|  |  |
| --- | --- |
| **SESSION** | **JULY/AUG - 2022** |
| **PROGRAM** | **MASTER of business administration (MBA)** |
| **SEMESTER** | **II** |
| **course CODE & NAME** | **DMBA205 – OPERATIONS RESEARCH** |

**Assignment Set – 1st**

**Questions**

**1. What is Operations Research? Explain advantages and limitations of Operations Research**

**Ans: Operations Research (O.R.):** Churchman, Aackoff, and Aruoff defined operations research as “the application of scientific methods, techniques and tools to the operation of a system with optimum solutions to the problems” where 'optimum' refers to the best possible alternative.

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**2. Solve the following linear programming problem using its Dual:**

**Minimize Z = 40x1+ 200x2**

**Subject to: 4x1 + 40x2 ≥ 160**

**3x1 + 10x2 ≥ 60**

**8x1 + 10x2 ≥ 80**

**wherex1, x2 ≥ 0**

**3. (a) ABC Iron & Steel Co. has 03 open health furnaces & 5 rolling miles. Transportation costs (Rs. Per Quintal) for transporting steel for furnaces to rolling mills are shown in the following table.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mills**  **Furnaces** | **M1** | **M2** | **M3** | **M4** | **M5** | **Capacity** |
| **F1** | **4** | **2** | **3** | **2** | **6** | **8** |
| **F2** | **5** | **4** | **5** | **2** | **1** | **12** |
| **F3** | **6** | **5** | **4** | **7** | **3** | **14** |
| **Requirements** | **4** | **4** | **6** | **8** | **8** |  |

**Find the initial basic feasible solution using VAM.**

**(b) Four jobs are to be done on four different machines. Assign the jobs to maximize the total profit.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Machines**  **Jobs** | **M1** | **M2** | **M3** | **M4** |
| **M1** | **15** | **11** | **13** | **15** |
| **M2** | **17** | **12** | **12** | **13** |
| **M3** | **14** | **15** | **10** | **14** |
| **M4** | **16** | **13** | **11** | **17** |

**Assignment Set – 2nd**

**Questions**

**4.(a). What is Monte Carlo Simulation? Write in brief about the Monte Carlo Simulation Procedure.**

**Ans: Monte-Carlo Simulation**

The Monte-Carlo method is a simulation technique in which statistical distribution functions are created by using a series of random numbers. This approach has the ability to develop many months or years of data in a matter of few minutes on a digital computer.

The method is generally used to solve the problems that cannot be adequately represented by

**(b) Write short note on Erlang M/M/1: ∞/FCFS Queuing model.**

**Ans:** The queueing system where the distribution of arrival and the departure both are assumed to be Poisson or the distribution of inter-arrival time and service time are assumed to be Exponentially distributed are called as the Poisson queuing system. The main Poisson

**5. The following table gives the activities in a construction project and other relevant information:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Optimistic time**  **(indays)** | **Most likely time**  **(indays)** | **Pessimistic time**  **(indays)** |
| **1-2** | **30** | **44** | **54** |
| **1-3** | **8** | **12** | **16** |
| **2-3** | **1** | **2** | **3** |
| **2-4** | **2** | **3** | **5** |
| **3-4** | **8** | **10** | **12** |
| **4-5** | **14** | **22** | **25** |

**i) Draw a PERT diagram and mark clearly the Critical Path**

**ii) Determine the expected project length?**

**iii) What is the probability that the project would be successfully completed in less than 60 days?**

**6. What is Principle of Dominance in Game Theory? Reduce the following game by dominance property and solve it:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Player B** | | | |
|  |  | **B1** | **B2** | **B3** | **B4** |
| **Player A** | **A1** | **2** | **-2** | **4** | **1** |
| **A2** | **6** | **1** | **12** | **3** |
| **A3** | **-3** | **2** | **0** | **6** |
| **A4** | **2** | **-3** | **7** | **1** |

**Ans:** The principle of dominance states that if one strategy of a player dominates over the other strategy in all conditions then the later strategy can be ignored. A strategy dominates