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**B.E. / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2013
GEOINFORMATICS ENGINEERING BRANCH**

SEVENTH SEMESTER – (REGULATIONS 2008)

GI 9404 OPERATIONS RESEARCH FOR GEOINFORMATICS

Time: 3hrs

Max Marks: 100

Answer ALL Questions
Part – A (10 x 2 = 20 Marks)

1. Write short note on scope of Operation Research.
2. Enumerate various operation research models.
3. What do you mean by sensitivity analysis? Give an example
4. Write short note on assumptions of Linear programming.
5. What do you mean by dynamic programming? Give example.
- 6 List out the characteristics of Dynamic programming problems
7. List out various rules to be followed while constructing the network.
8. Write short note on different management tools.
9. Differentiate between the Deterministic and stochastic simulation studies.
10. What do you mean by inventory management?

Part B (5 x 16 = 80)

11. Describe different phases of Operation Research study in detail.

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12a. High Tech industries import components for production of two different models of personal computers, called deskpro and portable. High Tech's management is currently interested in developing a weekly production schedule for both products. The deskpro generates a profit contribution of Rs 50/unit, and portable generates a profit contribution of Rs 40/unit. For next week's production, a max of 150 hours of assembly time is available. Each unit of deskpro requires 3 hours of assembly time. And each unit of portable requires 5 hours of assembly time. High Tech currently has only 20 portable display components in inventory; thus no more than 20 units of portable may be assembled. Only 300 sq. feet of warehouse space can be made available for new production. Assembly of each Deskpro requires 8 sq. ft. of warehouse space, and each Portable requires 5 sq. ft. of warehouse space.

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- i) Formulate a linear programming model for this problem.
- ii) Use Simplex method of algebraic approach to solve this model. What is the resulting total profit?

(OR)

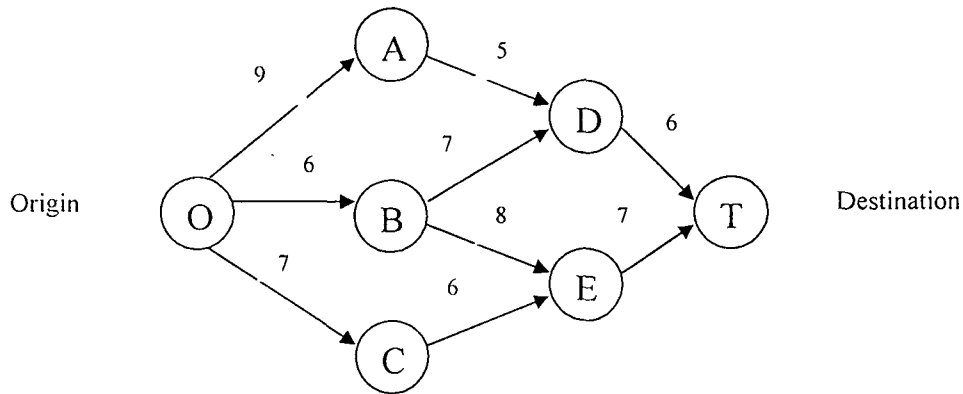
- 12b. Follow the instructions of question no. 12a and answer the following

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- i) Formulate a linear programming model for this problem.
- ii) Use the graphical method to solve this problem.
- iii) For each CPF solutions identify its adjacent CPF solutions.
- iv) Describe graphically what the simplex method does step by step to solve the problem

(PTO)

13a. Consider the following network, Where each number along a link represents the actual distance between the pair of nodes connected by that link. 16



- i) What are the stages and states for the dynamic programming formulation of this problem?
- ii) Find out the shortest path from the origin to the destination using dynamic programming.

(OR)

- 13b. i) Explain different types of dynamic programming in detail with examples 10
 ii) Explain the role of dynamic programming in Geoinformatics 6

14a. A small project has the following characteristics 16

| Activity | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|-----------------|---|---|---|----|----|---|---|---|-----|---|-----------|---|-----|---|
| Precedence | - | A | A | B | D | D | D | B | C,E | G | F, I,J | K | H,G | M |
| Duration (Days) | 5 | 2 | 6 | 12 | 10 | 9 | 5 | 9 | 1 | 2 | 3 | 9 | 7 | 8 |

- i) Draw the network
- ii) Determine the different types of floats
- iii) Find the Critical Path

(OR)

- 14b. i) Explain in detail resource analysis and allocation 4
 ii) The three time estimates t_0 , t_m and t_p of each activities of the project are given below 12

| Activity | t_0 (Optimistic time in days) | t_m (Most likely time in days) | t_p (Pessimistic time in days) |
|----------|---------------------------------|----------------------------------|----------------------------------|
| 1-2 | 2 | 5 | 14 |
| 1-3 | 3 | 12 | 21 |
| 2-4 | 5 | 14 | 17 |
| 3-4 | 2 | 5 | 8 |
| 4-5 | 1 | 4 | 7 |
| 3-5 | 6 | 15 | 30 |

- i) Draw the arrow diagram
- ii) Find the expected duration and variance of each activity
- iii) Determine the critical path and expected project completion time
- iv) What is the probability of completing this project in 35 days?

(PTO)

- 15a. i) What is Queuing theory? Explain basic structure and process involved in Queuing models. 8
ii) What do you mean by investment decision? Discuss various methods used for investment decision with their merits and demerits. 8

(OR)

- 15b. i) State and explain the assumptions underlying the basic EOQ formula. 4
ii) The annual Demand for a product is 3,600 units with an average of 12 units per day. The lead time is 10 days. The ordering cost per order is Rs 20 and the annual carrying cost is 25% of the value of the inventory. The price of the product per unit is Rs 3. The total working days in a year are 300.

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- i) What will be the EOQ?
- ii) Optimum Number of orders per annum
- iii) Find the purchase cycle time
- iv) Determine the Re-order level
- v) Number of days stock at re-order level
- vi) Find the total inventory cost per year