Roll. No. _____

International Institute of Health Management Research (IIHMR), New Delhi.
POSTGRADUATE DIPLOMA HOSPITAL AND HEALTH MANAGEMENT
(*Health Management Stream*)
(Batch 2020-2022)
OPERATIONS RESEARCH IN HEALTHCARE
(HEM-713)
End Term Examination

Time allowed: 2 hrs **Max. Marks: 100**

(Answer any five questions)
All Answers to be scanned and uploaded
Each question carries 20 marks **(5 x 20 = 100 marks)**

1. Each year Blue Cross Hospital purchases 20000 syringes that cost Rs.16 per syringe. The cost of placing an order is Rs.12 and the cost of holding is 24% per year.
   i. Determine the economic order quantity.
   ii. Compute the average inventory level, assuming that minimum inventory level is zero.
   iii. Estimate the number of orders per year and time between orders.
   iv. Determine the total annual cost.

2. What is operations research? How you can apply in healthcare services production. Explain the various operations research tools and techniques that could be applied in healthcare operations management.

3. A maintenance activity in the hospital consists of following jobs. Draw the network for the project and calculate the total float and free float for each activity. What can you say about the slacks of the events of the project?

Job	Duration (in days)
1-2	3
2-3	4
3-4	4
3-7	4
4-5	2
4-7	2
5-6	3
6-7	2

4. A department has five employees with five jobs to be performed. The time (in hours) each men will take to perform each job is given in the effectiveness matrix. How should the jobs be allocated, one per employee, so as to minimize the total man-hours?

	Employees				
	I	II	III	IV	V
A	10	5	13	15	16
B	3	9	18	13	6
C	10	1	2	2	2
D	7	11	9	7	12
E	7	9	10	4	12

5. Following table indicates the details of a project. The durations are in days :

Activity	t_0	t_m	t_p
1-2	2	4	5
1-3	3	4	6
1-4	4	5	6
2-4	8	9	11
2-5	6	8	12
3-4	2	3	4
4-5	2	5	7

(a) Draw the network

(b) Find the critical path

(c) Determine the expected variance of the completion time.

6. A finished product must exactly weigh 150 grams. The two raw materials used in manufacturing the product are RI, with a cost of Rs 2 per unit and R2 with a cost of Rs 8 per unit. At least 14 units of R_2 and not more than 20 units of R_1 must be used. Each unit of R_1 and R_2 weighs 5 and 10 grams respectively. Formulate the above situation as a mathematical model.

7. Find the initial solution of the following Transportation problem :

		To			
		A	B	C	Available
From	I	50	30	220	1
	II	90	45	170	3
	III	250	200	50	4
	Requirement	4	2	2	