

# ESCUELA SUPERIOR POLITECNICA DEL LITORAL

Administración de Operaciones

Examen Final

Term. 1, 2017

Yo, ....., al firmar este compromiso, reconozco que el presente examen está diseñado para ser resuelto de manera individual, que puedo usar una calculadora ordinaria para cálculos aritméticos, un lápiz o esferográfico; que sólo puedo comunicarme con la persona responsable de la recepción del examen; y, cualquier instrumento de comunicación que hubiere traído, debo apagarlo y depositarlo en la parte anterior del aula, junto con algún otro material que se encuentre acompañándolo. No debo además, consultar libros, notas, ni apuntes adicionales a las que se entreguen en esta evaluación. Los temas debo desarrollarlos de manera ordenada. Como estudiante de ESPOL me comprometo a combatir la mediocridad y actuar con honestidad, por eso no copio ni dejo copiar. Firmo al pie del presente compromiso, como constancia de haber leído y aceptar la declaración anterior.

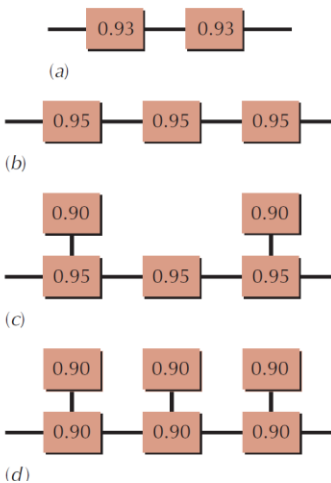
Firma: ..... Nro.Matrícula: .....

Paralelo: .....

1.) The Hardware Warehouse is evaluating the safety stock policy for all its items, as identified by the SKU code. For SKU M4389, the company always orders 80 units each time an order is placed. The daily demand is constant, at 5 units per day; the lead time is normally distributed, with a mean of 3 days and a standard deviation of 2. Holding cost is \$3 per unit per year. A 95% service level is to be maintained.

- (a) What is the standard deviation of demand during the lead time?
- (b) How much safety stock should be carried, and what should be the reorder point?
- (c) What is the total annual holding cost?

2.) Examine the systems given below. Which system is more reliable, a or b? c or d? Calculate the reliability of each system.



3.) Derek is disappointed in his high-speed Internet service. Although the Internet is seldom down, it kicks into slow mode quite often, which Derek considers to be a failure. He has tried three service providers with varying degrees of success. The number of failures in a typical eight-hour day and the average time to regain high-speed service are shown below. Derek must choose one of the following options. Calculate the system availability for each option. Which service would you recommend?

ISP	Number of Failures	Time to Regain Service
Xceptional	12	2 minutes
Yourizon	4	4 minutes
Zelltell	3	10 minutes

4.) Bowman Builders manufactures steel storage sheds for commercial use. Joe Bowman, president of Bowman Builders, is contemplating producing sheds for home use. The activities necessary to build an experimental model and related data are given in the accompanying table.

(a) Draw the network for this project.

(b) What is the project completion date?

(c) Formulate an LP problem to crash this project to 10 weeks. You do not need to solve it. Provide the objective, constraints, and labelled decision variables.

ACTIVITY	NORMAL TIME	CRASH TIME	NORMAL	CRASH	IMMEDIATE PREDECESSORS
			COST (\$)	COST (\$)	
A	3	2	1,000	1,600	—
B	2	1	2,000	2,700	—
C	1	1	300	300	—
D	7	3	1,300	1,600	A
E	6	3	850	1,000	B
F	2	1	4,000	5,000	C
G	4	2	1,500	2,000	D, E