KERALA AGRICULTURAL UNIVERSITY

B.Tech (Food.Engg.) 2014 Admission

Vth Semester Final Examination-January-2017

Cat. No: Meen.3106. **Marks: 50.00**

Title: Systems Engineering (1+1) **Time: 2 hours**

I Select the most suitable answer **(10x1=10)**

1. The number constraints in dual problem will be equal to the number of ----------in the primal. (Greater than or equal to type constraints, Less than or equal to type constraints, Decision Variables, Constraints)
2. If all the minimum ratios calculated are negative or infinity, then the LPP has ---------- solution (Multiple, Degenerate, Optimal, Unbound)
3. In the first phase of the two phase method, the objective function formed by the sum of all artificial variables has to be ----------
   (Maximized, Minimized, Depends on objective function, None of these)
4. In Big-M, method, the coefficient given to artificial variable in the objective function of a maximization problem is ----------
   (-M, M, 0, None of these)
5. Finding critical path in a project network is equivalent to finding ----------in the network.
   (Path with shortest duration, Path with longest duration, Path joining all the events, Path joining maximum number of nodes)
6. ----------activity only determines the dependency of one activity on the other and consumes no time or resources.
   (Critical, Non-Critical, Dummy, None of these)
7. FCFS, LCFS,SIRO are the common ----------of queuing model
   (Arrival pattern, Queue discipline, Departure pattern, Queue classification)
8. In standard form of LPP all the constraints should of the type ----------
   (Less than or equal to, Greater than or equal to, Equal to, Any of these)
9. The statement that Feasible region of a LPP is always a convex polygon is ----------
   (Always True, Always False, True or Fasle)
10. The customer behavior of not joining the queue because of its length is called ----------
    (Reneging, Balking, Jockeying, None of these)

II Write short notes/answers on any FIVE of the following **(5x2=10)**

1. Kendal's Notation
2. Fulkerson's Rule of numbering nodes
3. Artificial variable
4. Unbalanced Transportation Problem
5. Basic Feasible Solution
6. Multiple Optima
7. EOQ

III Write short answers on any FIVE **(5x4=20)**

1. Solve the following LPP Graphically

   Minimize $6X1 + 2X2$

   Subject to

   $100 \leq 5X1 + 4X2 \leq 200$

   $3X1 + 5X2 \leq 150$

   $X1, X2 \geq 0$
2. Explain Hungarian method of solving assignment problems.

3. Discuss the assumptions in LPP model.
4. What is float? What are the different types of float?
5. Differentiate between Payoff and Regret tables.
6. How are maximization transportation and assignment problems handled?
7. Write the dual of the following LPP
   Minimize 3X1 - 2X2 + 5X3
   Subject to
   $8X1 + 3X2 \leq 220$
   $3X1 + 5X2 - 2X3 \geq 80$
   $X1, X2, X3 \geq 0$

IV Write essay on any ONE **(1x10=10)**

1. The data for a PERT network given in the following table. Determine the critical path and the expected duration of completion of the project. Also calculate the probability that the project duration will exceed 60 days.

Activity	1-2	1-3	1-4	2-3	2-5	3-4	3-6	4-6	5-6
Optimistic time	2	6	6	2	11	15	3	9	4
Most likely time	4	6	12	5	14	24	6	15	10
Pessimistic time	6	6	24	8	23	45	9	27	16

2. Solve the following problem by simplex method
   Max. 12X 1 +18X 2 +10X 3
   Subject to
   $2X\,1 + 3X\,2 + 4X\,3 \leq 50$
   $X\,1 - X\,2 - X\,3 \geq 0$
   $X\,2 - 1.5X\,2 \geq 0$
   $X\,1, X\,2, X\,3 \geq 0$

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