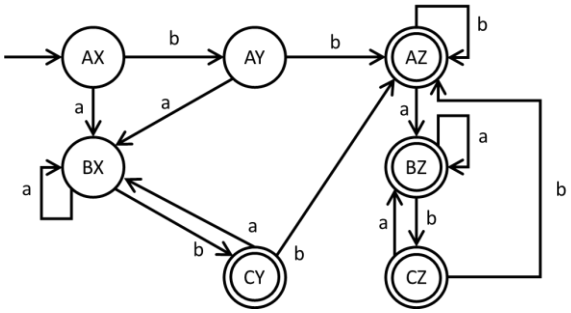
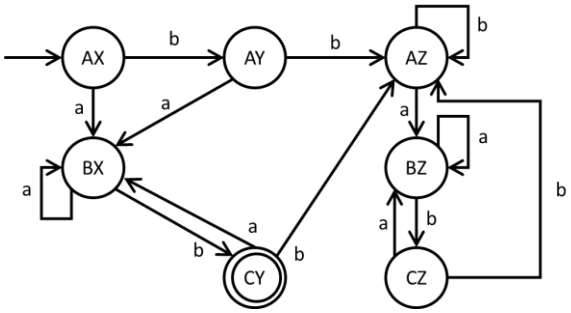
	a	b
AX	BX	AY
AY	BX	AZ
AZ	BZ	AZ
BX	BX	CY
BY	BX	CZ
BZ	BZ	CZ
CX	BX	AY
CY	BX	AZ
CZ	BZ	AZ



For L1 U L2



For L1 – L2



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