INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY, TRIVANDRUM
DEPARTMENT OF HUMANITIES
HS 321: PRINCIPLES OF MANAGEMENT SYSTEMS
QUIZ: 1, FEBRUARY 2024

Maximum marks:15 **Time: 60 Minutes**

Note: All questions carry equal marks.

1. Solve the following assignment problem for minimizing cost.

Managers	Projects				
	P_1	P_2	P_3	P_4	P_5
M_1	1	3	2	3	6
M_2	2	4	3	1	5
M_3	5	6	3	4	6
M_4	3	1	4	2	2
M_5	1	5	6	5	4

2. Discuss the contributions of Chester Bernard to the theory of management thought.

3. Read the case study and answer the question that follows: *Write your answer in form of points* taking information from the case study.

St. Mary's Hospital initiated a transformational effort to improve its operational efficiency in response to the growing challenges in the healthcare business. This hospital, similar to several healthcare organizations, encountered difficulties including extended patient waiting times, inconsistent procedures, and rising operating expenses. The hospital administration began a comprehensive review of current operations to find opportunities for improvement and efficiency benefits in response to the urgent need for a methodical solution.

The hospital's administration began the investigation by doing thorough time and motion measurements. The investigations provide a detailed insight of the patient care processes, from admission to discharge. Job duties were standardized to provide clarity and accuracy in each staff member's tasks. Furthermore, protocols were implemented to enhance resource allocation, improve communication efficiency, and remove duplications in daily operations.

The hospital had significant improvements in several aspects after the implementation. By identifying and eliminating bottlenecks in the admission process, patient waiting times were dramatically decreased. Implementing standardized job responsibilities improved communication among personnel, leading to a more organized and productive work environment. The hospital saw a significant reduction in operating expenses due to efficient resource allocation and the elimination of needless duplications. Emphasizing standardized processes improved the quality of patient care at St. Mary's Hospital. The hospital improved patient outcomes and satisfaction by implementing evidence-based procedures and maintaining consistency in healthcare delivery. Standardized procedures were critical in implementing best practices for infection control, minimizing the incidence of hospital-acquired infections.

In recognition of the significance of employee engagement and skill development in the healthcare profession, St. Mary's Hospital included these concepts into its training programs. Staff members underwent standardized and current training to improve their skills and boost the overall engagement and motivation of the workforce. The methodical training strategy guaranteed uniform skill levels among the

personnel and aided in the assimilation of new healthcare technology and practices. The hospital used technology innovations to enhance its operations. Electronic health records (EHR) systems improved documentation procedures and enabled smooth information exchange among healthcare practitioners. This not only decreased the likelihood of mistakes linked to manual documentation but also enhanced the overall organization of patient care.

The decrease in waiting times, the quality of service, and the implementation of a patient-focused approach led to favorable responses from the community. The hospital's reputation for providing efficient and high-quality healthcare services has improved, leading to an increase in patients and a strong connection with the community. The hospital improves efficiency, quality of treatment, and patient happiness via comprehensive analysis and optimization of healthcare processes.

Question:

State which school of management thought is described in the case study above and discuss its characteristics based on the information provided in the case study above.

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HS 321: PRINCIPLES OF MANAGEMENT SYSTEMS
QUIZ: 2, APRIL 2024

Maximum marks: 15 **Time: 60 Minutes**

Note: All questions carry equal marks. In case of doubt, clearly state the assumptions and answer the question.

1. Describe the organizational structure typically used in research and development organizations. What are its advantages and disadvantages?
2. An aeroplane can carry a maximum of 200 passengers. A profit of Rs.5000 is made on each first-class ticket and a profit of Rs.2000 on each economy-class ticket. The airlines reserve at least 20 seats for first class. However, at least four times as many passengers prefer to travel by economy class than by first class. Determine how many of each type of ticket must be sold to maximize the airline's profit. What is the maximum profit? Formulate the above as a linear programming problem and solve it using the Graphical method.
3. A chemical manufacturing company makes three products: A, B, and C. A combination of certain resources, R_1, R_2 and R_3, are required to manufacture these products. Each unit of product A requires processing in two resources, viz., two units of R_1 and three units of R_3. Each unit of product B requires three units of R_1, two units of R_2 and two units of R_3. Each unit of product C requires five units of R_2 and four units of R_3. The manufacturer has eight units of R_1, ten units of R_2 and fifteen units of R_3 available. The manufacturer also makes a profit of Rs.3 per unit of product A sold, Rs.5 per unit of product B sold and Rs.4 per unit of product C sold. Formulate the above as a linear programming problem and solve it using the Simplex method to maximize the profit for the company.

*******ALL THE BEST*******

INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY, TRIVANDRUM
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END SEMESTER EXAMINATIONS, MAY 2024
HS 321: PRINCIPLES OF MANAGEMENT SYSTEMS

Maximum Marks: 50 **Time allowed: 3 hours**

Note: 1. This question is divided into 3 parts: A, B and C and consists of 4 pages.
2. Answer the questions in a sequence to the extent possible.
3. Supplement your answers with appropriate diagrams and examples.

PART – A
(Each question carries 3 marks each)

1. Discuss the concept of product life cycle with an example.
2. Briefly discuss the case study of India's cryogenic engine project in 200 words. What are the managerial lessons from the same?
3. What do you mean by grapevine network in communication? Discuss its characteristics.
4. Distinguish between training and development. What is vestibule training?
5. Explain the concept of hierarchy of objectives.

PART –B
(Each question carries 5 marks each)

6. Discuss the most apt motivation theory that theorizes that multiple needs can be present in an individual at the same time. How can a manager use this theory to motivate individuals in organizations?
7. Discuss the various roles performed by managers in organizations with examples.

PART – C
(Each question carries 5 marks each)

8. The purchase manager of a government department is analysing a set of bids that he has received for five projects. The guidelines established for selecting the successful bidders require the manager to:
    a) Minimize the total cost to complete the projects;
    b) Not award more than one contract to each bidder; and

    The bids on the projects (in lakhs of rupees) are shown in the following table:

Bidder	Contract				
	A	B	C	D	E
B_1	7	8	8	12	7
B_2	9	13	10	14	5
B_3	3	7	6	13	11
B_4	17	17	7	8	8
B_5	8	12	7	15	16
B_6	10	10	10	16	8

For the above problem identify the successful bidder for each of the five contracts.

9. An Air Force is experimenting with three types of bombs P, Q and R in which three kinds of explosives, viz., A, B and C will be used. Taking various factors into consideration, it has been decided to use at most 600 kg of explosive A, at least 480 kg of explosive B and exactly 540 kg of explosive C. Bomb P requires 3, 2, 2 kg of A, B and C respectively, bomb Q requires 1, 4, 3 kg of A, B, and C respectively and bomb R requires 6, 2, 3, kg of A, B and C respectively. Now bomb P will give the equivalent of a 2-ton explosion, bomb Q will give a 3-ton explosion and bomb R will give a 4-ton explosion. Under what production schedule can the Air Force make the biggest bang?

10. For the project network corresponding to the following information:

Activity	Predecessor(s)	Time (Days)	Activity	Predecessor(s)	Time (Days)
A	-	6	L	C,G	10
B	-	8	M	D,H	10
C	-	2	N	G, L	6
D	-	12	O	G,L	3
E	B	5	P	M	7
F	B	9	Q	M	4
G	C	7	R	L, O	8
H	C	3	S	I,K,N	18
I	A,E	4	T	I,K,N	9
J	G	2	U	P,R,S	11
K	F,J	12	V	U	4

(i) Draw the project network and determine the critical path.

(ii) Obtain the total, interfering, free and independent floats for all activities and tabulate the results in a table.

11. Six jobs go first on machine I and then over machine II. The order of the completion of jobs has no significance. The following table gives the machine times in hours for six jobs and the two machines.

Job Number	J_1	J_2	J_3	J_4	J_5	J_6
Time of machine I (A)	5	9	4	7	8	6
Time of machine II(B)	7	4	8	3	9	5

Find the sequence of jobs that minimizes the total elapsed time to complete the jobs. Draw the Gantt chart and find the idle times of machine I and II.

12. A project consists of nine activities whose time estimates (in weeks) and other characteristics are given below is given below:

Activity	Immediate predecessor(s)	Time estimates (weeks)		
		Most likely	Most optimistic	Most pessimistic
A	-	4	2	6
B	-	6	6	6
C	-	12	6	24
D	A	5	2	8
E	A	14	11	23
F	B,D	10	8	12
G	B,D	6	3	9
H	C,F	15	9	27
I	E	10	4	16

(i) Identify the critical activities of the project.

(ii) If the project is required to be completed by December 31 of a given year and the manager wants to be 95% sure of meeting the deadline, when should he start the project work?

(iii)A penalty of Rs.15000 per week is to be imposed on the contractor if the project is not completed in 36 weeks. What is the probability that he will pay a penalty of Rs.45000?