

การสอบกลางภาค ประจำภาคการศึกษาที่ 1

ปีการศึกษา : 2549

วันที่ : 4 สิงหาคม 2549

เวลา : 13:30 - 16:30

วิชา : 240-361 Introduction to Queueing Theory

ห้อง : A403

ทุจริตในการสอบ โทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริต และพักการเรียนหนึ่งภาคการศึกษา

<u>คำสั่ง</u>

- 1. ข้อสอบมี 8 ข้อ 7 หน้า (ไม่รวมปก)
- 2. ห้ามนำเครื่องคิดเลขเข้าห้องสอบ
- 3. <u>อนุญาตให้จดบันทึกเขียนด้วยลายมือขนาด A4 1 แผ่น เข้าห้องสอบ</u>
- 4. แสดงวิธีทำและเขียนคำตอบให้ชัดเจน ถ้าอ่านไม่ออกถือว่าตอบผิด

รหัสนักศึกษา :	ชื่อ :	ตอน :

คำถาม	1	2	3	4	5	6	7	8	Total	
คะแนน									<u>.</u>	\neg

Student ID:	Name :	Section :
711111111111111111111111111111111111111		

1. Suppose a cellular telephone is equally likely to make zero handoffs (H_0) , one handoff (H_1) , or more than one handoff (H_2) . Also, a caller is either on foot (F) with probability 5/12 or in a vehicle (V). Suppose we also learn that $\frac{1}{4}$ of all callers are on foot making calls with no handoffs and that 1/6 of all callers are vehicle users making calls with a single handoff. Given these additional facts, find all possible ways to fill in the table of probabilities.

Probability table

	H₀	H₁	H ₂
F V	Po	p ₁	p ₂
	90	q ₁	q ₂

Answer				 	
	 	····		 	

2. In a packet voice communications system, a source transmits packets containing digitized speech to a receiver. Because transmission errors occasionally occur, an acknowledgment (ACK) or a nonacknowledgment (NAK) is transmitted back to the source to indicate the status of each received packet. When the transmitter gets a NAK, the packet is retransmitted. Voice packets are delay sensitive and a packet can be transmitted a maximum of d times. If a packet transmission is an independent Bernoulli trial with success probability p, answer the following questions. What is the PMF of T, the number of times a packet is transmitted?

nswer	

Stu	dent ID:	Name ;	Section:
3.	To commun	icate one bit of information reliabl	y, cellular phone transmit the same binary
	symbol five	times. Thus the information "zer	ro" is transmitted as 00000 and "one" is
			ation if three or more binary symbols are
	received cor	rectly. What is the information er	ror probability $P[E]$, if the binary symbol
		ility is $q = 0.1$?	
Ar	-		

_			
	· · · · · · · · · · · · · · · · · · ·		4
····			
·			
4.			ion line is 10 ⁻¹ . Find the probability that a
	block of 100	00 bits has five or more errors	
Ar	iswer		
_			

		11000	

Student ID:	Name:	Section :
5. Connection re requests in a r		ng to a Poisson process with intensity $\lambda = 5$
(a) What is the pr	obability that exactly 2 new requ	sests arrive during the next 30 seconds?
Answer		
	446	
(b) If a new con	nection request has just arrived	at the server, what is the probability that it
	0 seconds before next request ar	
	_	
was a second of the second of		
F144		
	W-V	

Stud	ent ID:	Name:	Section:
6. 4	A corporate Web serve	er records hits (requ	nest for HTML document) as a Poisson process at
â	a rate of 10 hits per so	econd. Each page is	s either an internal request (with probability 0.7)
1	from the corporate int	ranet or an external	l request (with probability 0.3) from the Internet.
(Over a 10-minute inte	val, what is the join	nt PMF of I, the number of internal requests, and
4	X, the number of exter	nal requests?	
Ans	wer		

	A 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	***************************************	

Student ID:	Name :	Section:
connection other particular transmit During success starts tra	al mobile phone transmits one packet in every ion. With probability $p = 0.1$, a packet is received. To avoid wasting transmitter power water enters a timeout state whenever five consect a timeout, the mobile terminal performs an probability $q = 0.01$ in every slot. When a substansmitting in the next slot as though no packet	eived in error, independent of any then the link quality is poor, the utive packets are received in error. independent Bernoulli trial with access occurs, the mobile terminal
Markov	chain for this system.	
Answer		
Answer		

Sti	udent ID :	<u>Name :</u>	Section:
8.	In each time	slot, a router can either stor	re an arriving data packet in its buffer or forward a
	stored packe	et (and remove that packet	from its buffer). In each time slot, a new packet
	arrives with	probability p , independent c	of arrivals in all other slots. This packet is stored as
	long as the re	outer is storing fewer than c	packets. If c packets are already buffered, then the
	new packet	is discarded by the router.	If no new packet arrives and $n > 0$ packets are
	buffered by	the router, then the router	will forward one buffered packet. That packet is
	then remove	ed from the buffer. Let X_n	denote the number of buffered packets at time n .
	Sketch the M	Markov chain for X_n and find	the stationary probabilities.
Aı	nswer		

		MM _{2.2} yy,	
www.harrin			