

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY,
WAKNAGHAT

TEST – 1, FEBRUARY 2019

MTech 1st Semester Structures

Course Code: 11MIWCE114

Max. Marks: 15

Course Name: Modelling, Simulation and Computer Applications

Max. Time: 1 hr.

Course Credits: 03

Note: All questions are compulsory. Marks are indicated against the questions. Carrying of mobile phone is strictly prohibited and will be treated as case of unfair means.

Q.1 (i) Find out Stationary points for the following function and classify them

$$f(x, y) = e^{-(x^2+y^2)}$$

(ii) Find the final grades/marks for 3 girls as shown in table below, and we know what their averages are for tests, projects, homework, and quizzes. We also know that tests are 40% of the grade, projects 15%, homework 25%, and quizzes 20%. Use matrix method.

Student	Tests	Projects	Homework	Quizzes
Alexandra	92	100	89	80
Megan	72	85	80	75
Brittney	88	78	85	92

[2+2]

Q.2 A company makes three products and has available 4 workstations. The production time (in minutes) per unit produced varies from workstation to workstation (due to different manning levels) as shown below:

Products	Workstation			
	1	2	3	4
1	5	7	4	10
2	6	12	8	15
3	13	14	9	17

Similarly, the profit (₹) contribution (contribution to fixed costs) per unit varies from workstation to workstation as below

Products	Workstation			
	1	2	3	4
1	10	8	6	9
2	18	20	15	17
3	15	16	13	17

If, one week, there are 35 working hours available at each workstation how much of each product should be produced given that we need at least 100 units of product 1, 150 units of product 2 and 100 units of product 3. Formulate this problem as a Linear Programming problem. [4]

Q.3 A carpenter makes tables and chairs. Each table can be sold for a profit of ₹30 and each chair for a profit of ₹10. The carpenter can afford to spend up to 40 hours per week working and takes six hours to make a table and three hours to make a chair. Customer demand requires that he makes at least three times as many chairs as tables. Tables take up four times as much storage space as chairs and there is room for at most four tables each week. Formulate this problem as a linear programming problem and solve it graphically. [7]