

93201A



## New Zealand Scholarship Statistics and Modelling, 2004

9.30 am Tuesday 16 November 2004

## ANSWER BOOKLET

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this Answer Booklet. Graph grids are printed on pages 3 and 22.

Show ALL working. Start each question on a NEW page. Number each question and part question carefully and legibly.

Check that this booklet has pages 2–22 in the correct order and that none of these pages is blank.

## YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

For Assessor's use only.	
Scholarship Criteria	
The student will:	
demonstrate an advanced level of statistical thinking	
apply probability theory and models to solve complex problems	
apply techniques of mathematical modelling to solve complex problems.	
Scholarship with Outstanding Performance Criteria	
<ul> <li>In addition to meeting the criteria for Scholarship, the student will:</li> <li>demonstrate sophistication of thinking across a range of concepts in the solution of problems</li> <li>in their solutions display logical development, precision and clarity across a range of concepts</li> <li>critically evaluate processes and solutions.</li> </ul>	
Overall Level of Performance	

## THIS PAGE HAS BEEN DELIBERATELY LEFT BLANK

Question number

		Ш					П		П				П										П			
	Ш									Н			Н													
-	-		-		Н		++		+	++			-	+		-	-					-	Н		Н	
					H		$\blacksquare$		$\blacksquare$	H			Н			$\blacksquare$			H			$\blacksquare$	Н		$\blacksquare$	
		ш							-		н		$\perp$						ш							
									#				$^{\dagger}$													
	ш		+		Н				-	Н			Н			+			ш				Н		ш	
	Ш	Ш	$\blacksquare$		П		$\blacksquare$		$\blacksquare$	H	$\blacksquare$		П			$\blacksquare$			Ш		$\blacksquare$	Н	П		$\blacksquare$	П
	ш	ш	#				-		-				$\blacksquare$						ш						$\blacksquare$	
	ш	ш			ш		#		#		ш		#						ш				ш		ш	
	ш																									
	$\vdash \vdash$			+	Н		-			-	+		Н		+++	++	++		ш	+++	++	-	Н		ш	
-	-		-		Н		-		-							-										
	ш	ш							-										ш						ш	
					Ш																					
							#																			
	$\Box$		H	H	Н	H	+		$\blacksquare$	H		$+\Pi$		+		H	+	HŦ		+		H	$\Box$	+	$\blacksquare$	H
		$\square$	$\blacksquare$				$\blacksquare$		$\blacksquare$	$\Box$				$\blacksquare$		$\Box$				$\Box$	$\Box$	$\Box$				Ш
	Ħ	Ħ	$\mp$		Ħ		#		#	Ħ			$\dagger$	#		#			ш	$\parallel$		$\forall$	Ħ	$\Box$	$\Box$	Ħ
	Ш	Ш	$\pm$		$\perp$				$\pm$		Ш		$\pm$	+	ш	$\pm$			Ш	#	Ш	$\pm$		$\perp$	$\blacksquare$	Ш
	Ш	Ш	$\pm$							Н										+					Ш	
	H	$\Pi$	H	H	F	H	H		H	F	H	+	H	H		H	H		H	$\blacksquare$	$\blacksquare$	H	F	$\blacksquare$		H
		Ш	#	H			$\blacksquare$		$\blacksquare$	H		$\Box$	$\blacksquare$	#		+			Ш	$\blacksquare$		$\Box$		$\Box$	$\blacksquare$	
	ш	Ш	#		H.	ш	#	ш	#	H	ш		$\bot$	#	#	#			ш	Щ	ш	#		ш	ш	Ш
	ш																									
	$\vdash \vdash$	+++	-		Н		-				н		+		+	++	++			+	++	-	Н		-	
	-		-		Н		-		-				-			-						-	Н			
	ш	ш							-				$\perp$						ш							
	ш																		ш						ш	
					Н																					
			+	+	Н		+		-	+			Н			+				+		+	Н		Н	
					H		-		-				Н						Ш				Н			
	ш	ш					$\blacksquare$						$\Box$						ш						$\blacksquare$	
	ш	Ш				Ш					Ш									$\pm \pm$	Ш				$\parallel$	Ш
	ш	ш	Ш	Ш	ш	Ш	ш		ш	Ш	ш		ш			Ш	ш		ш		ш	Ш	ш		ш	
			+		Н		-		-	+			Н			+				+		+	Н		Н	Н
	H				Н		-		-		Н		Н						Н				Н		Н	
	#		#		H	ш	#		#	H	ш		1	#		#	#	-	ш	#	ш	#	H		$\square$	ш
	ш				$\perp$	Ш				$\parallel$	Ш								ш	$\pm \pm$	Ш				ш	Ш
	Ш	Ш	Ш		Ш			Ш							Ш				Ш	$\boxplus$	Ш					Ш
	-									H			+													
	$\Box$		$\blacksquare$	F	H	H	$\blacksquare$		$\blacksquare$	H		+	H	+		H	$\Box$		H	+	$\Box$	$\Box$		$\blacksquare$	$\blacksquare$	H
			$\Box$				$\blacksquare$		$\blacksquare$	H	П	$\Box$		#		$\perp$			Ш	$\Box$		$\Box$		$\Box$	$\blacksquare$	
	$\Box$	ш	$\forall$		$\Box$		$\dagger$		#	Ħ			$\dagger$	$\forall$		#			ш	$\Box$		$\forall$			ш	Ħ
	Ш	Ш	$\pm$		Ш	Ш		Ш		$\perp$			$\pm$			$\pm$			Ш	$\boxplus$	Ш	$\pm$			Ш	Ш
			$\blacksquare$		H		$\blacksquare$			H			T			$\blacksquare$										
	H	H	#	$\Box$	H		+	Н	#	Ħ	Н		#	#	$\Box$	#			H	$\blacksquare$	Ħ	#	H	$\Box$	$\blacksquare$	H
	ш		#		ш	ш	#				ш			#			1		ш		ш	ш			ш	ш
																			Ш						Ш	Ш
		Ш								H			$\mathbb{H}$			+										
			#		H		-		-	$\Box$				-		#				+		-	H		$\blacksquare$	
			#							Ħ	Ш					#			ш	$\Box$					$\parallel$	Ш
	Ш	Ш	$\pm$		$\perp$	Ш		Ш	+				$\pm$	#		$\pm$			Ш	$\pm$	Ш	$\pm$			Ш	Ш
	H	$\Box$	$\blacksquare$	H	H	H	$\blacksquare$	Н	$\blacksquare$	H	H	$\blacksquare$	H	$\blacksquare$	H	H	$\Box$		П	$\blacksquare$	H	H	H	$\blacksquare$	H	H
	H	Ш	#	+	$\vdash$		+	Н	+	Ħ	Н	$\Box$	$\perp$	#		#			ш	$\Box$	H	#		$\perp$	Н	H
	$\Box$				$\vdash$		$\dagger$		#	$\Box$			+						ш				$^{\dagger}$		$\parallel \parallel$	ш
																										Ш
		$\Box$	+			ш		Ш		$\Box$		$\perp$	$\perp$						$\perp$							$\sqcup$

Question number	

Question number	

Question number	

Question number	

Assessor's use only	

Question	
number	

Question number	

	Assessor's use only
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	

0 "	
Question number	
-	

Question number

Assessor's use only	
use only	

Question	
number	
-	

	Assessor's use only
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	
_	

Question	
Question number	

Assessor's use only Question number

Assessor's use only Question number

Question	
number	

Question number	

	As	ssesso ise or	or's nly
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			
_			

Question number	

	Assessor's use only
-	
-	
-	
_	
_	
_	
_	
_	
_	
-	
_	
-	
-	
_	
_	
_	
-	
_	
-	
-	
-	
_	
_	

Question	
Question number	

Assessor's use only

Question number	
number	
-	

assessor's use only	

Question number	

Question number