

# ESCUELA SUPERIOR POLITECNICA DEL LITORAL

Administración de Operaciones

Primer Parcial

Term. 2, 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: .....

## Part 1

- 1.) A deterministic model is one in which
  - a. there is some uncertainty about the parameters used in the model.
  - b. there is a measurable outcome.
  - c. all parameters used in the model are known with complete certainty.
  - d. there is no available computer software.
  
- 2.) The EVSI
  - a. is found by subtracting the EMV without sample information from the EMV with sample information.
  - b. is always equal to the expected value of perfect information.
  - c. equals the EMV with sample information assuming no cost for the information minus the EMV without sample information.
  - d. is usually negative.
  
- 3.) If a rational person selects an alternative that does not maximize the EMV, we would expect that this alternative
  - a. minimizes the EMV.
  - b. maximizes the expected utility.
  - c. minimizes the expected utility.
  - d. has zero utility associated with each possible payoff.
  
- 4.) Productivity increases when:
  - a. Inputs increase while outputs remain the same.
  - b. Inputs decrease while outputs remain the same.
  - c. Outputs decrease while inputs remain the same.
  - d. Inputs and outputs increase proportionately.
  
- 5.) Services often
  - a. are tangible (can be touched).
  - b. are standardized.
  - c. are knowledge based.
  - d. all of the above.

6.) True or False: A value chain is a series of activities from supplier to customer that takes away value from a product or service.

Part 2

For the following questions, consider the following linear programming problem:

$$\begin{aligned} \max Z &= 7X_1 + 3X_2 \\ \text{s. t.} \quad X_1 + X_2 &\leq 10 \\ X_2 &\geq 4 \\ X_1, X_2 &\geq 0 \end{aligned}$$

7.) What should be the optimal values of  $X_1, X_2,$  and  $Z$ ?

8.) What should the shadow price be on each of the two constraints? (*Hint:* There should be 2 different shadow prices.)

9.) Based on your answer from question (5), what should the reduced cost be for  $X_2$ ?

Part 3

10.) Bill Holliday is not sure what she should do. He can either build a quadplex (i.e., a building with four apartments), build a duplex, gather additional information, or simply do nothing. If he gathers additional information, the results could be either favorable or unfavorable, but it would cost him \$3,000 to gather the information. Bill believes that there is a 50–50 chance that the information will be favorable. If the rental market is favorable, Bill will earn \$15,000 with the quadplex or \$5,000 with the duplex. Bill doesn't have the financial resources to do both. With an unfavorable rental market, however, Bill could lose \$20,000 with the quadplex or 10,000 with the duplex. Without gathering additional information, Bill estimates that the probability of a favorable rental market is 0.7. A favorable report from the study would increase the probability of a favorable rental market to 0.9. Furthermore, an unfavorable report from the additional information would decrease the probability of a favorable rental market to 0.4. Of course, Bill could forget all of these numbers and do nothing. What is your advice to Bill?

11.) Eddie Kelly is running for reelection as mayor of a small town in Alabama. Jessica Martinez, Kelly's campaign manager during this election, is planning the marketing campaign, and there is some stiff competition. Martinez has selected four ways to advertise: television ads, radio ads, billboards, and newspaper ads. The costs of these, the audience reached by each type of ad, and the maximum number of each is shown in the following table:

TYPE OF AD	COST PER AD	AUDIENCE REACHED/AD	MAXIMUM NUMBER
TV	\$800	30,000	10
Radio	\$400	22,000	10
Billboards	\$500	24,000	10
Newspapers	\$100	8,000	10

In addition, Martinez has decided that there should be at least six ads on TV or radio or some combination of those two. The amount spent on billboards and newspapers together must not exceed the amount spent on TV ads. While fundraising is still continuing, the monthly budget for advertising has been set at \$15,000. How many ads of each type should be placed to maximize the total number of people reached?

