PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2022
(Sixth Semester)

Branch – **STATISTICS**

OPERATIONS RESEARCH - II

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 1 = 10)

1 Every game results in an outcome is loss or gain or a draw, usually called
(i) Payoff (ii) strategy
(iii) Value of the game (iv) Zero sum game

2 In a game with a saddle point, maximum for player I equals....for Player II
(i) Minimax (ii) Maximin
(iii) Row minima (iv) Column maxima

3 The group replacement policy is suitable for identical low cost items which are likely to _____
(i) fail suddenly (ii) fail completely and suddenly
(iii) fail over a period of time (iv) be progressive and retrogressive

4 The problem of replacement is felt when job performing units fail _____
(i) suddenly and gradually (ii) gradually
(iii) suddenly (iv) neither gradually nor suddenly

5 Simulation is an imitation of .....
(i) Imaginary (ii) Reality
(iii) Value (iv) New proposals

6 The range of random numbers assigned to each value of the variable is in direct proportion to its.....
(i) Monte carlo (ii) Inverse probability
(iii) Cumulative probability (iv) CPM

7 The probability that the system is busy, $\rho = \lambda/\mu$
(i) $\rho = -\lambda/\mu$ (ii) $\rho = \lambda/\mu$
(iii) $\rho = \lambda/-\mu$ (iv) $\rho = \lambda^2/\mu$

8 The Probability that there are more than n customers in the system
(i) ρ^n (ii) ρ^{2n}
(iii) ρ^{n+1} (iv) ρ^{-n}

9 An activity which does not consume either any resource and time is known as .....activity
(i) Predecessor (ii) successor
(iii) Dummy (iv) Dangling

Cont...

10 All the activities in any critical path are called .....Activities
(i) Dual (ii) Dummy
(iii) Dangling (iv) Critical

SECTION - B (35 Marks)

Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 7 = 35)

11 a Write the assumptions of Game Theory.

OR

b Determine the saddle-point(s) of the following matrix:

Pay-offMatrix

B / A	B_1	B_2	B_3	B_4
A_1	5	15	7	8
A_2	13	12	10	20
A_3	25	30	15	40
A_4	60	50	10	8

12 a Define replacement problem and write any two replacement situation.

OR

b Machine A costs Rs. 9,000. Annual operating costs are Rs.200 for the first year, and then increase by Rs. 2,000 every year. Determine the best age at which to replace the machine. If the optimum replacement policy is followed, what will be the average yearly cost of owning and operating the machine?

13 a Explain the classification of simulation models.

OR

b Explain the generation of Random Numbers.

14 a Explain the characteristics of queueing system.

OR

b Explain the queue system M/M/1 : ∞ / FIFO.

15 a Explain the Types of Activities in Network Analysis.

OR

b From the following table draw a Network diagram and indicate the EST, LST, EFT and LFT of the various activities

Name of the Activity	Pre-requisite Activity	Estimated Time (days)
A	None	2
B	None	3
C	None	4
D	A	6
E	B	7
F	C	5
G	D&E	8
H	B	9
I	H&F	5

SECTION - C (30 Marks)

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

16 Reduce the following game to 2X2 by graphic method and find the various optimum results.

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

17 A firm is considering replacement of a machine, whose cost price is Rs. 12,200 and the scrap value, Rs. 200. The running (maintenance and operating) 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	1200	1800	2500	3200	4000

When should the machine be replaced?

18

The distribution of inter-arrival time in a single server model is And the distribution of service time is	T=1	2	3
	f(T) = ¼	½	¼
	s = 1	2	3
	F(S) = 1/2	1/4	1/4

Complete the following table using the two digit random numbers as 12, 40, 48, 93, 61, 17, 55, 21, 85, 68 to generate arrivals and 54, 90, 18, 38, 16, 87, 91, 41, 54, 11 to generate the corresponding service times.

Arrival Random	Arrival Number	Number Time	Time service begins	Random Number	Time service ends	Waiting time in queue

19 Explain the queue system M/M/c :N / FIFO.

20 The following table gives the information relating to the various activities concerning a project.

Name of the Activity	Pre–requisite Activity	Time Estimated (in days)
A	None	2
B	A	3
C	A	4
D	Band C	6
E	None	2
F	E	8

From the above information relating to the project:

(i) Draw up a Network diagram
(ii) Determine the critical path
(iii) Ascertain the minimum completion time of the project.
(iv) List the critical and non-critical activities.
(v) Find out the total float, Free float and independent float for the various activities.

Z-Z-Z END