

PGDORM SEM II

ASSIGNMENTS

Academic Year 2018-19

***Please follow the instructions and submit the assignment in the given time.**

1. Assignment is compulsory.
2. Last date to submit these assignments is the last date of your semester-2 examination (which will be held in the month of July). On the date of the examination, get your assignment answer sheet for the corresponding subject.
3. All assignments should be in written format. Assignment sheets to be collected from IDOL, Room no. 5.
4. No typed assignment or Xerox will be accepted.
5. Outstation students have to send the assignments by post, no assignment on mails to be approved.
6. Outstation students can send on the address:
PGDFM / PGDORM Section, Room no 112, Institute of Distance and Open Learning, University of Mumbai, Kalina, Santacruz (East), Mumbai-400098.

APPLIED STATISTICS FOR MANAGEMENT

(20 Marks)

1) Calculate Spearman's Rank correlation for the data given

X	50	55	65	50	55	60	50	65	70	75
Y	110	110	115	125	140	115	130	120	115	160

2) Calculate Karl Pearson's Coefficient of correlation

X	100	200	300	400	500	600	700
Y	30	50	60	80	100	110	130

3) ABC Co. is bringing out a new toy. It is attempting to decide whether to bring out a full, partial or small product line. The company has three levels of demands Good, Fair & Poor with estimated probabilities 0.2, 0.4, 0.4 respectively. The payoff table is as under

Suggest suitable decision 1) using EMV Criterion 2) EOL Criterion.

	FULL	PARTIAL	POOR
GOOD	8000	7000	5000
FAIR	5000	4500	4000
POOR	-2500	-1000	0000

4) Given following Payoff matrix suggest best course of action using i) maximax ii) minimin

iii) maximin iv) Laplace v) minimax regret.

State of nature = S1, S2, S3, S4, S5. Actions = A1, A2, A3, A4, A5

	A1	A2	A3	A4
S1	100	150	300	150
S2	-50	200	200	200
S3	125	50	-100	300
S4	140	100	150	100
S5	135	100	0	0

5) Ten pieces of cloth out of different rolls of equal length contained following number of defects (1,3,5,0,6,0,9,4,4,3). Draw a suitable control chart & state whether the process is in a state of control.

6) State whether the new treatment is superior to the old treatment. (LOS 5%)

	FAVOURABLE RESULT	UNFAVOURABLE RESULT
NEW	140	30
OLD	60	20

7) A tea company appoints 4 salesmen A, B, C, D & observe their sales in 3 seasons, details are given below

	A	B	C	D
SUMMER	36	36	21	35
WINTER	28	29	31	32
MONSOON	26	28	29	29

- Do the salesmen significantly differ in performance?
- Is there a significant difference in sales between seasons?

ADVANCED LINEAR PROGRAMMING

(20 Marks)

- 1) A firm is producing two products **BETA** and **GAMA** which yield unit profit of Rs. 35 and Rs. 40 respectively. The two products are known to need 4 kg and 3 kg of raw material, respectively, per unit and 5 and 4 labour hours respectively. 96 kg of raw material and 120 labour hours are available. The problem is represented as follows

$$\text{Maximize } Z = 35X_1 + 40X_2$$

$$\text{Subject to } 4X_1 + 3X_2 \leq 96 \dots\dots\dots(\text{Resource 1})$$

$$4X_1 + 5X_2 \leq 120 \dots\dots\dots(\text{Resource 2})$$

The max profit obtainable is Rs. 1005/- But the Manager wants to set a **Goal** to achieve a profit of Rs. 1400/-

Can you help him? Explain Mathematically. (04 Marks)

- 2) Explain the following term with illustrations (*any 2*)

1) Gomory's Cutting Plane Algorithm for Integer LPP

2) Dynamic Programming

3) Non Linear Programming (04 Marks)

- 3) Solve the given LPP by Simplex only. Find an Optimum Solution. Check if the same solution can be called as Optimum Solution to IPP. If not iterate till you get Integral Values for the Basis.

$$\text{Maximize } Z = 95X_1 + 85X_2 \quad (04 \text{ Marks})$$

Subject to,

$$1) 3X_1 + 4X_2 \leq 72 \dots(R1)$$

$$2) 6X_1 + 3X_2 \leq 90 \dots(R2)$$

$$X_1, X_2, \geq 0$$

- 4) Solve the following as Parametric Problem:

$$\text{Maximize } Z = 3X_1 + 2X_2$$

$$\text{Subject to, } 1. X_1 + 2X_2 \leq 10 - 4t$$

$$2. 4X_1 - X_2 \leq 8 + 4t,$$

$$\text{for } X_1, X_2 \text{ and } t \geq 0 \quad (04 \text{ Marks})$$

- 5) Solve the following as Parametric Problem:

$$\text{Maximize } Z = (8 - 2t) X_1 + (6 + t) X_2$$

$$\text{Subject to, } 1. 5X_1 + 3X_2 \leq 60$$

$$2. 4X_1 + 6X_2 \leq 72$$

$$\text{for } X_1, X_2 \text{ and } t \geq 0 \quad (04 \text{ Marks})$$

OPTIMIZATION MODELS - 2

(20 Marks)

1. A small project consists of following activities

Activity	Preceding Activity	Time (days)
A	-	4
B	-	5
C	-	7
D	A	6
E	B	7
F	C	6
G	D	5
H	E	8
I	F	5

- i. Draw networks diagram and find critical path and project completion time
- ii. Find EST, EFT, LST, LFT, HS, TS, TT, FF, IF, INT.F (10 Marks)

2. A project manager has made following 3-point time estimates for various activities of a project.

Events	Three point estimates in days		
	Optimistic	Most likely	Pessimistic
1-2	1	3	5
1-3	2	4	6
2-5	3	5	7
2-4	5	6	7
5-6	5	7	9
4-6	6	8	10
3-6	7	9	11
6-7	2	3	4

- i. Draw the PERT networks and find out the expected project completion time.
- ii. What project completion will have 99% confidence of completion?
- iii. What is the probability of completing the project in 24 days? (10 Marks)

3. 4 workers W1, W2, W3 and W4 are to be assigned 4 machines M1, M2, M3 and M4. Profit potential for each worker-machine combination is given in Rs thousands. Find optimal assignment of workers and machines to maximize total profit. Worker W2 cannot be assigned machine M3

	M1	M2	M3	M4
W1	24	32	26	29
W2	31	38	X	34
W3	28	24	30	26
W4	26	25	29	21

(10 Marks)