GUJARAT TECHNOLOGICAL UNIVERSITY ME- SEMESTER II– EXAMINATION – SUMMER 2015

Subject Code: 2724003Date: 26/0			5/2015	
Subje Time Instruc	ect N : 2:3 ctions 1. 4 2. 1 3. 1	ame: Optimization in Rubber Industries 50 PM – 5:00 PM Total Marks: 7 : Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	0	
Q.1	(a)	You are asked to determine optimum scheduling and sizing for a rubber plant having three stages in process; mixing, molding and curing. Discuss the process of generating optimal design alternatives.	09	
	(b)	Discuss importance of gantt chart in flow shop scheduling.	05	
Q.2	(a)	Discuss influence of transfer policies on cycle time for a batch plant. Give example of rubber process demanding zero wait transfer policy.	07	
	(b)	Discuss MILP model for optimization of batch production plant	07	
		OR		
	(b)	Explain the basics and working of Genetic Algorithm for optimization.	07	
Q.3	(a)	It is required to shift a heavy processing machine inside process area through a passage. The machine is 4 ft high, 3 ft wide and 25 ft long. It is to be shifted keeping it horizontal. The restriction in the passage is a right-angled turn around the corner from 10 ft wide corridor in to a 6 ft wide corridor. Headroom is 20 ft in the corridor. Will we be able to complete the job of shifting through the restriction of the passage? Justify your answer.	07	
	(b)	Explain Affine Scaling method for Liner Programming	07	
		OR		
Q.3	(a)	Explain the duality concept for Linear Programming by any non simplex method.	07	
	(b)	Explain the basics of Multi objective optimization (MOO). Discuss applications of MOO.	07	
Q.4	(a)	Using the Rosenbrock search technique, seek the minimum of the objective function $f(x) = 100(x_2 - x_1^2)^2 + (1 - x_1^2)$ with an initial point of (-1.2, 1.0). Carry out one stage of search and find directions for next iteration.	09	
	(b)	Find the minimum of $y = t_1^2 + 2t_2 + \frac{3}{t_1 t_2}$	05	

- **Q.4** In searching for the minimum of the objective function $y = x_1^2 + 3x_2^2 + 5x_3^2$ using the Sequential Simplex method calculate first simplex. Distance between vertices is a = 0.2 and one of the vertex at the point {-1, 2, -2}. Carry out vertex rejection-regeneration in first table till pattern starts rotating and same points re-appear in pattern. Complete the first table, reduce the size of pattern using a = 0.01 and construct the new pattern for next iteration. Carry out three vertex rejection-regeneration for second stage of search.
- Q.5 (a) List out limitations of Region Elimination methods. Compare different 05 Region Elimination methods and suggest best method for Initial interval of 3.5 for accuracy of 0.1.
 - (b) Carry out three stages of a Hooke-Jeeves search for searching a minimum of 09 the objective function f(x) = x₁² + exp(x₁² + x₂²), staring at the point (2, 2). Use δ = 0.5. A stage consists of a local exploration, together with an accelerated move.

OR

- Q.5 (a) A poster is to contain 300 cm² of printed matter with margins of 6 cm at the top and bottom and 4cm at each side. Find the overall dimensions that minimize the total area of the poster.
 - (b) Explain following terms in context to optimization: constraints, objective 07 function, feasible region, unimodal function, continuous function, derivative discontinuity, convex function.
