



National Open University of Nigeria
Faculty of Sciences
Department of Computer Science
2024 1 EXAMINATION

CIT425 - Operations Research

Instruction: Answer Question 1 and any other three questions
Time Allowed: 2 ¾ hours

Question 1:

- a. Explain how Operations Research is applied to solve management problems and aid in decision-making? **8 marks**
- b. (i) Compare and contrast quadratic programs with linear programs in terms of their objective and constraints **4 marks**
- c. What are the features of dynamic programming **4 marks**
- d. (i) Explain the difference between a balanced and an unbalanced transportation problem. **4 marks**
(ii) Assess the strengths and weaknesses of the Enumeration of Solution method in solving assignment problems **5 marks**

Question 2:

- a. Analyze the limitations of Operations Research and explain how conflicts between Operations Research analysts and managers can arise. **5 marks**
- b. Evaluate the role of Operations Research in business decision-making and its impact on improving operational efficiency. **10 marks**

Question 3:

ABC Group of Companies Ltd is an investment company doing an analysis of the pension fund for a certain company. A maximum of #10 million is available to invest in two places. No more than #8 million can be invested in stocks yielding 12% and at least #2 million can be invested in long-term bonds yielding 8%. The stock-to-bond investment ratio cannot be more than 1 to 3. How should ABC Group advise their client so that the pension fund will receive the maximum yearly return on investment?

15 marks

Question 4:

Discuss the effectiveness of the dynamic programming approach in solving real-world planning problems. Provide examples to support your arguments. **15 marks**

Question 5:

Discuss the differences between the North-West Corner method, Least Cost method, and Vogel's Approximation method for solving transportation problems with respect to allocation strategy, cost consideration and effectiveness. **15 marks**

Question 6:

Compare and contrast the Enumeration method and the Hungarian method for solving assignment problems, highlighting their strengths and weaknesses. **15 marks**