

Examination : Final Examination Academic year : 2004

Date: 24 Feb 2005 Time: 13:30 - 16:30

Subject: 240-361 Introduction to Queueing Theory Room: R200

ทุจริตในการสอบ โทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริต และพักการเรียนหนึ่งภาคการศึกษา

## **NOTE**

- There are 4 questions, 8 pages (not include cover). Answer all questions.
- All questions are different marks.
- Calculator, textbooks and hand-out are prohibited.
- Each answer must be clear and show how to get the answer.

Student ID:Name:	Section :
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Question	1	2	3	4	Total
Marks	-				

Stu	ident ID:	Name :	Section :
1.	Consider a pa	cket stream whereby packets arrive acc	cording to Poisson process with rate 10
	packets/sec. I	f the interarrival time between any two	packets is less than the transmission
	time of the fir	rst to arrive, the two packets are said to	collide. Assuming the link capacity is
		=10 Mbps and packet length is 10 Kb	
		ide with either its predecessor or its s	-
		nother packet?	(10 marks)
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stu	ident ID: Name: Se	ection:
2.	A communication line capable of transmitting at a rate of 60 Kbits/sec will accommodate 10 sessions. Each session generates Poisson traffic. For the case of the capable of transmitting at a rate of 60 Kbits/sec will accommodate 10 sessions.	se where five
	of the sessions transmit at a rate of 300 packets/min while the other five tran of 60 packets/min. Packet lengths are exponentially distributed with mean 10	
	the average number of packets in queue, the average number in the syst	tem, and the
	average delay per packet when the line is allocated to the sessions by using  (a) 10 equal-capacity time-division multiplexed channels.	(18 marks)
Ar	nswer	(10 marks)
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Student ID	: Name :	Section :
(b)	Statistical multiplexing.	(10 marks)
(0)	Statistical multiplexing.	(10 marks)
Answer		
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Stı	ıdent ID :	Name:		Section :
3.	In M/M/2 queue	ing system, derive the follo	owing in term of $\mu$ and $\lambda$	
	(a) P <sub>n</sub>			(5 marks)
Aı	nswer			
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Student ID:	Name:	Section :
(b) N: average	ge number of packets in the system	(5 marks)
Answer		
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Student ID:	Name:	Section :
(a) T · overo	ge waiting time in the system	(2 marks)
(c) 1 averag	ge waiting time in the system	(2 marks)
Answer		
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<u>Stude</u>	nt ID: Name:	Section:
4	An M/M/1 queueing system in which the total number of jobs is limited	$\mathbf{d}$ to $K$ owing to a
li	mitation on queue size. Given $P_n = \frac{1-\rho}{1-\rho^{K+1}} \cdot \rho^n$	
	(a) Find the steady-state probability that the processor is idle.	(2 marks)
Ans	wer	
<u> </u>		
	(b) Find the steady state probability that an arriving request is rejequeue is full.	ected because the (2 marks)
Ans	•	(2 mans)
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(c)	Find the throughput of the system in the steady state.	(3 marks)
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	system for the 90th percentile?	(5 marks)
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