**H.T No**

**Regulations:**

**A15**



**Sreenidhi Institute of Science and Technology**

(An Autonomous Institution)

**Code No: 5BC11 Date: 10-June-2019 (FN)**

**B.Tech II Year II-Semester External Examination, May/June-2019 (Supplementary)**

**OPERATIONS RESEARCH (ME)**

**Time: 3 Hours Max.Marks:75**

***Note: a****) No additional answer sheets will be provided.*

*b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.*

*c) Missing data can be assumed suitably.*

**Part - A Max.Marks:25**

**Answer all QUESTIONS.**

|  |  |  |
| --- | --- | --- |
| 1. | What are slack and surplus variables? | [3M] |
| 2. | Explain about Hungarian Method in Assignment problem. | [3M] |
| 3. | Write steps to solve n jobs through two machines problem | [3M] |
| 4. | What is saddle point in Game theory? | [3M] |
| 5. | Define EOQ in Inventory Model. | [3M] |
| 6. | What are the types of simulation? | [2M] |
| 7. | What is Degeneracy in Simplex Method? | [2M] |
| 8. | What are the situations for replacement? | [2M] |
| 9. | What is Dominance principle in Theory of Games? | [2M] |
| 10. | What is Queue behavior? | [2M] |

**Part – B Max.Marks:50**

**ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 10 MARKS.**

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| --- | --- | --- | --- |
| 11. | a) | Maximize  s.t | [5M] |
|  | b) | Write about scope and Phases of OR | [5M] |
|  |  |  |  |
| 12. | a) | Solve the following Transportation problem using MODI method.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | D1 | D2 | D3 | D4 | Supply | | S1 | 19 | 30 | 50 | 10 | 7 | | S2 | 70 | 30 | 40 | 60 | 9 | | S3 | 40 | 8 | 70 | 20 | 18 | | Demand | 5 | 8 | 7 | 14 |  | | [5M] |
|  | b) | Solve the following travelling salesman problem.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | TO | | | | | | | From |  | A | B | C | D | E | | A | - | 4 | 10 | 14 | 2 | | B | 12 | - | 6 | 10 | 4 | | C | 16 | 14 | - | 8 | 14 | | D | 24 | 8 | 12 | - | 10 | | E | 2 | 6 | 4 | 16 | - | | [5M] |
|  |  |  |  |
| 13. |  | Find the sequence of jobs that minimizes the total elapsed time to complete the following jobs on two machines.   |  |  | | --- | --- | | Jobs | 1 2 3 4 5 6 | | Machine A  Machine B | 3 12 5 2 9 11  8 10 9 6 3 1 | | [10M] |
|  |  |  |  |
| 14. |  | Solve the following game | [10M] |
|  |  |  |  |
| 15. |  | Patients arrive at a clinic in a poisson manner at an average rate of 6 per hour. The doctor on average can attend to 8 patients per hour. Assuming that the service time distribution is exponential, find (i) Average number of patients waiting in the queue. (ii) Average time spent by a patient in the clinic. | [10M] |
|  |  |  |  |
| 16. | a) | Write about Bellman’s principle of Optimality. | [5M] |
|  | b) | Write about MONTE-CARLO Technique. | [5M] |
|  |  |  |  |
| 17. |  | A machine costs Rs. 12,200. The scrap value is RS. 200. The maintenance costs of the machine are given below   |  |  | | --- | --- | | Year | 1 2 3 4 5 6 7 8 | | Maintenance Cost | 200 500 800 1200 1800 2500 3200 4000 |   When should the machine be replaced. | [10M] |
|  |  |  |  |
| 18. |  | A manufacturer has to supply 12000 units of a product per year to his customer. Shortages are not permitted and there is no lead time. The inventory holding cost is Rs. 0.20 per unit per month and the set-up cost per run is Rs. 350. Determine  (i) the economic lot size (ii) the period of one run  (iii) the minimum annual inventory cost. | [10M] |

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