Post Graduate Diploma in Management (Hospital & Health Management)

PGDM – 2022-24 Batch

2nd Year - 6th Term Examination

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Course & Code	:	**Operation Management in Hospitals-HOM 716**	**Reg. No.**	:
Term & Batch	:	**VI, 2022-24**	**Date**	: **23.01.2024**
Duration	:	**3 Hrs.**	**Max. Marks**	: **70**

Instructions:
- Budget your time as per the marks given for each question and write your answer accordingly.
- Don't write anything on the Question Paper except writing your Registration No.
- Mobile Phones are not allowed even for computations.

Part A: Q. 1 to Q.5 (5 questions*2 marks = 10 marks).

Q 1. Modern operations management has its roots in the theories of:
   a) Human Relations Management
   b) Organizational Behavior
   c) Scientific management
   d) Bureaucratic Management.

Q 2. Objective function of LPP is $Z = 3x + 4y$ subjected to constraints $x + y \leq 4$, $x \geq 0$ and $y \geq 0$ is:
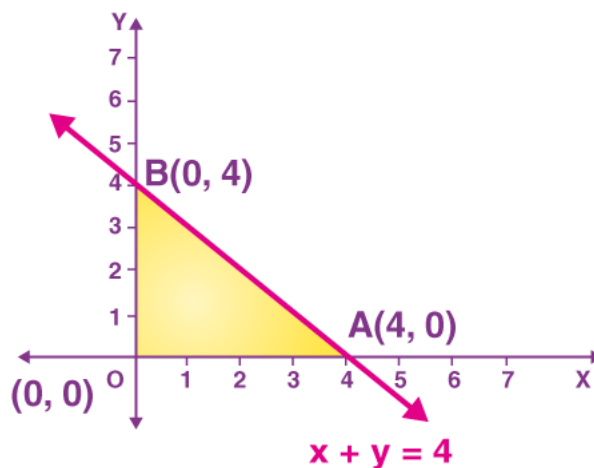
The point at which the objective function is maximized is :

a) (0, 4)
b) (4, 0)
c) (0, 0)
d) (2, 2)

Q 3.   The assignment algorithm was developed by _____.
a) Modi
b) Kuhn
c) Hungarian
d) Vogel's

Q 4.   The solution to a transportation problem with 'm' rows (supplies) & 'n' columns (destination) is feasible if number of positive allocations are

a)   m + n
b)   m * n
c)   m + n – 1
d)   m + n + 1

Q 5.   In a zero-sum game,
a) what some players win, the others lose.
b) the sum of each player's winnings if the game is played many times must be zero.
c) the game is fair – each person has an equal chance of winning.
d) the long-run profits of each player must be zero.

Part B: Q.6 to Q.12 (5 questions *12 Marks =60 Marks) Attempt any five.

Q 6. A department has five employees with five jobs to be performed. The coordinator of this department has just received five jobs that be assigned to these individuals, and only one job may be assigned to each individual. The estimated number of days required to complete each of these jobs by the five individuals is given in the table below.

		Jobs				
		I	II	III	IV	V
	A	6	12	3	11	15
	B	4	2	7	1	10
Employees	C	8	11	10	7	11
(Persons)	D	16	19	12	23	21
	E	9	5	7	6	10

The coordinator would like to minimize the number of days required for the completion of these jobs. Solve this using Hungarian method. Who will be assigned to each job? How many workdays will be required to complete these jobs?

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Q 7. Explain the history of operations management and important tools & techniques which could be applied in hospitals.

Q 8. A hospital is considering a new computerized information and inventory management system. The following information has been gathered regarding the installation and implementation of the system.

	Activity	Description	Immediate Predecessors	Duration (weeks)
Start	A	Select the computer model	-	6
	B	Design input / output system	A	12
	C	Design monitoring system	A	10
	D	Assemble the computer hardware	B	20
	E	Develop the main programmes	B	11
	F	Develop input/output routines	C	8
	G	Create Database	E	6
	H	Install the system	D,F	3
Finish	I	Test and implement	G,H	6

From the above information draw the activity on arrow network for the project, determine the critical path and compute the minimum time for the implementation of the computerized production and inventory management system. Find the float of non-critical activities.

Q 9.   The game is defined as follows:
• Two hunters go out to catch meat.
• There are two rabbits in the range and one stag. The hunters can each bring the equipment necessary to catch one type of animal.
• The stag has more meat than the rabbits combined, but both hunters must chase the stag to catch it.
• Rabbit hunters can catch all their prey by themselves.
• The values in the table represent the amount of meat (in pounds) the hunters will get for each given outcome.

                         Hunter 2

		Stag	Rabbit
	Stag	3,3	0,2
Hunter 1	Rabbit	2,0	1,1

Using the Nash Equilibrium of this game, what is the best decision the hunters can make? If there is more than one best decision, explain the pros and cons of each.

Q10. Three electric power plants with capacities of 25, 40, and 30 million kWh supply electricity to three cities. The maximum demands at the three cities are estimated at 30, 35, and 25 million kWh. The price per million kWh at the three cities is given in Table, below. During the month of August, there is a 20% increase in demand at each of the three cities, which can be met by purchasing electricity from another network at a premium rate of Rs. 1000 per million kWh. The network is not linked to city 3, however.

Contd…4..

The utility company wishes to determine the most economical plan for the distribution and purchase of additional energy. Formulate the problem as a transportation problem and determine an optimal plan?

	City		
Plant	1	2	3
1	Rs600	Rs700	Rs400
2	Rs320	Rs300	Rs350
3	Rs500	Rs480	Rs450

Q11. A company is involved in the production of two items (X and Y). The resources need to produce X and Y are twofold, namely machine time for automatic processing and craftsman time for hand finishing. The table below gives the number of minutes required for each item:

	Machine time	Craftsman time
Item X	13	20
Item Y	19	29

The company has 40 hours of machine time available in the next working week but only 35 hours of craftsman time. Machine time is costed at Rs10 per hour worked and craftsman time is costed at Rs2 per hour worked. Both machine and craftsman idle times incur no costs. The revenue received for each item produced (all production is sold) is Rs20 for X and Rs30 for Y. The company has a specific contract to produce 10 items of X per week for a customer.

Formulate the problem of deciding how much to produce per week as a linear program and provide a graphical solution.

Q 12. A manufacturer uses an item at a uniform rate of 25,000 units per year. Assume that no shortage is allowed, and delivery is at an infinite rate. The ordering, receiving, and hauling cost is Rs.23 per order, while inspection cost is Rs.22 per order. Interest costs is Rs.0.056 and deterioration and obsolescence cost are Rs.0.004 respectively per year for each item actually held in inventory plus Rs.0.02 per year per unit based on the maximum number of units in inventory. Determine EOQ. If the lead time is 40 days, find reorder level.