PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION MAY 2017
(Fourth Semester)

Branch - COMMERCE WITH COMPUTER APPLICATIONS

OPERATION RESEARCH

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

SECTION-A (20 Marks)
Answer ALL questions
ALL questions carry EQUAL marks (10 x 2 = 20)

1 Write the need for an artificial variables in LPP.
2 Name the components of a LPP.
3 When will you say that an assignment problems is balanced?
4 Define safety stock.
5 What do you mean by group replacement?
6 Explain the meaning: Money is worth 10% per year.
7 Define queuing model.
8 What is no passing rule?
9 Define direct costs.
10 Define crash time.

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

11 a Solve the LPP using graphical method

Max Z = 2xi 4- 3x2
S.T. $X! - x_2 < 2$
$xi + x_2 > 4$
$Xi, x_2 > 0.$

OR

b Write down the dual problem of the following LPP.

Min $Z = x_2 + 3x_3$
S. T. $2xj + x_2 < 3$
$x_{\{} + 2X_2 + 6x_3 > 5$
$-Xi + x_2 + x_3 = 2$
$Xi, X_2, x_3 > 0.$

12 a An item has a demand of 9,000 units / year. The cost of one procurement is Rs. 100 and holding cost per unit is Rs. 240 / yr. Shortages are not allowed. Determine EOQ, time between orders and number of orders per year.

OR

b Find the optimum assignment for the following

	Contractors			
	1	2	3	4
Subassemblies 1	15	13	14	17
2	11	12	15	13
3	13	12	10	11
4	15	17	14	16

13 a The cost of a machine is Rs. 6,100 and its scrap value is Rs. 100. Find the optimum replacement time

Year:	1	2	3	4	5	6	7	8
Maintenance cost:	100	250	400	600	900	1200	1600	2000

OR

Cont . . .

13 b A machine costs Rs. 500. Operation and maintenance costs are 0 for first year and increase by 100 every year. If the money is worth 5% every year, find the optimal replacement period.

14 a Define: Total float, free float, independent float and interference float.

OR

b Draw the network diagram for the following A, C, D can start simultaneous by E > B, C; F, G > D; H, I > E, F; J> I, G; K > H; B > A.

15 a Explain the components of a queueing system.

OR

b Write the assumptions made while solving a sequencing problem.

SECTION - C (30 Marks)

Answer any **THREE** Questions
ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

16 Solve, using Simplex method

Max $Z = 4xi + 10x_2$

St $2xi + x_2 < 50$

$2xj + 5x_2 < 100$

$2xi + 3x_2 < 90$

$Xi, x_2 > 0.$

17 Use VAM to find initial solution. Also find the optimum solution.

	D1	D2	D3	D4	Supply
SI	**6**	**1**	**9**	**3**	**70**
S2	**11**	**5**	**2**	**8**	**55**
S3	**10**	**12**	**4**	**7**	**70**
Demand	**85**	**35**	**50**	**45**	

18 The cost of replacing an individual item is Rs. 1.25. The cost of group replacement is 50 paise. Find the best interval for group replacement.

End of month : 1	**2**	**3**	**4**	**5**
Probability of failure to date: 0.10	**0.30**	**0.55**	**0.85**	**1.00***

1000 items are in use.

19 In a super market, the average arrival rate of customer is 10 in every 30 minutes follow Poisson distribution. The average time taken by the cashier to handle a customer is 2.5 minutes. Find the probability that the queue length exceeds 6. Also find the expected system time.

20 Find the expected project duration, expected variance of the duration and standard deviation of the completion time

Activity: 1-2	**1-3**	**1-4**	**2-4**	**2-5**	**3-5**	**4-5**
to *	**2**	**3**	**4 8**	**6**	**2**	**2**
tm:	**4**	**4**	**5 9**	**8**	**3**	**5**
tp:	**5**	**6**	**6 11**	**12**	**4**	**7**

Z-Z-Z END