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Roll No. _____

19/1566

B.C.A. Examination, 2019

Fourth Semester

Fourth Paper

(Optimization Techniques)

Time : Three Hours ***Maximum Marks : 75***

Note: Answer any **five** questions. **All** questions carry equal marks.

Note : The answers to short questions should not exceed 200 words and the answers to long questions should not exceed 500 words.

1. (a) Write the advantages and limitations of LPP. 5

   (b) Define Basic solution and Optimum solution. 5

P.T.O.

   (c) Discuss Primal and Dual Problem. 5

2. What do you understand by Simplex method to solve a LPP. Solve the following LPP 10

   Maximize

   $z = 3x_1 + 2x_2$

   S.to.c.

   $-2x_1 + x_2 \leq 1$

   $x_1 \leq 2$

   $x_1 + x_2 \leq 3$

   and $x_1, x_2 \geq 0$

3. Obtain the steady state equation for the Model M/M/1 : FIFO and derive the formula for

   (i) Average number of units in the queue.

   (ii) Average waiting time of an arrival in the queue. 15

4. Define a Queue and explain the various queue disciplines.

   A self-service store employs one cashier at its counter. Nine customers arrive on an av-

erage every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service time, find-

(i) Average number of customers in the system

(ii) Average number of customers in the queue.

(iii) Average time a customer spends in the queue. 8+7=15

5. Explain how the theory of replacement is used in the replacement of items whose maintenance cost varies with time. 15

6. Find the cost per period of individual replacement policy of an installation of 300 light bulbs, given the following: 15

(i) Cost of replacing an individual bulb is Rs. 2/-

http://www.mgkvponline.com

(ii) Conditional probability of failure is given below :

Week No. :	0	1	2	3	4
Conditional : Probability of failure	0	0.1	0.3	0.7	1.0

Also calculate the number of light bulbs that would fail during each of the four weeks.

7. Derive EOQ formula for an inventory model with finite production rate and shortages permitted. 15

8. Give Johnson's procedure for determining an optimal sequence for processing n jobs on two machines. Give the justification of the rule used in the procedure. 15