**CIE: Internal Assessment Details**

**Internal Assessment Question Paper – 1**

**M S RAMAIAH INSTITUTE OF TECHNOLOGY**

(Autonomous Institute, affiliated to VTU)

**DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING**

**Programme B.E**

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| **Term:** | **Aug 17th** 2016 **Dec 17th** 2016 | **Course Code:** | **IS532** |
| **Course:** | **Operations Research** | **Semester:** | V – A, B & C |
| **CIE:** | Test – I | **Max Marks:** | 30 |
| **Date:** | 3.10.2016 | **Time:** | 2pm-3pm |

**Portions for Test:** Lecture Nos. from 1 to 16 as per lesson plan.

**Instructions to Candidates:** Answer any two questions.

**Note:** Mobiles and Programmable Calculators are strictly prohibited.

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| **Sl No** | **Questions** | **Marks** | Bloom’s Level | CO |
| **1 a)** | i) List the different Phases of Operations Research | **(03)** | **U** | **CO1** |
|  | ii)A manufacturer has three machines A, B, C with which he produces three different articles P, Q, R. The different machine times required per article, the amount of time available in any week on each machine and the estimated profits per article are furnished in the following table:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Article | Machine time (in hrs) | | | Profit per article  (in rupees) | | A | B | C | | P  Q  R | 8  2  3 | 4  3  0 | 2  0  1 | 20  6  8 | | Available machine hrs | 250 | 150 | 50 |  |   Formulate the problem as LPP. | **(05)** | **AP** | **CO1** |
| **b)** | Consider the following linear programming model.  Maximize *Z* = 2*x*1 + 3 *x*2,  subject to  *x*1 + 3*x*2 ≤ 6  3*x*1 + 2*x*2 ≤ 6  and  *x*1 ≥ 0, *x*2 ≥ 0.  **Use the algebraic method to solve the above LPP. Label each as either feasible or infeasible** | **(07)** | **AP** | **CO2** |
| **2 a)** | The continuing education Division at the Ozark Community college offers a total of 30 courses each semester. The courses offered are usually of two types: Practical and Humanistic. To satisfy the demands of the community, at least 10 courses of each type must be offered each semester. The division estimates that the revenues of offering practical and humanistic courses are approximately $1500 and $1000 per course, respectively. Formulate the Linear programming model and also solve by using graphical method | **(08)** | **AP** | **CO1** |
| **b)** | i)Define slack and surplus variable with an example | **(02)** | **U** | **CO2** |
|  | ii) Consider the following linear programming model.  Minimize *Z* = 8*x*1 - 2 *x*2,  subject to  -4*x*1+2*x*2 ≤ 1  5*x*1 - 4*x*2 ≤ 3  and  *x*1 ≥ 0, *x*2 ≥ 0.  **Solve the above LPP by simplex method** | **(05)** | **AP** | **CO2** |
| **3 a)** | Consider the following linear programming model.  Minimize *Z* = 1.5*x*1 + 2.5 *x*2,  subject to  *x*1+3 *x*2≥ 3  *x*1 + *x*2 ≥ 2  and  *x*1 ≥ 0, *x*2 ≥ 0.  **Use graphical analysis to identify all the *corner-point solutions* for this model. Label each as either feasible or infeasible.** | **(08)** | **AZ** | **CO1** |
| **b)** | Solve the following LPP by penalty method.  Minimize *Z* = 3x1 + 2x2 + x3,  subject to  x1 + x2 = 7  3x1 + x2 + x3 ≥ 10  and  x1 ≥ 0, x2 ≥ 0, x3 ≥ 0. | **(07)** | **AP** | **CO2** |

# U : Understand ; AP: Apply ; AZ: Analyze