Question Paper

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER MASTER IN HOSPITAL ADMINISTRATION DEGREE EXAMINATION - NOVEMBER 2018
SUBJECT: MHA 601 - OPERATIONS RESEARCH IN HEALTHCARE
(2017-2019 BATCH - REGULAR)
Monday, November 26, 2018 (14.00 - 15.30)

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

Operations Research in Healthcare [MHA 601 - 2017]

Marks: 50   **Duration: 90 mins.**

Long Essays:

1)   What is process Mapping? What are the steps involved in process mapping? Why is   (10)
            process mapping important?
            This is a process of patients that need to undergo a protocol-based hip replacement, and
            return home after the hospital admission. Draw a process map the process can be
            described in operations management terms as a series of operations connected by the
            flow of patients inside a hospital.? Use flowchart symbols.
            - A referral by a general practitioner and the wait for the appointment with an orthopedic
            surgeon;
            - A first visit to an orthopedic surgeon in the outpatient department of a hospital;
            - A referral and X-ray examination at the radiology department;
            - A second visit to the orthopedic surgeon to discuss the results of the
            - Examination and the need for an operation and a hospital admission;
            - The placement of the patient on the waiting list and the wait before the admission;
            - The admission to the ward and the pre-operative stay;
            - The operation;
            - The post-operative stay at the ward;
            - The discharge;
            - A follow-up visit to the orthopaedic surgeon in the outpatient department;
            - The referral back to the general practitioner.
            Note: Waiting times and lead-times in the chain for patients with hip replacement.
            Second visit to the orthopaedic surgeon can take place on the same day, but the patient
            returns after 20 days to the orthopaedic surgeon for a follow-up visit of the admission.

Period	Description of period	Term	Duration
1	Time between the referral and the first visit	Access time	10 days
2	Time between first visit and second visit	Response time	60 minutes
3	Time between second visit and day of admission	Waiting time (on waiting list)	2 months
4	Time between discharge and follow-up visit	Follow-up time	20 days

2)   A multihospital system (MHS) owns twelve hospitals. Revenues (x, or the independent   (10)
            variable) and profits (y, or the dependent variable) for each hospital are given following.
            Obtain a regression line for the data and predict profits for a hospital with $10 million in
            revenues. All figures are in millions of dollars.

The coefficients of the line, a and b Equation

$$b = n(\Sigma xy) - (\Sigma x)(\Sigma y) / n(\Sigma x^2) - \Sigma x)^2$$
$$a = \Sigma y - b \Sigma x / n$$

Regression line equation $= y_x = a + bx$

Multihospital System Revenue and Profit Data

Hospital	Revenue(x)	Profit(y)	xy	x^2
1	7	0.15		
2	2	0.10		
3	6	0.13		
4	4	0.15		
5	14	0.25		
6	15	0.27		
7	16	0.24		
8	12	0.20		
9	14	0.27		
10	20	0.44		
11	15	0.34		
12	7	0.17		
Total				

3. Short Essays:

3A)　　What are the different types of forecasting Methods?　　(5)

3B)　　Name four operational research tools that can be used to reduce cost?　　(5)

3C)　　What does the letter designation for queuing model stand for (A/B/C/D)? Describe what each position of letter in Kendall notation entails?　　(5)

3D)　　Nurses in Unit A worked collectively a total of twenty-five hours to treat a patient who stayed five days, and nurses in Unit B worked a total of sixteen hours to treat a patient who stayed four days. Calculate which of the two similar hospital nursing units is more productive.　　(5)

3E)　　Draw a network diagram for the following:　　(5)
i) Activity **B** and **C** precedes **A**
ii) Activity **D** follows **B**
iii) Activity **E** follows **C**
iv) Activity **D** and **E** precedes **F**

3F)　　A pharmaceutical firm produces two products X and Y. Each unit of product X requires 3 hrs of operation I and 4 hrs of operation II, while each unit of product Y requires 4 hrs of operation I and 5 hrs of operation II. Total time available for operation I and II are 20 hrs and 26 hrs respectively. Product X sells at profit of 10 per unit, while Y sells at a profit of 20 per unit. Formulate the linear programming problem to determine the quantities of X and Y to be produced, so that the profit earned is always maximum. Define the variable and formulate Objective function and constraints?　　(5)

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