[M19P1107]

I M. Tech I Semester (R19) Regular Examinations
OPTIMIZATION TECHNIQUES
Electrical & Electronic's Engineering Department
MODEL QUESTION PAPER

TIME: 3Hrs. **Max. Marks: 75 M**

Answer **ONE Question** from **EACH UNIT.**
All questions carry equal marks.
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			CO	KL	M
		UNIT-I			
1.	**a)**	State an optimization problem. Give any five Engineering applications of optimization.	**1**	**K3**	**7M**
	b)	Find minimum value of the function $f(X_1, X_2) = X_1^2 + X_2^2 - 10\ X_1 - 10X_2$ satisfying the constraints $X_1+X_2 \leq 9$, $X_1-X_2 \geq 6$ and $X_1, X_2 \geq 0$ using Lagrangian multipliers.	**1**	**K3**	**8M**
		OR			
2.		An advertising company has to plan their advertising strategy thrgh the different media, namely TV, Radio and Newspaper. The purpose of advertising is to reach maximum number of potential customers. The cost of an advertisement in TV, Radio and Newspaper are Rs 3000/-, Rs2000/- and Rs2500/- respectively. The average expected potential customers reached per unit by 20000 of which 15000 are female customers. These figures with Radio are 60000 and 40000 and with Newspaper 25000 and 12000 respectively. The company has a maximum budget for advertising is Rs50000/- only. It is proposed to advertise thrgh TV or Radio between 6 and 10 units and atleast 5 advertisements shld appear in Newspaper. Further it decides that atleast 100000 exposures shld take place among female customers. Budget of advertising by Newspaper is limited to Rs25000/- only. Formulate into linear programming problem and solve it by using simplex method.	**1**	**K3**	**15M**
		UNIT-II			
3.		Minimize $Z= X_1-X_2+2X_1^2 + 2\ X_1X_2+ X_2^2$ with the starting point (0,0) using the univariate method.	**1**	**K3**	**15M**
		OR			
4.		Solve the following Linear Programming Problem by Revised simplex method. Maximize $Z= 5X_1+ 3X_2$ Subject to $4X_1+ 5X_2 \geq 10$ $5X_1+ 2X_2 \leq 10$, $3X_1+ 8X_2 \leq 12$ And $X_1, X_2 \geq 0$	**1**	**K3**	**15M**
		UNIT-III			
5.		State Kuhn- Tucker conditions. Minimize $f(X_1, X_2) = (X_1-1)^2 + (X_2-5)^2$, Subject to $-X_1^2 + X2 \leq 4$	**1**	**K4**	**15M**

		$-(X_1-2)^2 + X_2 \leq 3$ by Kuhn- Tucker conditions			
		OR			
6.		Solve the following problem by Powell's method (Use pattern search directions) Minimize $f(X_1, X_2) = 4X_1^2 + 3X_2^2 -5 X_1X_2-8X_1$ from starting point (0, 0).	**1**	**K4**	**15M**
		UNIT-IV			
7.		Minimize $f(X_1,X_2) = 6x_1^2 + 3x_2^2 +4x_1x_2$ subject to $x_1+x_2-5 =0$ solve the problem by using the interior penalty function approach.	**1**	**K3**	**15M**
		OR			
8.		Minimize $f(X_1,X_2) = 1/3(x_1 +1)^3+x_2$ subject to $g_1(X_1,X_2)$ $1-x_1 \leq 0$, $g_2(X_1,X_2) = -x_2 \leq 0$. solve the problem by using an exterior penalty function approach.	**1**	**K2**	**15M**
		UNIT-V			
9.		Using Fibonacci method minimize $Z= 12x - 3x^4-2x^2$ Take the initial interval as [0,2] and n=6. Calculate the interval of uncertainty after 6 cycles.	**1**	**K3**	**15M**
		OR			
10.		Find the minimum function $f(x)=0.65-(0.75/(x^2+1))-(0.65x)\tan^{-1}(1/x)$ using the quadratic interpolation method with an initial step size of 0.1. show calculations for two refits.	**1**	**K3**	**15M**