ESCUELA SUPERIOR POLITECNICA DEL LITORAL

Administración de Operaciones
Mejoramiento
Term. II, 2018

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.) In decision theory, the minimum expected opportunity loss
   a. is always equal to the highest expected payoff.
   b. is always greater than the expected value with perfect information.
   c. Is always computed when finding the minimax regret decision.
   d. is always equal to the expected value of perfect information.

2.) If the Economic Order Quantity (EOQ) assumptions are met and a company orders more than the economic order quantity ($Q > Q^*$), then
   a. total annual holding cost will be greater than the total annual ordering cost.
   b. total annual holding cost will be less than the total annual ordering cost.
   c. total annual holding cost will be equal to the total annual purchase cost.
   d. total annual holding cost will be equal to the total annual ordering cost.

3.) True or False: Total factor productivity is a series of activities from supplier to customer that add value to a product or service.

4.) True or False: Sensitivity analysis determines how the solutions will change with a different model or input data.

5.) To _____ is to try to duplicate the features, appearance, and characteristics of a real system.

6.) The number of failures in a typical 8-hour day and the average time to regain service are shown below. Which internet provider is best? Show your work for complete credit.

Internet	Number of Failures	Time to Regain Service
A	10	2 minutes
B	8	4 minutes
C	3	10 minutes

7.) A presidential candidate has allocated $40,000 for advertising. Two types of ads will be used: newspaper and television. Each newspaper ad costs $200 and reaches an estimated 3,000 people. Each television ad costs $500 and reaches an estimated 7,000 people. The candidate would like to reach as many people as possible, but she has stipulated that at least 10 ads of each type must be used. Also, the number of newspaper ads must be at least as great as the number of television ads. How many ads of each type should be used? How many people will this reach?

8.) The activities necessary to complete a project and related data are given in the accompanying table.

Activity	Normal Time (weeks)	Crash Time (Weeks)	Normal Cost ($)	Crash Cost	Immediate Predecessors
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

(a) What is the expected project completion time?

(b) Formulate an LP problem to crash this project to 10 weeks. Note: You do not need to solve it. Make sure to include the objective function, decision variables (with labels), and constraints.

Equations

How to find Z: $Z = \frac{X-\mu}{\sigma}$

Economic Order Quantity: $EOQ = Q^* = \sqrt{\frac{2DC_o}{C_h}}$

Annual Ordering Cost: $Annual\ Ordering\ Cost = \frac{D}{Q}C_o$

Annual Holding Cost: $Annual\ Holding\ Cost = \frac{Q}{2}C_h$

Marginal Analysis with Discrete Distributions

Decision Rule: $P \geq \frac{ML}{MP+ML}$

Equations Related to Design of Goods and Services

$$MTBF \equiv Mean\ Time\ Between\ Failures$$

$$MTTR \equiv Mean\ Time\ to\ Repair$$

System Availability: $SA = \frac{MTBF}{MTBF+MTTR}$

Equations Related to Sales and Operations Planning

Optimal Probability of Demand or No-Shows= $\frac{C_u}{C_u+C_o}$

Where $Cost\ of\ Underbooking\ or\ Underestimating\ demand \equiv C_u$ and
$Cost\ of\ Overbooking\ or\ Overestimating\ Demand \equiv C_O$

Equations Related to Project Management

Expected Activity Time: $t = \frac{a+4m+b}{6}$

Variance of Activity Completion Time: $Variance = \left(\frac{b-a}{6}\right)^2$

Earliest Finish Time: $EF = ES + t$

Latest Start Time: $LS = LF - t$

Slack: $Slack = LS - ES\ or\ Slack = LF - EF$

Project Variance: $Project\ Variance = \sum Variance\ of\ Activities\ on\ the\ Critical\ Path$

Project Standard Deviation: $Project\ Standard\ Deviation = \sqrt{Project\ Variance}$

Value of Work Completed:
$Value\ of\ Work\ Completed = (Percent\ of\ work\ completed) *$
$(Total\ Activity\ Budgeted)$

Activity Difference: $Activity\ Difference = Actual\ Cost - Value\ of\ Work\ Completed$

Crash Cost per Time Period: $Crash\ Cost\ per\ Time\ Period = \frac{Crash\ Cost - Normal\ Cost}{Normal\ Time - Crash\ Time}$