

# Unit 6 - Week 4

**Course outline**

How does an NPTEL online course work?

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Assignment Detailed Solution

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## Assignment 4

The due date for submitting this assignment has passed. **Due on 2020-02-26, 23:59 IST.**  
As per our records you have not submitted this assignment.

1) A company makes plastic storage bags for the food industry. Out of the hourly production of 2000 500-g bags, 40 were found to be nonconforming. If the inspector chooses a bag randomly from the hour's production, what is the probability of it being nonconforming?

a. 0.06  
b. 0.04  
c. 0.02  
d. None of these

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: c.

2) In the production of metal plates for an assembly, it is known from past experience that 10% of the plates do not meet the length requirement. Also, from historical records, 5% of the plates do not meet the width requirement. Assume that there are no dependencies between the processes that make the length and those that trim the width. What is the probability of producing a plate that meets both the length and width requirements?

a. 0.921  
b. 0.855  
c. 0.955  
d. None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: b.

3) What proportion of the parts will not meet at least one of the requirements for question number 2?

a. 0.145  
b. 0.175  
c. 0.185  
d. None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: a.

4) The number of defects per shift has a Poisson distribution with  $\lambda = 3.8$ . What is the probability that the second shift produces fewer than three defects?

a. 0.1615  
b. 0.2243  
c. 0.1856  
d. 0.2689

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: d.

5) A process is known to produce 5% nonconforming items. A sample of 40 items is selected from the process. What is the probability of obtaining no more than 3 nonconforming items in the sample? (Hint: Consider Binomial distribution)

a. 0.7865  
b. 0.8618  
c. 0.8924  
d. 0.9248

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: b.

### COMMON DATA QUESTIONS (QUESTION 6 to QUESTION 8)

Twenty five patients of a certain glucose-related group were randomly selected, and their systolic blood pressure, blood glucose level, and total cholesterol level were measured. Upon administration of a certain drug, after 6 months the same characteristics were measured for the selected patients. The data are shown in Table below.

Patient Number	Before			After		
	Blood Pressure	Blood Glucose	Total Cholesterol	Blood Pressure	Blood Glucose	Total Cholesterol
1	145	186	240	138	183	233
2	162	142	235	143	150	246
3	128	122	203	125	119	218
4	116	124	222	118	126	230
5	130	121	219	121	132	215
6	132	116	205	134	108	183
7	110	105	195	112	102	192
8	125	119	216	122	107	204
9	139	115	226	125	105	215
10	142	132	231	130	133	225
11	154	152	255	140	150	233
12	124	120	235	125	122	222
13	114	118	212	112	113	214
14	136	131	238	122	126	230
15	150	220	255	144	180	250
16	133	135	232	126	130	224
17	129	119	220	123	109	231
18	108	106	234	114	103	238
19	112	117	194	111	108	204
20	146	122	225	130	117	220
21	153	204	256	132	196	242
22	145	182	248	134	175	240
23	126	140	229	120	135	206
24	138	180	240	125	172	231
25	129	135	218	120	133	204

6) Find the mean, standard deviation, skewness coefficient, kurtosis coefficient, and interquartile range of systolic blood pressure before the drug was administered. (Hint: Use MINITAB software to evaluate)

a. Mean = 138.52; Standard deviation = 31.23; Skewness coefficient = 1.38; Kurtosis coefficient = 0.98; IQR = 28.50.  
b. Mean = 227.32; Standard deviation = 17.41; Skewness coefficient = -0.19; Kurtosis coefficient = -0.43; IQR = 22.00.  
c. Mean = 133.04; Standard deviation = 14.56; Skewness coefficient = 0.03; Kurtosis coefficient = -0.65; IQR = 20.50.  
d. None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: c.

7) Find the mean, standard deviation, skewness coefficient, kurtosis coefficient, and interquartile range of systolic blood pressure after the drug was administered. (Hint: Use MINITAB software to evaluate)

a. Mean = 125.84; Standard deviation = 9.39; Skewness coefficient = 0.32; Kurtosis coefficient = -0.54; IQR = 13.00.  
b. Mean = 133.36; Standard deviation = 27.97; Skewness coefficient = 0.92; Kurtosis coefficient = -0.26; IQR = 41.50.  
c. Mean = 222.00; Standard deviation = 16.73; Skewness coefficient = -0.49; Kurtosis coefficient = -0.11; IQR = 23.00.  
d. None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: a.

8) Find the mean, standard deviation, skewness coefficient, kurtosis coefficient, and interquartile range of total cholesterol after the drug was administered. (Hint: Use MINITAB software to evaluate)

a. Mean = 125.84; Standard deviation = 9.39; Skewness coefficient = 0.32; Kurtosis coefficient = -0.54; IQR = 13.00.  
b. Mean = 133.36; Standard deviation = 27.97; Skewness coefficient = 0.92; Kurtosis coefficient = -0.26; IQR = 41.50.  
c. Mean = 222.00; Standard deviation = 16.73; Skewness coefficient = -0.49; Kurtosis coefficient = -0.11; IQR = 23.00.  
d. None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: c.

9) In which data collection method data is collected from each and every member of the population?

a. Census Data Collection  
b. Sample data collection  
c. Experimental Data Collection  
d. Observation Data Collection

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: a.

10) If the weighting machine observes the weight of the person is 63 kg, but the expected value of the weight is 69 kg. Then the relative accuracy and absolute error of the measurement will be

a. Relative accuracy = 91.30%, Absolute error = 8.69%  
b. Relative accuracy = 96.28%, Absolute error = 7.89%  
c. Relative accuracy = 95.59%, Absolute error = 5.69%  
d. Relative accuracy = 96.34%, Absolute error = 9.57%

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: a.

11) The scale on which equal interval between objects represents equal differences is \_\_\_\_\_.

a. Nominal Scale  
b. Ordinal Scale  
c. Ratio Scale  
d. Interval Scale

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: d.

12) Consider an exercise on pull-off force for a connector. The data for 40 test specimens are as follows:

241	220	249	209	258	194	251	212	237	245	238	185	210	209	210
187	197	201	198	218	225	195	199	190	248	255	183	175	203	245
213	178	195	235	236	175	249	220	245	190					

Make a stem-and-leaf plot of the data. Determine the median, range, and quartiles for the pull-off force data on the stem-and-leaf plot.

a. Median = 210; range = 86;  $Q_1 = 193$ ;  $Q_2 = 210$ ;  $Q_3 = 240$   
b. Median = 212; range = 83;  $Q_1 = 194$ ;  $Q_2 = 212$ ;  $Q_3 = 239$   
c. Median = 211; range = 86;  $Q_1 = 195$ ;  $Q_2 = 211$ ;  $Q_3 = 239$   
d. None of the above

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: d.

### COMMON DATA QUESTIONS: (QUESTION 13 and QUESTION 16):

A refrigerator organization wishes to check the quality of their product. So they conducted a gage R&R study, where five parts are evaluated four times by three operators. The data obtained through the study is given in the following table.

Part	Operator A					Operator B					Operator C				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	109	122	86	108	130	114	106	73	97	130	112	107	83	99	108
2	107	115	103	110	131	113	113	71	101	113	112	117	82	98	110
3	106	108	96	101	127	109	123	78	94	119	106	98	96	97	106
4	102	127	108	93	126	105	108	84	107	124	100	116	102	87	103

Use following table for calculation of  $d_2$  in gage R&R studies

Number of observation in sample	Factor $d_2$ for estimating sigma from $\bar{R}$
2	1.128
3	1.693
4	2.069
5	2.326
6	2.534

13) The value of  $\sigma_{\text{Repeatability}}$  is \_\_\_\_\_.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: (Type: Range) 6.6500,6.8000

14) The value of  $\sigma_{\text{Reproducibility}}$  is \_\_\_\_\_.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: (Type: Range) 5.1000,5.2500

15) The value of  $\sigma_{\text{R&R}}^2$  is \_\_\_\_\_.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: (Type: Range) 72.2500,72.4500

16) The value of  $F_{\frac{P}{T}}$  ratio for the operator C is \_\_\_\_\_.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: (Type: Range) 1.1000,1.3000

17) Which of the followings are the examples of ordinal level of measurement?

a. Eye color  
b. Quantity purchased  
c. Class rank  
d. Gender

a.  
 b.  
 c.  
 d.

No, the answer is incorrect.  
Score: 0  
Accepted Answers: c.