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SARDAR PATEL UNIVERSITY
M.Sc. Examination, II[nd] Semester
Friday Date : 7-12-2012
Time :10.30 a.m. to 1.30 p.m.
Subject/Course Code : PSO2ESTAO2
OPERATION RESEARCH

Q-1 Answer following. 08

(1) Integer linear programming problem (lpp) develop by
  (a) Gomory.
  (b) Georg Dantzing.
  (c) Hadley.
  (d) Non of above.

(2) In lpp we use
  (a) G-inverse.
  (b) Unique Moore-Penrose inverse.
  (c) Product form of inverse.
  (d) Non of above

(3) $\sum_{i=1}^{r} a_{ij} X_j \leq b_i$ convert to equality using
  (a) Slack variable..
  (b) Surplus variable.
  (c) Artificial variable.
  (d) Non of above.

(4) Artificial variable is needed
  (a) To convert inequality $\sum_{i=1}^{r} a_{ij} X_j \geq b_i$ in equality.
  (b) To convert inequality $\sum_{i=1}^{r} a_{ij} X_j > b_i$ in equality.
  (c) To have initial b.f.s.
  (d) Non of above.

(5) Associated with every lpp (maximization or minimization) there always exist another lpp based on the same data and solution is called
  (a) Canonical problem.
  (b) Dual problem.
  (c) Optimization problem.
  (d) Non of above.

(6) Non linear programming problem include
  (a) Linear programming problem.
  (b) Dual problem.
  (c) Integer-lpp.
  (d) Non of above.

(7) Little's formula use in
  (a) linear programming problem.
  (b) Dual problem.
  (c) Integer -lpp.
  (d) Queue theory.

(8) Continuous change in cost is
  (a) Sensitivity analysis.
  (b) Parameter programming problem.
  (c) Structural change analysis.
  (d) Non of above.

P T O

Q-2 Attempt any **SEVEN** 14

(1) Define lpp.
(2) Write standard matrix form of lpp.
(3) Write simplex criteria-II.
(4) Explain reneged behavior of customer in queue system.
(5) Who develop simplex method.
(6) What do you mean by term "feasible solution".
(7) Draw diagram for queue system.
(8) Define convex function.
(9) Give real life example of network schedule.

Q-3 A. Derive distribution of arrival (pure birth process) 06

B. Write a brief note on dual simplex method. 06

OR

B. Write complete note on integer lpp 06

Q-4 A. Discuss discrete change in cost vector C and availability (requirement) vector $\underline{b}$.

B. Minimize $Z = f(x_1, x_2) = 3e^{2x_1+1} + 2e^{x_2+5}$ subject to 06
$x_1 + x_2 = 7$ and $x_1, x_2 \geq 0$.

OR

(B) Explain : Resources analysis. 06

Q-5 A. Write difference between CPM and PERT. 06

B. The time spent on his job has an exponential with mean 30 minutes. If worker repairs set in fifo, and if the arrival of set is approximately Poisson with an average rate of 10 per a day, what is expected idle time each day ? How many job are ahead of the average set brought in ? 06

OR

B. Project consist of following activities as follows: 06

Activity	Immediate Predecessor	Estimated duration (days) Optimistic	Most likely	Pessimistic
A	--	1	1	7
B	--	1	4	7
C	--	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D,E	3	6	15
H	F,G	1	2	3

(1) Draw the PERT network (2) Compute expected project compilation time. (3) What duration will have 95% confidence for project compilation? (4) If average duration for activity F increase to 14 days, what will be it's effects on the expected project completion time which will have 95% confidence? [Note : standard normal $Z = 1.645$, area under normal curve from zero to Z is 0.45]

Q-6 A. Define non-lpp. Solve : min $z = X_1^2 + X_2^2 + X_3^2$, s.t.c $4X_1 + X_2^2 + 2X_3 = 14$; 06
$X_1, X_2 \geq 0$.

B. Discuss post optimality analysis. 06

OR

B. Show that if either problem from the primal-dual pair has an optimal solution, then the other problem has an optimal solution. 06

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