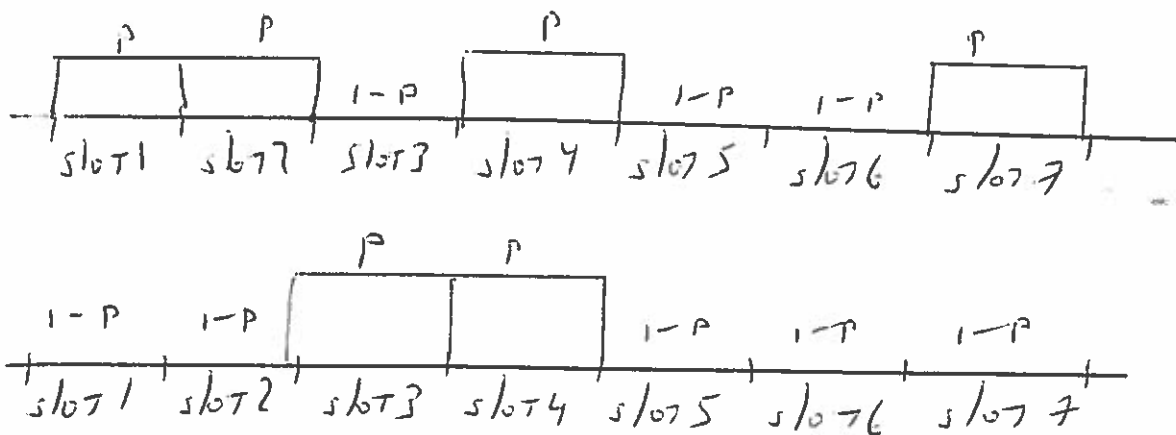NAME:_____ Circle: ESE or CS/IS

Midterm   ESE/CSE 346   T. Robertazzi   Spring 2020

Answer all questions. Total is 20 points: Q1:8 pts, Q2: 6 Pts, Q3: 6
pts. Show any work.

1. There are two independent Bernoulli streams of packets. The
   independent probability of a packet arrival in a slot is p. The independent
   probability of no packet arrival in a slot is 1-p. Answer all questions.

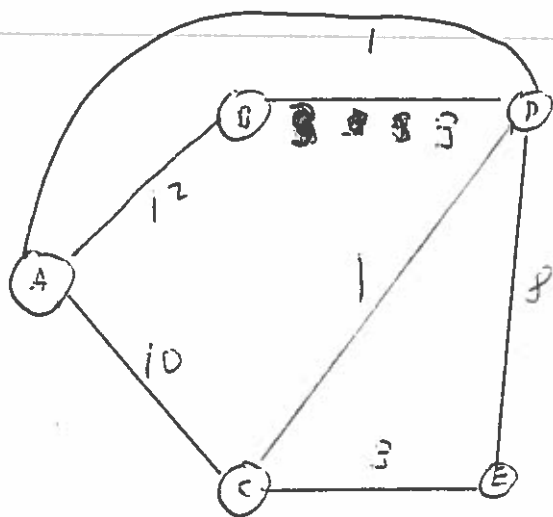[a] Find Prob[top diagram sequence shown]:

[b] Find Prob[both diagrams sequences shown]:

[c] Find Prob[on one stream, 4 packets in 7 slots in any order]:

[d] Find Prob[on one stream a single packet in 2 slots]:

2. Is there an error for a CRC code received packet 1100111011? The check
   bits are in included. Let G(x) be 10011. Show work.

3. Create the Dijkstra algorithm table for this network. This is a shortest
   path problem. Node A is the root. Only include distances in the tables,
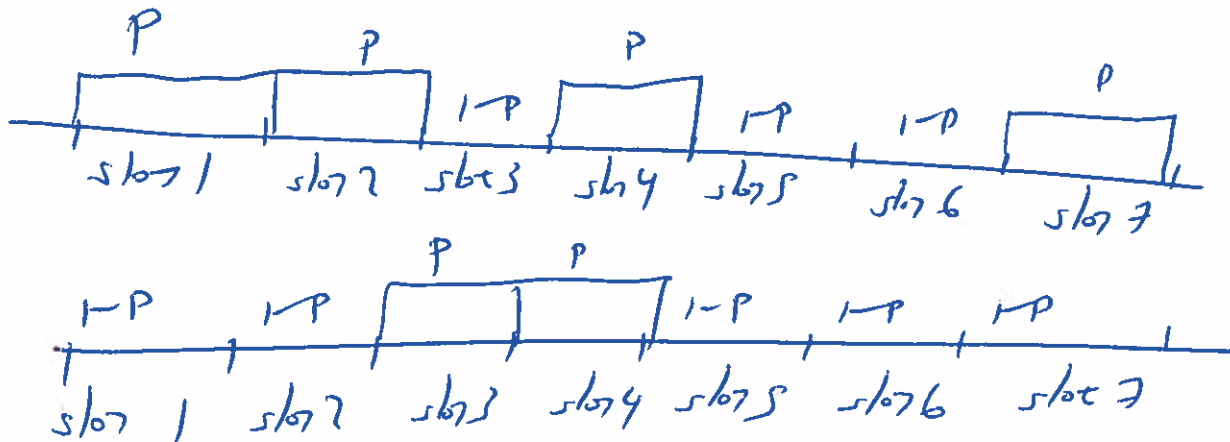   not pointers. Label the columns from left to right B C D E.

Q1: 8 points, Q2 and Q3: 6 points each   Total = 20 points

Answer all questions show all work

(a) Prob [Top diagram sequence] = $P^4(1-P)^3$

(b) Prob [both diagram sequence] = $P^6(1-P)^8$

(c) Prob [on one stream, #4 packets in 7 slots in any order] = $\binom{7}{4} P^4 (1-P)^3$

(d) Prob [single packet in any 2 slots] = $2P(1-P)$

?

$$10011\,\overline{)\,11\;0011\;\;101\textcircled{0}1}\;\;\text{check}\quad \text{bib}$$

$$10011\downarrow$$

$$10101$$

$$10011\;\;\curvearrowright$$

$$11010$$

$$10011\;\;\downarrow$$

$$10011$$

$$10011$$

$$000\;1$$

$$\uparrow$$
remainder
error!

3
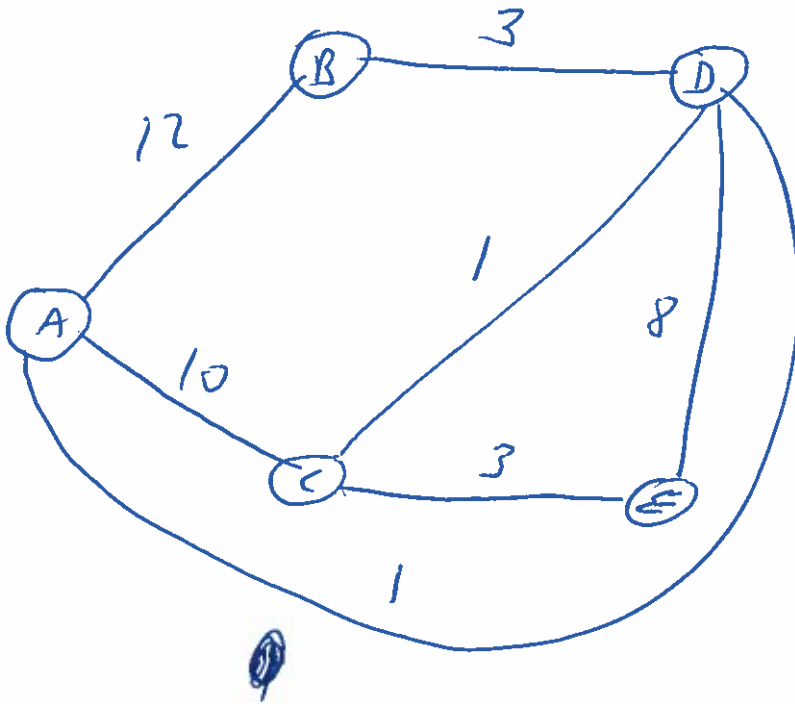
N	B	C	D	E
1 {A}	12	10	⓪	∞
2 {A, D}	4	2	①	9
3 {A,C,D}	4	②	1	5
4 {A,B,C,D}	④	2	1	5
5 {B} {A,B,C,E}	4	2	1	⑤