14STU23

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2018
(Sixth Semester)

Branch - STATISTICS

CORE ELECTIVE - II: OPERATIONS RESEARCH - II

Time : Three Hours Maximum : 75 Marks

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

1 What is a Two person zero-sum game?
2 Define Saddle point.
3 Write any two situations where the replacement of certain items needs to be done.
4 What is individual and group replacement policies?
5 Define Simulation.
6 Give any two real world practical applications of simulation.
7 Define a Queue.
8 Give the formula for server utilization factor..
9 Define a Critical Path.
10 Mention the types of floats.

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

11 a Solve the game whose pay off matrix is given by

	Player B			
Player A	17	3	4	
	5	6	4	5
	7	2	0	3

OR

b Solve the following game graphically

	Player B			
Player A	1	3	-3	7
	2	5	4	-6

12 a Describe various types of replacement situations in brief.

OR

b A Firm is considering replacement of a machine, whose cost price is Rs. 12,200 and the scrap value is only Rs.200. The maintenance costs (in prices) are found from experience to be as follows:

Year	1	2	3	4	5	6	7	8
Maintenance Cost	200	500	800	1,200	1,800	2,500	3,200	4,000

When should the machine be replaced?

13 a Briefly explain the concept of event-type simulation with an example.

OR

b Point out the various steps involved in the generation of random numbers.

14a In a super market, customers arrive according to Poisson distribution with a mean arrival rate of 5 per hour and the service time was exponentially

14 a Cont...

i) Average number of customers in the shop and the average number of customers waiting for a service.

ii) The percent of time an arrival can walk right in without having to wait.

iii) The percentage of customers who have to wait for getting service.

OR

b Write a brief note on (M/M/l) : (N/FIFO) queue and its applications.

15a Distinguish between CPM and PERT.

OR

b Draw the network for the data given below and compute

i) Critical path and ii) Total duration of the project

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 x 1 0 = 30)

16 Solve the following game using dominance property.

		Firm B		
		I	II	
Firm A	I	TO	5	-2
	H	13	12	15
	III	16	14	10

17 The cost of a new machine is Rs. .5,000. The maintenance cost of n^{lh} year is given by $C_n=500(n-l);n=l,2,.....$ Suppose that the discount rate per year is 0.5. After how many years it will be economical to replace the machine by new one?

18 List out the various advantages and limitations of using simulation.

19 Explain the important characteristics of queuing system.

20 A Project consists of eight activities with the following relevant information:

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

I) Draw the PERT network and find out the expected project completion time,

ii) Find the variance of each activity.

Z-Z-Z END