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 – April/May – 2017**

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| **Code :** | **14MA3015** | **Duration :** | **3hrs** |
| **Sub. Name :** | **OPERATIONS RESEARCH TECHNIQUES** | **Max. marks :** | **100** |

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Q. No. | Sub Div. | | Questions | Course  Outcome | Marks |
| 1. | a. | | Use **two- phase simplex method**, solve the LPP.  Max. Z = 2x1+ x2  Subject to 3x1 +2x2 ≤ 2;  5x1 ≤10;  x1 + x2 ≥ 8;  -x1 + x≥ 4;  x1, x2, ≥ 0. | CO1 | 20 |
| (OR) | | | | | |
| 2. |  | | Using **duality**, solve the LPP:-  Max. Z = 3x1 +4x2  Subject to x1 + x2 ≤ 450:  2x1 + x2 ≤ 600;  x1 , x2 ≥ 0. | CO1 | 20 |
| 3. |  | | |  |  |  | | --- | --- | --- | | O1  ORIGIN: O2  O3 | 2 3 4 5  1 3 1 4  4 1 2 3 | 10  12  13 | | Requirement | 12 8 10 5 |  |   Find the Optimum solution for the following problem | CO2 | 20 |
| (OR) | | | | | |
| 4. |  | | Find the minimum assignment time for the following problem   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | **J1** | **J2** | **J3** | **J4** |  | | **M1** | **18** | **26** | **17** | **11** |  | | **M2** | **13** | **28** | **14** | **26** |  | | **M3** | **38** | **19** | **18** | **15** |  | | **M4** | **19** | **26** | **24** | **10** |  | |  |  |  |  |  |  | | CO2 | 20 |
| 5. |  | | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  | J1 | J2 | J3 | J4 | J5 | J6 | J7 | | M1 | 4 | 9 | 8 | 5 | 10 | 9 | 8 | | M2 | 5 | 4 | 3 | 6 | 2 | 5 | 4 | | M3 | 7 | 8 | 6 | 12 | 6 | 7 | 13 |   Find the optimum sequence, idle time and total elapsed time | CO2 | 20 |
| (OR) | | | | | |
| 6. |  | | A self service store employ one cahierat its counter, Nine customers arrive on an average every 5 minutes. While the cashier can serve 10 customers in 5 minutes. Assuming poission for arrival and service, Calculate the following Ls,Lq , Ws and Wq | CO2 | 20 |
| 7. |  | | A project scheduled has the following data. Draw the network, calculate te, Vt, St, critical path, total duration of the project Te,  ES, EF, LS, LF, TF ,and FF   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Job | 1-2 | 2-3 | 2-4 | 3-5 | 3-6 | 4-6 | 4-7 | 5-8 | 6-8 | 7-8 | | Duration | 2 | 3 | 5 | 4 | 1 | 6 | 2 | 8 | 7 | 4 | | CO3 | 20 |
| (OR) | | | | | |
| 8. |  | | A project scheduled has the following data. Draw the network, calculate te, Vt, St, critical path, total duration of the project Te,  ES, EF, LS, LF, TF ,and FF   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Activity | 1-2 | 2-3 | 2-4 | 3-5 | 4-5 | 4-6 | 5-7 | 6-7 | 7-8 | 7-9 | 8-10 | 9-10 | | to | 1 | 1 | 1 | 3 | 2 | 3 | 4 | 6 | 2 | 4 | 1 | 2 | | tm | 2 | 2 | 3 | 4 | 3 | 5 | 5 | 7 | 4 | 6 | 2 | 5 | | tp | 3 | 3 | 5 | 5 | 5 | 7 | 6 | 8 | 6 | 8 | 3 | 7 | | CO3 | 20 |
|  | | | **Compulsory:** |  |  |
| 9. | |  | Solve the following using dual simplex method  Max. Z = 2x1+2 x2 +4x3  Subject to 2x1 +3x2 +5x2 ≥ 2;  3x1 +x2 +7x2 ≤ 3 ;  x1 +4 x2 +6x2 ≤5;  x1, x2, x3 ≥ 0. | CO3 | 20 |

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