Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV/DEC 2023

GEOINFORMATICS

VII SEMESTER

GI5701 DECISION SUPPORT SYSTEM FOR RESOURCE MANAGEMENT

(Regulation2019)

Time:3hrs Max.Marks: 100

CO1	Acquire knowledge about structure of Expert system and its difference with conventional programming
CO2	Understand and develop Rule based expert system for geomatic problems.
CO3	Handle the inexact real world problems to get the solution.
CO4	Integrate Operation research and geomatic tools to design a Hybrid model to solve real world problems
CO5	Plan, control and Monitor the activities of the project properly for effective implementation.

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20 Marks)
(Answer all Questions)

Q.No	Questions	Marks	CO	BL
1	Differentiate between conventional programming and Expert Systems	2	1	L1
2	Compare and contrast human expertise with artificial expertise in the context of Expert Systems.	2	1	L1
3	Write short note on different levels of knowledge in the context of Expert Systems.	2	2	L2
4	Compare and contrast various reasoning methods used in Expert system.	2	2	L2
5	What advantages does fuzzy logic offer in comparison to traditional classification methods for RS data?	2	3	L2
6	Write short note on any two real-world examples where Bayesian theory is effectively used.	2	3	L1
7	What is the historical origin of OR?	2	4	L1
8	Construct the dual problem for the following linear programming model. Maximize $Z = 4x_1 + x_2$ Subject to $3x_1 + 2x_2 \leq 6$ $6x_1 + 3x_2 \leq 10$ $x_1, x_2 \geq 0$.	2	4	L2
9	What is Inventory? List out different types of inventory commonly used for real world applications.	2	5	L2
10	What do you understand by the term "crashing of an activity"?	2	5	L1

PTO

PART- B(5x 13=65 Marks)
(Restrict to a maximum of 2 subdivisions)

Q.No	Questions	Marks	CO	BL
11 (a) (i)	Explain the roles of different players in the development and deployment of Expert Systems. Also elaborate on different key features of Expert system.	9	1	L4
(ii)	Discuss various characteristics of Expert Systems.	4	1	L4
	OR			
11 (b) (i)	Explain the key activities involved in Expert System development.	10	1	L4
(ii)	Explore potential future trends in the application of Expert Systems in geomatics.	3	1	L4
12 (a) (i)	Explain various methods used to represent the knowledge in detail with neat sketch.	13	2	L4
	OR			
12 (b) (i)	What is Knowledge, Knowledge engineering and Knowledge Engineer? Explain various methods used to acquire knowledge in detail with neat sketch.	13	2	L4
13 (a) (i)	Discuss various process of classifying remote sensing (RS) data using fuzzy logic.	10	3	L3
(ii)	Compare and contrast Bayesian theory, certainty theory and fuzzy logic.	3	3	L3
	OR			
13 (b) (i)	Give an overview of certainty theory and how it handles uncertain evidence.	7	3	L3
(ii)	Provide a detailed explanation of Bayesian theory.	6	3	L3
14 (a) (i)	A geomatic company is involved in conducting two types of surveying projects: Topographic Survey (TS) and Aerial Survey (AS). Each Topographic Survey requires 3 days of fieldwork and 2 days of office work, while Aerial Surveys require 2 days of fieldwork and 4 days of office work. The profit for each Topographic Survey is Rs. 5,000 and for each Aerial Survey is Rs. 8,000. The company has a total of 15 days of fieldwork and 16 days of office work available. i) Generate relevant data table and formulate the linear programming model. ii) Use graphical method to solve this LP model to maximize the company's profit. iii)	8	4	L3
(ii)	Discuss the standard form of a linear programming model and the assumptions made.	5	4	L3
	OR			
14 (b) (i)	For the problem given in 14 a (i) i) Generate relevant data table and formulate the linear programming model. ii) Use simplex method to solve this LP model to maximize the company's profit	13	4	L3
15 (a) (i)	Consider the following Geomatic project. The main activities and their durations are as follows: Activity A: Data Collection Duration: 10 weeks Activity B: GIS Mapping Duration: 8 weeks	13	5	L4

	Activity C: Remote Sensing Analysis Duration: 12 weeks Activity D: Geospatial Modeling Duration: 14 weeks Activity E: Report Generation Duration: 6 weeks Precedence Relations: Activity A must be completed before starting Activity B. Activity B must be completed before starting Activities C and D. Activity C must be completed before starting Activity E. Activity D must be completed before starting Activity E. i) Draw the network ii) Determine EST, EFT, LST and LFT iii) Find the Critical Path and Project completion time iv) Calculate Total float			
	OR			
15 (b) (i)	Explain the classical EOQ model and state the assumptions underlying the basic EOQ formula.	4	5	L4
(ii)	A Geomatics department uses a specific piece of equipment with the following details: Annual demand (D): 800 units Cost per order (S): Rs.150 Cost per unit (C): Rs. 80 Holding cost per unit per year (H): Rs.15 Lead time (LT): 2 weeks (10 working days) Number of working days in a year: 260 days Determine i) The Economic Order Quantity (EOQ) in terms of the number of units and its monetary value, ii) Calculate the total inventory cost, iii) The inventory cycle time.	9	5	L4

PART- C(1x 15=15 Marks)
(Q.No.16 is compulsory)

Q.No	Questions	Marks	CO	BL
16. (i)	Explain the concept of conflict resolution with neat sketch.	3	2	L5
(ii)	A Geomatics project involves multiple activities. The estimated durations (in weeks) and activities relation are as follows: Activity A: Data Collection Pessimistic Time (P): 14 weeks, Most Likely Time (M): 10 weeks Optimistic Time (O): 8 weeks Activity B: GIS Mapping Pessimistic Time (P): 18 weeks, Most Likely Time (M): 14 weeks Optimistic Time (O): 12 weeks	12	5	L6

PTO

	Activity C: Remote Sensing Analysis Pessimistic Time (P): 16 weeks, Most Likely Time (M): 12 weeks Optimistic Time (O): 10 weeks Activity D: Geospatial Modeling Pessimistic Time (P): 22 weeks, Most Likely Time (M): 18 weeks Optimistic Time (O): 14 weeks Activity E: Report Generation Pessimistic Time (P): 12 weeks, Most Likely Time (M): 8 weeks Optimistic Time (O): 6 weeks Activity F: Quality Assurance Pessimistic Time (P): 10 weeks, Most Likely Time (M): 6 weeks Optimistic Time (O): 4 weeks Relations among activities: Activity A must be completed before starting Activity B. Activity B must be completed before starting Activities C and D. Activity C must be completed before starting Activity E. Activity D must be completed before starting Activity F. Activity E must be completed before starting Activity F. i) Construct the network.ii) Determine the expected task time. iii) Find the critical path. iv) What is the project duration? v) Determine the probability of completing the project within 70 weeks.