Quantitative technique assignment

What is a linear programming problem? Discuss the scope and role of linear programming in solving management problems. Discuss and describe the role of linear programming in managerial decision-making bringing out limitations, if any. 2. Explain the concept and computational steps of the simplex method for solving linear programming problems. How would you identify whether an optimal solution to a problem obtained using simplex algorithm is unique or not? a)What is the difference between a feasible solution, a basic feasible solution, and an optimal solution of a linear programming problem?)What is the difference between simplex solution procedure for a `maximization' and a `minimization' problem? c)Using the concept of net contribution, provide an intuitive explanation of why the criterion for optimality for maximization problem is different from that of minimization problems. Outline the steps involved in the simplex algorithm for solving a linear programming maximization problem. Also define the technical terms used therein. 3. " Linear programming is one of the most frequently and successfully employed Operations Research techniques to managerial and business decisions. ' Elucidate this statement with some examples. …2… …2… 4. Describe the transporation problem and give its mathematical model. Explain, by taking an illustration, the North-West Corner Rule, the Least Cost Method and the Vogel's Approximation Method to obtain the initial feasible solution to a transportation problem. Discuss the various methods of finding initial feasible solution of a transportation problem and state the advantages, disadvantages, and areas of application for them. 5. What is an assignment problem? It is true to say that it is a special case of the transportation problem?

Explain. How can you formulate an assignment problem as a standard linear programming problem? Illustrate. What do you understand by an assignment problem? Give a brief outline for solving it. 6. What are different types of inventories? Explain. What functions does inventory perform? State the two basic inventory decisions management must make as they attempt to accomplish the functions of inventory just described by you. 7. What is queuing theory? What type of questions are sought to be answered in analyzing a queuing system? Give a general structure of the queuing system and explain.

Illustrate some queuing situations. What is queuing theory? In what types of problem situations can it be applied successfully? Discuss giving examples. 8. What is a replacement problem? Describe some important replacement situations and policies. Briefly explain the costs which are relevant to decisions for replacement of depreciable assets. Illustrate their behaviour and explain how the optimal time for replacement of an asset can be determined. ...3... ...3... 9. What kinds of decision-making situations may be analysed using PERT and CPM techniques? State the major similarities between PERT and CPM.

Under what circumstances is CPM a better technique of project management than PERT? A construction company has received a contract to build an office complex. It has frequently engaged itself in constructing such buildings. Which of the two network techniques, PERT and CPM, should in your opinion, be employed by the company? Why? 10. Describe the steps involved in the process of decision making. What are pay-off and regret functions? How can entries in a regret table be derived from a pay-off table? 11. What do you

understand by Markov processes? In what areas of management can they be applied successfully?

What do you understand by transition probabilities? Is the assumption of stationary transition probabilities realistic, in your opinion? Why or why not? 12. Explain how the probability tree helps to understand the problem of Markov processes. Explain the method of calculation of ending up in each absorbing state when a chain beings in a particular transient state. What is fundamental matrix of Markov chains? What does it calculate? 13. What is simulation? Describe the simulation process. State the major two reasons for using simulation to solve a problem. What are the advantages and limitations of simulation? `When it becomes difficult to use an optimization technique for solving a problem, one has to resort to simulation". Discuss. " Simulation is typically the process of carrying out sampling experiments on the models of the system rather than the system itself. " Elucidate this statement by taking some examples. …4… …4… 14. A company has three offers for its existing equipment in one of the divisions. The first buyer is willing to pay Rs. 50, 000 at the end of 8 years' period. The second buyer offers Rs. 39, 000—consisting of an immediate payment of Rs. 14, 000 and Rs. 25, 000 after 6 years.

The third buyer agrees to buy the equipment for Rs. 29, 000 payable right away. Which is the best offer for the company if it can earn an interest @ 8% per annum on the money received? 15. What is the difference between qualitative and quantitative techniques of forecasting. When is a qualitative model appropriate? Briefly discuss the Delphi method of making forecasts. 16. a)How do you distinguish between resource leveling and resource

allocation problems? State and explain an algorithm for resource allocation.

b)Explain the following as they are used in PERT/CPM (i)Beta distribution, and (ii) Budget over-run. …5… …5… 17.

The following table gives data on normal time and cost, and crash time and cost for a project. `Duration (Weeks)Total Cost (Rs) Activity NormalCrashNormalCrash 1 – 232300450 2 – 333 75 75 2 – 453200300 2 – 544120120 3 – 441100190 4 – 632 90130 5 – 6 31 60110 i)Draw the network and find out the critical path and the normal project duration. ii)Find out the total float associated with each activity. iii)If the indirect costs are Rs. 100 per week, find out the optimum duration by crashing and the corresponding project costs. iv)With the crash duration indicated, what would be the minimum crash duration possible, ignoring indirect costs? 8. What is a `game' in game theory? What are the properties of a game? Explain the " best strategy" on the basis of minimax criterion of optimality. Describe the maximin and minimax principles of game theory. …6… …6… 19. Explain the steps involved in solution to dynamic programming problems. Explain the following in the context of dynamic programming: (a)Stages (b)States (c)Pay-off function (d)Recursive relationship 20. A political campaign for election to the parliament is entering its final stage and pre-poll surveys are medicating a very close contest in a certain constituency.

One of the candidates in the constituency has sufficient funds to give five full-page advertisements in four different areas. Based on the polling information, an estimate has been made of the approximate number (in thousands) of additional votes that can be polled in different areas. This is shown below. No. ofArea Commercial AdsABCD 0 0 0 0 0 1913117 21517115

31212325 425232129 531252733 Using dynamic programming, determine how the five commercial ads be distributed between the four areas so as to maximize the estimated number of votes.