

Question Paper

Exam Date & Time: 05-Feb-2019 (10:00 AM - 11:30 AM)



MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER MASTER IN HOSPITAL ADMINISTRATION DEGREE EXAMINATION - FEBRUARY 2019
SUBJECT: MHA 601 - OPERATIONS RESEARCH IN HEALTHCARE
(2017-2019 BATCH - REPEATER)
Tuesday, February 05, 2019 (10.00 - 11.30)

Answer all the questions.
Illustrate with diagrams, flowcharts wherever required.
Budget the time accordingly.

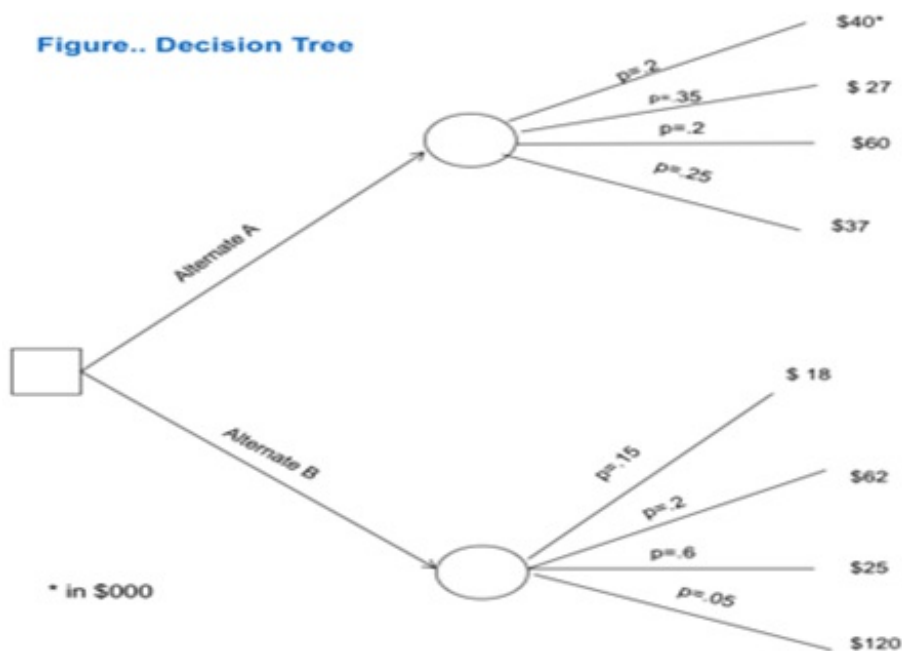
Marks: 50

Duration: 90 mins.

SECTION - A

Long Essays:

- 1) Describe the framework and barriers of a good decision analysis? Given the decision tree (10) in the figure below, which alternative should be chosen?



- 2) The mean arrival rate of a patient at the hospital registration with one server is 3 per minute, and the mean service rate is 4 patients. Suppose that $n = 2$ and $K = 5$, where n = number of patients in the system, and k = maximum length of the line. Calculate each of the performance measures. (10)
1. System utilization.
 2. Average number in line.
 3. Average number in system.
 4. Average time in line.
 5. Average time in system.
 6. Probability of zero units in the system.
 6. Probability of n units in the system.
 7. Probability the waiting line won't exceed K units.
 8. Average waiting time for an arrival not served immediately.

Hint to question 2	System utilization
<p>....</p> $r = \lambda / \mu$ $L = L_q + r$ $W_q = \frac{L_q}{\lambda}$ $W = W_q + \frac{1}{\mu}$	$\rho = \frac{\lambda}{s\mu}$ <p>---</p> $L_q = \frac{\lambda^2}{\mu(\mu - \lambda)} \quad P_0 = 1 - \frac{\lambda}{\mu}$ $P_n = P_0 \left(\frac{\lambda}{\mu}\right)^n$

SECTION - B

3. Short Essays:

- 3A) Mention some of the operation research tools to reduce variability/Improve logistic flows? (5)
- 3B) Write short notes on Scope of work in Project Management? (5)
- 3C) Name some of the commonly used Measures of Central Tendency? (5)
- 3D) Mention some of the averaging techniques for forecasting? Using the data from the table (5) mentioned below build forecasts with smoothing constant $\alpha = 0.5$.

Period(t)	Actual	Forecast	Error
1	15908		
2	15504		
3	14272		
4	13174		
5	10,022		
6			

- 3E) The available work time per physician day is 5 hours (physicians work 10 hours per day, but only 50 percent of that time is spent with patients), there are 8 physicians, and 100 patients are expected at the clinic every day. Calculate the Takt time? What do you infer from your results? (5)
- 3F) Draw a network diagram for the below mentioned activities: (5)

Activity	Predecessor activity	Duration
A	none	5 weeks
B	none	4 weeks
C	A	6 weeks
D	A	5 weeks
E	B	6 weeks
F	C	4 weeks
G	D & E	2 weeks

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