rstj CULFLGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 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 (10 x 2 = 20)

1 Define strategy for a player.
2 What is meant by saddle point?
3 State group replacement policy.
4 What happens to the items that deteriorate gradually for optimum replacement interval?
5 Define simulation.
6 State the classification of simulation models.
7 Define size of the queue.
8 What do you mean by Poisson queues?
9 Define dummy activity in network theory .
10 Given variance = 3, duration of project = 17 days what is the probability of meeting the due date of 19 weeks?

SECTION - B (25 Marks!
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5x5= 25)

11 a For what value of X, the game with following payoff matrix is strictly determinable?

		Player B		
		B_1	B_2	B_3
Player A	A_1	X	6	2
	A_2	-1	X	-7
	A3	' -2	4	3

OR

b Solve the game:

	Player B	
	B_1	**B_2**
Player A	A_1 30	2
	A_2 4	14
	A_3 6	9

12 a The yearly cost of two machines A and B, when money value is neglected is shown in table below. Find their cost patterns if money value is 10% per year and hence find which machine is more economical.

Year	1	2	3
Machine A (Rs.)	1800	1200	1400
Machine B (Rs.)	2800	200	1400

OR

b Explain group replacement policy.

13 a Explain Monte Carlo simulation.

OR

b Explain generation of random numbers.

Cont...

Cont...

14 a On an average, 6 customers reach a telephone booth every hour to make calls. Determine the probability that exactly 4 customers will reach in 30-minutes period, assuming that arrivals follow Poisson distribution.

OR

b Customers arrive at the first class ticket counter of a theatre at the rate of 12 per hour. There is one clerk serving the customers at the rate of 30 per hour.
i) What is the probability that there is no customer in the counter.
ii) What is the probability that there are more than 2 customers in the counter?

15 a Explain the rules of construction of a network.

OR

b Draw a network to represent the project.

Task : A < D, A < E, B < F, D < F, C < G, C < H, F < I, G < I

Task:	A	B	C	D	E	F	G		H I
Davs-:	8	10	8	10	16	17	17	14	9

SECTION - C (30 Marks!

Answer any THREE Questions

ALL Questions Carry EQUAL Marks (3 x 1 0 = 30)

16 Solve the following game by using the principle of dominance.

Plaver B

Player A	I	II	III	IV	V	VI
1	j4	2 -	0	2	1	1 j
	4	3	1	3	2	2
J	j4	3	7	-5	1	2 —!
4	j4	3	4	-1	2	j
5	| 4	3	J	-2	2	2 !

17 The maintenance cost and resale value per year of a machine whose purchase price is Rs. 7,000 is given below:

Year:	1	2	3	4	5	6	7	**8**
Maintenance cost in Rs. :	900	1,200	1,600	2,100	2,800	3,700	4,700	5,900
Resale value in Rs. :	4,000	2,000	1,200	600	500	400	400	400

When should the machine be replace?

18 Generate a sequence of 5 two - digit random numbers by employing mixed congruential method given the recursive equation as $r_{i+}i = (2\ r; + 53)$ (modulo 100) and $r_0 = 46$.

19 A self service store employs one cashier at its counter. Nine customers on an average every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service time, find
(i) Average number of customers in the sy stem
(ii) Average number of customers in the queue or average queue length
(iii) Average time a customer spends in the system
(iv) Average time a customer waits before being served.

20 A mother notes that when her teenage son uses the telephone, he takes no less then 10 minutes for a call and sometimes as much as one hour. Twenty-minutes calls are more frequent than calls of any other duration.
If son's phone call were an activity in a PERT project:
(i) What would be the phone call's expected duration?
(ii) What would be its variance ?
(iii) In scheduling the project, how much time would be allocated for the phone call?