ASSIGNMENT BOOKLET

Post Graduate Diploma in Applied Statistics

(Specialisations in Industrial Statistics/Biostatistics)

MSTE-001: Industrial Statistics-I

(Valid from 1st January 2026 to 31st December, 2026)

It is compulsory to submit the assignment before filling the Examination Form. Candidates should submit the latest assignment for the courses for which they filled the examination form. Only Work books/Lab Record Books are needed to be submitted for the Lab Courses.

School of Sciences
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068
(2026)

Dear Student,

Please read the information on assignments in the Programme Guide that we have sent you after your enrolment. A weightage of 30%, as you are aware, has been earmarked for continuous evaluation, **which would consist of one tutor-marked assignment** for this course. The assignment for the theory course MSTE-001 has been given.

Instructions for Formatting Your Assignments

Before attempting the assignment, please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ENROLLMENT NO :……

NAME :……

ADDRESS :……

……

……

PROGRAMME CODE: PGDAST

COURSE CODE: MST-001

COURSE TITLE: FOUNDATION IN MATHEMATICS AND STATISTICS

STUDY CENTRE: ……..……. DATE: …….……...

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
3) Leave 4 cm margin on the left, top and bottom of your answer sheet.
4) Your answers should be precise.
5) This assignment is to be submitted at the Study Centre.

   We strongly suggest that you should retain a copy of your answer sheets.
6) This assignment is valid from January 1st, 2026 up to December 31, 2026.
7) The latest assignments should be submitted by the candidate.
8) **You cannot fill the Exam Form for this course** till you have submitted this assignment. So solve it and **submit it to your study centre at the earliest.** If you wish to appear in the **TEE, June 2026,** you should submit your TMAs by **March 31, 2026.** Similarly, If you wish to appear in the **TEE, December 2026,** you should submit your TMAs by **September 30, 2026.**

We wish you good luck.

TUTOR MARKED ASSIGNMENT

MSTE-001: Industrial Statistics-I

Course Code: MSTE-001

Assignment Code: MSTE-001/TMA/2026

Maximum Marks: 100

Note: All questions are compulsory. Answer in your own words.

1. State whether the following statements are **True** or **False**. Give reason in support of your answer: **(5×2=10)**

(a) The c-chart is suitable for monitoring to proportion of defective.

(b) In single sampling plan, if we increase acceptance number then the OC curve will be steeper.

(c) In a series system, improving the reliability of the weakest component gives the maximum improvement in system reliability.

(d) If the probabilities are not associated with the occurrence of different states of nature, then the situation is known as decision making under risk.

(e) In single sampling plan, if we increase acceptance number then the OC curve will be steeper.

2. A factory purchases bolts in lots of 800. Acceptance is decided using a single-sampling plan with sample size n = 20 and acceptance number c = 3. Assume that 2% of defective items are considered acceptable quality and 7% defective items are considered unacceptable quality.

Find:

(i) The probability of accepting a lot when the incoming quality level is 5% defective.

(ii) The Average Outgoing Quality (AOQ), assuming rejected lots are completely screened and defectives are replaced.

(iii) The Average Total Inspection (ATI). **(10)**

3. A company manufactures water pumps. The quality control inspector of the company takes a sample of 100 water pumps at regular intervals. The numbers of defective pumps for 15 samples are given below:

Sample No.	Defective Pumps	Sample No.	Defective Pumps	Sample No.	Defective Pumps
1	5	6	0	11	6
2	6	7	4	12	1
3	3	8	8	13	10
4	2	9	2	14	2
5	1	10	2	15	1

Use the data to construct a suitable chart. Observe the results and comment on the control of the process as indicated by the chart. **(10)**

4. A two-person zero-sum game having the following payoff matrix for player A

		Player B				
		I	**II**	**III**	**IV**	**V**
	I	2	4	3	8	4
Player A	**II**	5	6	3	7	8
	III	6	7	9	8	7
	IV	4	2	8	4	3

(i) Check whether saddle point exit or not.

(ii) If saddle point does not exit then determine optimal strategies for both the manufacturers and value of the game. **(20)**

5. A system consists of six independent components arranged as follows:

- Two components with reliabilities 0.9 and 0.8 connected in series.
- This series combination is connected in parallel with a component of reliability 0.7.
- The resulting subsystem is connected in series with two components of reliabilities 0.85 and 0.95.

Draw the reliability block diagram and calculate the overall reliability of the system. **(20)**

6. In a manufacturing process, 4 items are inspected every hour for 10 consecutive hours. The measured quality characteristic (in mm) is given below:

Hour	**1**	**2**	**3**	**4**
1	50	52	51	49
2	51	50	53	52
3	49	50	48	51
4	52	54	53	51
5	50	49	51	50
6	53	52	54	55
7	48	49	50	47
8	51	52	50	51
9	54	55	53	54
10	50	51	49	50

Construct control chart for variability and mean and comment on the state of statistical control. If the process is out of control, obtain revised control limits. **(20)**

7. A restaurant produces fresh burgers for its customers every day. The company is known for supplying fresh burgers and never uses burgers prepared on the previous day. Demand for burgers is uncertain, preparation capacity is limited, and the restaurant has the option of producing 0, 100, 200, 300 and 400 burgers every day. It has been estimated that the cost of producing each burgers pack is Rs.15. Each burger is sold for Rs. 20. Prepare a payoff matrix when 0, 100, 200, 300 or 400 demands of the burgers turn up on any given day. Prepare an opportunity loss table and hence find the optimum strategy. **(10)**