Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **14MA3018** | **Duration :** | **3hrs** |
| **Sub. Name :** | **OPTIMIZATION TECHNIQUES** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Solve the following linear programming problem using graphical method:  Maximize  subject to the constraints | CO2 | 10 |
|  | b. | A company makes two kinds of leather belts. The respective profits are Rs.4 and Rs.3 per belt. Each belt is processed on two machines A and B. Belt of type I requires one minute of processing on A and two minutes on B while type II requires one minute on A and one minute on B. Machine A is available for not more than 7 hours and 30 minutes, while machine B is available for 10 hours during any working day. Formulate the linear programming problem to find the number of belts of types I and II to be manufactured to get maximum profit. | CO2 | 10 |
| (OR) | | | | |
| 2. |  | Use simplex method to solve the following linear programming problem:  Maximize subject to the constraints | CO3 | 20 |
| 3. |  | Solve the following integer linear programming problem using cutting plane algorithm:  Maximize subject to the constraints:    and are integers | CO3 | 20 |
| (OR) | | | | |
| 4. |  | Use branch and bound method to solve the following LPP  Minimize  subject to the constraints    and are integers. | CO3 | 20 |
|  |  |  |  |  |
| 5. |  | An organization is planning to diversify its business with a maximum outlay of Rs.4 crores. It has identified three different locations to install plants. The organization can invest in one or more of these plants subject to the availability of the fund. The different possible alternatives and their investment (in crores of rupees) and present worth of returns during the useful life (in crores of rupees) of these plants are given in the plant. Find the optimal allocation of the capital to different plants which will maximize the corresponding sum of the present worth of the returns.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | Plant 1 | Plant1 | Plant2 | Plant2 | Plant3 | Plant3 | | Alternative | cost | Return | Cost | Return | Cost | Return | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | | 2 | 1 | 12 | 2 | 16 | 2 | 9 | | 3 | 2 | 15 | 3 | 20 | 3 | 12 | | 4 | 3 | 19 | 4 | 25 | - | - | | CO3 | 20 |
| (OR) | | | | |
| 6. |  | Alpha logistic company has to load a cargo out of four items whose details are shown below. The maximum weight of the cargo is 7 tons. Find the optimal cargo loading using dynamic programming method such that the total return is maximized.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Item i | 1 | 2 | 3 | 4 | | Weight/unit | 2 | 1 | 4 | 3 | | Return /unit | 1000 | 400 | 2100 | 1400 | | CO3 | 20 |
|  |  |  |  |  |
| 7. |  | Solve the nonlinear programming problem using Kuhn-Tucker conditions.  Max z =  subject to the constraints | CO3 | 20 |
| (OR) | | | | |
| 8. |  | Solve the following nonlinear programming problem using the restricted basis method of separable programming:  Maximize  subject to | CO3 | 20 |
|  |  |  |  |  |
|  | | **Compulsory:** |  |  |
| 9. |  | Solve the following geometric programming problem  Minimize  where | CO3 | 20 |

ALL THE BEST