PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BCom DEGREE EXAMINATION MAY 2017
(Third Semester)

Branch - e-COMMERCE

OPERATIONS RESEARCH

Time : Three Hours   Maximum : 75 Marks

SECTION-A (20 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (10x2 = 20)

1   Define LPP.

2   Write any two methods of solving LPP.

3   Give the main condition for solving an assignment problem.

4   What is safety stock?

5   What is group replacement policy?

6   Write the formula for calculating present worth factor (pwf) in replacement problems.

7   Give the classification of general queuing model.

8   Define sequencing.

9   Write the three time estimates used in PERT analysis.

10   What is crashing?

SECTION - B (25 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5 x 5 = 25)

11 a Solve graphically the following LPP:

Minimize $Z = 20x_1 + 40x_2$

S.T. $36x_1 + 6x_2 > 108$, $3x_1 + 12x_2 > 36$, $20x_j + 10x_2 > 100$ and $x_h, x_2 > 0$.

OR

b Write the various steps for formulating a primal-dual problems.

12 a Find the initial basic Feasible solution to the following transportation problem using the north-west comer rule.

	D	E	F	G	Available
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Requirement	200	225	275	250	

OR

b Explain the following terms in inventory theory in brief:
(i) Lead time (iii) Re-order point (iii) EOQ.

13 a Describe the various types of replacement situations.

OR

b A firm is considering replacement of a machine whose cost price is Rs. 12,200 and the scrap value Rs. 200. The running cost in rupees are found from experience to be as follows:

Year:	1	2	3	4	5	6	7	8
Running cost:	200	500	800	1,200	1,800	2,500	3,200	4,000

When should the machine be replaced?

14 a Briefly explain the important characteristics of queuing system.

OR

   b Determine the optimum sequence for performing the job and minimum elapsed time.

Job :	J_i	J_2	J_3	J_4	J_5	J_6
Machine A :	1	3	8	5	6	3
Machine B :	5	6	3	2	2	10

15 a Distinguish between CPM and PERT.

OR

   b Draw the network for the data given below and compute critical path.

Activity :	A	B	C	D	E	F	G	H	I
Predecessor:	-		-	A	B	C	D,E	B	H,F
Estimated time (Weeks):	3	5	4	2	3	9	8	7	9

SECTION - C (30 Marks)
Answer any THREE Questions
ALL Questions Carry EQUAL Marks ($3 \times 10 = 30$)

16   Solve the following LPP by using Simplex method:

$$Max\ Z = X_1 + x_2 + 3x_3$$
$$s.t\ 3x_1 + 2x_2 + x_3 < 3$$
$$2x_1 + x_2 + 2x_3 < 2$$
$$and\ X_1,\ x_2, x_3 > 0.$$

17   Solve the following assignment problems:

Workers

	W	X	Y	Z
A	8	7	9	10
B	7	9	9	8
C	10	8	7	11
D	10	6	8	7

18   Let $v = 0.9$ and initial price is Rs. 5,000 running costs are as follows:

Year:	1	2	3	4	5	6	7
Running cost (Rs.):	400	500	700	1,000	1,300	1,700	2,100

What would be the optimum replacement interval?

19   A supermarket has a single cashier. During the peak hours, customers arrive at a rate of 20 customers per hour. The average number of customers that can be processed by the cashier is 24 per hour. Calculate:
   i)   The probability that the cashier is idle
   ii) The average number of customers in the system
   iii) The average number of customers in the queue.

20   A project consists of eight activities with the following informations:

Activity :	1-2	1-3	1-4	2-5	3-5	4-6	5-6	6-7
to :	1	1	2	1	2	2	3	1
tm :	1	4	2	1	5	5	6	2
tp:	7	7	8	1	14	8	15	3

i) Draw the PERT network and find out the expected project completion time (ii) Find the critical path.