SARDAR PATEL UNIVERSITY
M.Sc. Examination, IInd Semester
Friday Date : 2-11-2018
Time :10.00 a.m. to 1.00 p.m.
Subject/Course Code : PSO2ESTAO2
OPERATION RESEARCH

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Q-1   Answer following.

(1)   Little's formula use in

   (a)   Non linear programming problem.
   (b)   Integer linear programming problem.
   (c)   Dual programming problem.
   (d)   Queue theory.

(2)   Kuhn-Tucker condition use in

   (a)   Simplex methods.
   (b)   Intiger-lpp.
   (c)   Non-lpp.
   (d)   None of these

(3)   General non-linear programming problem with single equality constrain are usually solved by

   (a)   Lanrange's method.
   (b)   Simplex method.
   (c)   Kuhn-Tucker condition.
   (d)   Dual simplex method.

(4)   In context of resources analysis overhead cost is

   (a)   Cost only.
   (b)   Direct cost only.
   (c)   In direct cost only.
   (d)   Both direct and indirect cost.

(5)   In integer lpp we use

   (a)   Two-phase method.
   (b)   Revise simplex method.
   (c)   Dual simplex method.
   (d)   Kuhn-Tucker condition.

(6)   Due to variation in demand, supply and foreign exchange b and c of lpp continuously change

   (a)   Re-formalize lpp continuously and solve by simplex method. .
   (b)   Use post optimality.
   (c)   Use parametric programming problem.

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(d) Non-of-above.

(7) In usual notation float analysis perform in

(a) In CPM.
(b) In PERT.
(c) In recourse analysis .
(d) Non-of-above.

(8) Point a is interior point of set A if every ϵ-neighbour contain

(a) Points which are in set A.
(b) Points which are not in set A.
(c) Points which are in set A and points which are not in set A.
(d) It depends on how small $\epsilon > 0$.

Q-2 Answer following.

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(1) Explain cost/time trade-off use in resources analysis.

(2) Write standard matrix form of lpp.

(3) Write simplex criteria for incoming non-basic variable for maximization problem.

(4) Define extreme point.

(5) What is "PERT" analysis.

(6) Draw diagram for queue system.

(7) Explain reneged behavior customer in queue.

(8) Write real life example where CPM and network is used.

(9) Define non-linear programming problem.

Q-3   A Discuss : Five operating characteristic of queue system.

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B Solve : Maximize $z = \frac{18}{5}X_1 - \frac{2}{5}X_1^2 + \frac{8}{5}X_2 - \frac{1}{5}X_2^2$; s.t.c $2X_1 + X_2 = 10$;

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$X_1, X_2 \geq 0$.

OR

B A cashier of medical store can serve five customer per fifteen minutes. Management thought cashier was idle because on average he receive only

eighteen customer per hours, on other hand frequent complain of long waiting took place. Compute (1) Average # of customer waiting in queue (2) queue length (3) variance of queue length. (4) variance of queue length

Q-4   A   In usual notation show that : (1) Every b.f.s is extreme point. (2) Every extreme   6
          is b.f.s to set of constrain $A\underline{X} = \underline{b}$.

      B   Using optimal simplex table given below for lpp : Maximize $z = 4X_1 +$ 6
          $6X_2 + 2X_3$, s.t.c $X_1 + X_2 + X_3 \le 3$, $X_1 + 4X_2 + 7X_3 \le 9$, $X_1, X_2, X_3 \ge$
          0. Determine the range of discrete in component b_1.

C_B	Y_B	X_B	Y_1	Y_2	Y_3	Y_4	Y_5
4	Y_1	1	1	0	-1	4/3	-1/3
6	Y_2	2	0	1	2	-1/3	1/3
	Z=16	0	0	0	6	10/3	2

OR

      B   Explain Gomory constrain use in integer lpp.

Q-5   A   Write dual simplex method.   6

      B   In usual notation consider following data in week and answer the quarries :   6

TASK	A	B	C	D	E	F	G	H	I
t_o	5	18	26	16	15	6	7	7	3
t_p	10	22	40	20	25	12	12	9	5
t_m	8	20	33	18	20	9	10	8	4

(1) Critical path. (2) What is probability that project will complete within 41.5 weeks. (3) Duration of project that will have 95 % chance of being completed.

OR

      B   Table given below gives data for normal and crash duration with cost. Crash the

activity so as project duration reduce by one week. Give your report

Activity	Normal		Crash	
	Week	Cost	Week	Cost
1 - 2	3	300	2	400
1 - 3	3	30	3	30
2 - 4	7	420	5	580
2 - 5	9	720	7	810
3 - 5	5	250	4	300
4 - 5	0	0	0	0
5 - 8	6	320	4	410
6 - 7	4	400	3	470
6 – 8	13	780	10	900
7 - 8	10	1000	9	1200

Q-6 A Write difference between CPM and PERT.   6
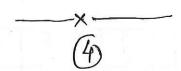
Q-6 B Discrete change in cost vector.   6

<div align="center">OR</div>

B State and prove simplex criteria for incoming non-basic variable .

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