Code: 17E00105

MBA & MBA (Finance) I Semester Regular & Supplementary Examinations January 2020

STATISTICS FOR MANAGERS

(For students admitted in 2017, 2018 & 2019 only)

Time: 3 hours Max. Marks: 60

All questions carry equal marks

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SECTION – A

(Answer the following: 05 X 10 = 50 Marks)

1 (a) Explain the nature and significance of statistics to business.

(b) What are the differences among the mean, median and mode?

OR

2 (a) State the business applications of measures of central tendency.

(b) The numbers of work stoppages in a country over the last 10 years are 22, 20, 21, 15, 5, 11, 19, 19, 15, and 11.

(i) What is the median number of stoppages?

(ii) How many observations are below the median? Above it?

(iii) What is the modal number of work stoppages?

3 (a) What is the significance of correlation?

(b) The following sample of observations was randomly selected:

x	5	3	6	3	4	4	6	8
y	13	15	7	12	13	11	9	5

Determine the correlation coefficient and interpret the relationship between *x* and *y*.

OR

4 (a) Explain different types of correlations.

(b) State the assumption of regression analysis.

5 (a) What do you understand by the following in the theory of probability:

(i) Mutually exclusive events.

(ii) Collectively exhaustive events.

(b) A store receives 3 red, 6 white, and 7 blue shirts. Two shirts are drawn at random. Determine the probability that:

(i) Both the shirts are white.

(ii) One shirt is red and the other shirt is white.

(iii) Both the shirts are blue.

OR

6 (a) Explain the concept of conditional probability.

(b) A company employed 150 employees of whom 40 are mechanical engineers and 110 are diploma holders in management. Thirty per cent of the management diploma holders are mechanical engineers. If an employee is selected at random, what is the probability that the employee is a management diploma holder and a mechanical engineer?

7 (a) Explain the properties and importance of the *F* distribution.

(b) Identify the limitations of two-way ANOVA?

OR

Contd. in page 2

8 (a) What is the importance of hypothesis testing in managerial decision making?

(b) Use the following data to perform one-way ANOVA.

Factor 1	Factor 2	Factor 3	Factor 4
13	17	22	18
12	15	26	17
13	18	27	16
14	16	28	15
15	17	29	16
13	18	30	17

Use α = 0.05 to test the hypotheses for the difference in means.

9 (a) Explain the conceptual framework of χ^2 test with respect to expected and observed frequencies.

(b) Discuss the concept of contingency table.

OR

10 (a) Explain the major advantages of non-parametric tests over parametric tests.

(b) A sample of 300 employees who own a car among various IT companies were questioned on whether they own a luxury car. The responses obtained were tabulated as given below:

Company	Infosys	Wipro	TCS	CTS	Tech Mahindra	Accenture	IBM	Row Total
Employees owning a luxury car	10	4	7	8	3	9	9	50
Employees not owning a luxury car	30	31	38	22	27	56	46	250
Column total	40	35	45	30	30	65	55	300

(i) Find the degree of freedom for conducting the chi-square test.
(ii) Develop a table of observed frequency and expected frequency.
(iii) Find the chi-square value for the given data.

SECTION – B

(Compulsory question, 01 X 10 = 10 Marks)

11 **Case Study:**

Problem:

A large supermarket has adopted a new strategy to increase its sales. It has adopted a few consumer friendly policies and is using video clips of 15 minutes to propagate the new policies. The following table provides data about the number of video clips shown in a randomly selected day and the sales turnover of the supermarket in the corresponding day.

Days	No. of video clips shown	Sales (in thousand rupees)
1	25	150
2	25	210
3	25	140
4	35	180
5	35	230
6	35	270
7	40	310
8	40	330
9	40	300
10	50	270
11	50	310
12	50	340

(i) Develop a regression model to predict sales from the number of video clips shown.
(ii) Calculate the coefficient of determination and interpret it.
(iii) Calculate the standard error of the estimate.

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Code: 17E00105

MBA & MBA (Finance) I Semester Supplementary Examinations June 2019

STATISTICS FOR MANAGERS

(For students admitted in 2017 & 2018 only)

Time: 3 hours Max. Marks: 60

All questions carry equal marks

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SECTION – A

(Answer the following: 05 X 10 = 50 Marks)

1 Explain the nature and significance of statistics. Discuss the application of statistics in business.

OR

2 Calculate the arithmetic mean and median of the frequency distribution given below. Hence calculate the mode using the empirical relation between the three:

Height (in cms)	No. of students	Height (in cms)	No. of students
130-134	5	150-154	17
135-139	15	155-159	10
140-144	28	160-164	1
145-149	24		

3 Calculate Karl Pearson's coefficient of correlation between price and supply of a commodity from the following data:

Price (Rs.)	17	18	19	20	21	22	23	24	25	26
Supply (kg.)	38	37	38	33	32	33	34	29	26	23

OR

4 Differentiate between correlation and regression.

5 Discuss the properties of a binomial distribution.

OR

6 Discuss the theorems of probability.

7 What is a hypothesis? Explain the types of hypothesis used in research.

OR

8 Explain the uses of T-test and F-test.

9 Discuss the applications of Chi-square test in detail.

OR

10 What is a one sample sign test? Explain its significance.

SECTION – B

(Compulsory question, 01 X 10 = 10 Marks)

11 **Case Study:**

Find the value of the correlation coefficient from the following table:

Subject	Age X	Glucose level Y
1	43	99
2	21	65
3	25	79
4	42	75
5	57	87
6	59	81

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Code: 17E00105

MBA & MBA (Finance) I Semester Regular & Supplementary Examinations December/January 2018/19

STATISTICS FOR MANAGERS

(For students admitted in 2017 & 2018 only)

Time: 3 hours Max. Marks: 60

SECTION – A

(Answer the following: (05 X 10 = 50 Marks)

*****

1 Discuss the application of dispersion measures for business decision making.

OR

2 A security analyst studied hundred companies and obtained the following data for the year 1997:

Dividend declared (%)	0-8	8-16	16-24	24-32	32-40
Number of companies	15	30	40	10	5

Calculate the standard deviation of the dividend declared.

3 Obtain the lines of regression from the following data:

x:	16	12	10	14	18
y:	19	11	15	18	17

OR

4 Define regression. Explain its properties and applications.

5 What are the properties of Poisson distribution?

OR

6 Potassium blood levels in healthy humans are normally distributed with a mean of 17.0 mg/100 ml, and standard deviation of 1.0 mg/100 ml. Elevated levels of potassium indicate an electrolyte balance problem, caused by Addison's disease. However, a test for potassium level should not cause too many "false positives". What level of potassium should we use so that only 2.5% of healthy individuals are classified as "abnormally high"?

7 Explain the steps involved in testing the hypothesis. What are the possible errors that may occur while testing the hypothesis?

OR

8 Explain the different types of ANOVA. What are the steps involved in carrying out ANOVA?

9 How chi-square is calculated? Explain any two of its applications.

OR

10 Explain the different types of non parametric tests.

SECTION – B

(Compulsory question, 01 X 10 = 10 Marks)

11 **Case Study:**

The following are the details of sales effected by three sales persons in three door-to-door campaigns.

Sales person	Sales in door – to – door campaign			
A	8	9	5	10
B	7	6	6	9
C	6	6	7	5

Construct an ANOVA table and find out whether there is any significant difference in the performance of the sales persons.

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Code: 14E00105

MBA I Semester Supplementary Examinations December/January 2018/19

BUSINESS STATISTICS

(For students admitted in 2014 (LC), 2015 & 2016 only)

Time: 3 hours Max. Marks: 60

SECTION – A

(Answer the following: (05 X 10 = 50 Marks)

*****

1 Enumerate the methods of measuring dispersion and state the characteristics of a good measure of dispersion.

OR

2 The coefficient of variation of wages of male workers and female workers are 55% and 70% respectively, while the standard deviations are 22.0 and 15.4 respectively. Calculate the overall average wages of all workers given that 80% of the workers are male.

3 State the properties of Karl Pearson's coefficient of correlation and explain how would you internet the value of r with suitable example.

OR

4 Find the coefficient of correlation by Karl Pearson's method from the following table.

X	6	2	10	4	8
Y	9	11	?	8	7

Arithmetic means of X and Y are 6 and 8 respectively.

5 State the important characteristics and properties of binomial distribution. Under what conditions can a binomial distribution be applied?

OR

6 The following table shows the distribution of number of faulty units produced in a single shift in a factory. The data is for 400 shifts.

No. of faults	0	1	2	3	4
No. of shifts	138	161	69	27	5

Fit a Poisson distribution to the data.

7 In a large city A, 20% of the random sample of 1000 school children had defective eye sight. In another large city B, 15% of a random sample of 2000 children had the same defect. Is this difference between two proportions significant? Obtain 95% confidence limits for the difference in the population proportions.

OR

8 Two random samples were drawn from two normal population and their values are:

A	66	67	75	76	82	84	88	90	92		
B	64	66	74	78	82	85	87	92	93	95	97

Test whether the two population have the same variance at 5% level of significance.

(F = 4.30 at 5% level for $v_1 = 10$ and $v_2 = 8$)

Contd. in page 2

9 The number of car accidents in a city was found as 20, 17, 12, 6, 7, 15, 8, 5, 16 and 14 per month. Use Chi-square test to check whether these frequencies are in agreement with the belief that occurrence of accidents was the same during the 10 month period. Test at 5% level of significance.

OR

10 In a survey of 200 girls of which 40% were intelligent, 30% had uneducated fathers, while 20% of the unintelligent girls had educated fathers. Do these figures support the hypothesis that educated fathers have intelligent girls? Test at 5% level of significance. (Table value of χ^2 = 3.84)

SECTION – B

(Compulsory question, 01 X 10 = 10 Marks)

11 **Case Study:**

In a certain factory production can be accomplished by four different workers on 5 different types of machines. A sample study, in context of a two-way design without repeated values, is being made with two-fold objectives of examining whether the four workers differ from with respect to mean productivity and whether the mean productivity is the same for the 5 different machines. The researcher involved in this study reports while analyzing the data as under.

(i) Sum of squares for variance between machines = 35.2

(ii) Sum of squares for variance between work man = 53.8

(iii) Sum of square for total variance = 174.2

Set up ANOVA table for the given information and draw the inference about variances at 5% level of significance (Table value F = 2.53)

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Code: 17E00105

MBA I Semester Regular Examinations December/January 2017/2018

STATISTICS FOR MANAGERS

(For students admitted in 2017 only)

Time: 3 hours Max. Marks: 60

SECTION – A

(Answer the following: (05 X 10 = 50 Marks)

*****

1 Explain the measures of central tendency for business decision making.

OR

2 Find standard deviation from the following data:

Values	5	10	15	20	25	30	35
Frequency	2	7	11	15	18	4	1

3 Calculate the coefficient of correlation of the following data:

x	2	3	4	5	6
y	7	9	10	14	15

OR

4 Compute rank correlation from the following table.

x	415	434	420	430	424	428
y	330	332	328	331	327	325

5 Difference between binomial and Poisson distribution.

OR

6 Fit a Poisson distribution to the following data and find out theoretical or expected frequencies.

x	0	1	2	3	4	5	6	7
f	48	72	99	73	43	20	8	2

7 Test the significance difference between simple mean and the population mean.

OR

8 The average hourly wage of a sample of 150 workers in plant A is Rs. 256 with a standard deviation of Rs. 1.08. Average wage of a sample of 200 workers in plant B Rs. 2.87 with a standard deviation of Rs. 1.28 can be applicant safely. Assume that the hourly wages paid by plant B is higher than plant A.

9 Tests are made on the proportion of defective costing produced by five different molds. If there were 14 defectives among 100 costing made with mold – I. 33 defectives among 200 costings made with mold – II. 21 defective among 180 costings made with mold – III. 17 defectives among 120 costings made with mold – IV and 25 defectives among 150 costings made with mold – V. Use the 0.01 level of significance to test whether the true proportion of defective is the same for each mold.

OR

10 The following figures show the distribution of digits in numbers chosen at random from a telephone directory.

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	1026	1107	997	966	1075	933	1107	972	964	853

Test whether the digits may be taken to occur at equal frequency in the directory.

SECTION – B

(Compulsory question, 01 X 10 = 10 Marks)

11 **Case Study:**

The 3 samples given below have been obtained from a normal population with equal variance. Test the hypothesis that sample means are equal.

A	8	10	7	14	11
B	7	5	10	9	9
C	12	9	13	12	14

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Code: 14E00105

MBA I Semester Regular & Supplementary Examinations December/January 2016/2017

BUSINESS STATISTICS

(For students admitted in 2014, 2015 & 2016 only)

Time: 3 hours Max. Marks: 60

All questions carry equal marks

(Statistical tables is permitted in the examination hall)

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SECTION – A

Answer the following: (05 X 10 = 50 Marks)

1 What are the various methods of measuring dispersion? Explain each one with suitable examples.

OR

2 (a) Calculate mean for the following frequency distribution.

Value	10	27	28	34	55	38	52	40	45	57
Frequency	5	6	8	9	6	5	7	4	3	5

(b) The monthly salaries of employees (in thousand rupees) is given in the following table. Compute the median salary of the employees.

Monthly salaries of employees (in thousand rupees)										
Employee	1	2	3	4	5	6	7	8	9	10
Salary	120	35	132	128	148	136	138	151	153	150

3 (a) Define and distinguish between correlation and regression.

(b) Elaborate the utility of regression analysis.

OR

4 The sales revenue and advertisement expenses of a company for the past 10 months is given in the following table. Calculate the Karl Pearson's coefficient of correlation between sales and advertisement.

Sales and advertisement expenses for 10 months (in Rs. 1000's)										
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
Advertisement expenses	10	11	12	13	11	10	9	10	11	14
Sales	110	120	115	128	137	145	150	130	120	115

5 What is binomial distribution? What are the main assumptions of a binomial distribution? Define mean and standard deviation in a binomial distribution.

OR

6 The retail price of a 5 kg bag of white cement of a company varies from Rs. 200 per bag to Rs. 230 per bag. Assuming that these prices are uniformly distributed, (i) Compute mean, variance and standard deviation of prices of this distribution. (ii) if a price is randomly selected, what is the probability that this price is in between Rs. 210 to Rs. 225? (iii) Compute the probability that this price is less than or equal to Rs. 227.

7 Define and briefly explain the following terms:

(a) Independent variable.

(b) Treatment variable.

(c) Classification variable.

(d) Experimental units.

(e) Dependent variables.

OR

8 A firm allows its employees to pursue additional income-earning activities such as consultancy, tuitions, etc. in their out-of-office hours. The average weekly earnings through these additional income earning activities is Rs. 5000 per month per employee. A new HR manager who has recently joined the firm feels that this amount may have changed. For verifying his doubt, he has taken a random sample of 45 employees. The sample mean is computed as Rs. 5500 and the sample standard deviation is computed as Rs. 1000. Use $\alpha = 0.10$ to rest whether the additional average income has changed in the population.

Contd. in page 2

9 What is χ^2 – distribution? What is its importance in business decision making?

OR

10 A company is trying to improve the work efficiency of its employees. It has organized a special training programme for all employees. In order to assess the effectiveness of the training programme, the company has selected 10 employees randomly and administered a well-structured questionnaire. The scores obtained by the employees are given below.

S.No	Before training	After training
1	30	35
2	32	34
3	37	31
4	34	33
5	36	33
6	33	37
7	29	37
8	33	42
9	30	40
10	32	43

At 95% confidence level, examine whether the training programme has improve the efficiency of employees.

SECTION – B

(Compulsory Question) 01 X 10 = 10 Marks

11 **Case study:**

A company organized a training programme for three categories of officers: sales managers, zonal managers and regional managers. The company also considered the educational level of the employees. Based on their qualifications, officers were also divided into three categories: graduate, post graduate and doctorate. The company wants to ascertain the effectiveness of the training programme on employees across designation and educational levels. The scores obtained from randomly selected employees across different categories are given below.

		Designation		
		Sales managers	Zonal managers	Regional managers
Qualification	Graduate	30	34	38
		40	40	39
		42	42	40
		33	45	42
	Post Graduate	35	36	40
		39	38	43
		41	42	41
		39	43	32
	Doctorate	34	44	30
		38	45	28
		39	37	32
		35	38	29

Employ a two-way analysis of variance to determine whether there is significant difference in effects. Take α = 0.05.

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Code: 14E00105

MBA I Semester Regular & Supplementary Examinations December/January 2015/2016

BUSINESS STATISTICS

(For students admitted in 2014 & 2015 only)

Time: 3 hours Max. Marks: 60

All questions carry equal marks

*****

SECTION – A

Answer the following: (05 X 10 = 50 Marks)

1 What is the concept of coefficient of variation? What is the application of coefficient variation in business decision making?

OR

2 (a) Find the mean, median and mode for the following set of numbers:
(i) 3, 5, 2, 6, 5, 9, 5, 2, 8 and 6.
(ii) 51.6, 48.7, 50.3, 49.5 and 48.9.

(b) From the following data, find the first and third quartiles:

Serial No.	1	2	3	4	5	6	7	8
Daily wages (in hundred rupees)	15	20	34	45	52	63	71	82

3 What are the assumptions of regression analysis? Distinguish between correlation and regression.

OR

4 Determine the line of regression for the following data, taking:

(a) X as the independent variable and Y as the dependent variable.

(b) Y as the independent variable and X as the dependent variable.

(α = 0.05)

X	12	21	28	25	32	42	43	39	55
Y	14	22	12	28	35	37	32	44	49

5 Define probability. Explain the concept of marginal probability, union probability, joint probability and conditional probability.

OR

6 In a toy manufacturing company, three machines namely, A, B and C, are employed to manufacture toys. Machines A, B and C manufacture 20%, 30% and 50% of the total toys, respectively. A quality control officer examined the machines and found that A, B and C produce 2%, 3% and 5% defectives of the total output. A toy is selected at random and is found to be defective. What are the probabilities that this toy came from machine A, B and C respectively.

7 What is hypothesis? Discuss the hypothesis testing procedure.

OR

8 Modern bicycles has conducted a survey among 100 randomly selected men and 120 randomly selected women. As per the findings, 25 men and 35 women say that the size of the wheel is a very important factor in purchasing a bicycle. On the basis of this data, can the company claim that a significantly higher proportion of women when compared to men believe that the size of wheels is a very important factor. Take 95% as the confidence level.

9 (a) What is the χ^2 goodness-of-fit test and what are its applications in decision making?

(b) Under what circumstances is the χ^2 test of independence used?

Contd. in Page 2

OR

10 A vice president (sales) of a garment company wants to determine whether the sales of the company's brand of jeans is independent of age group. He has appointed a marketing researcher for this purpose. This marketing researcher has taken a random sample of 703 consumers who have purchased jeans. The researcher conducted survey for three brands of the jeans, namely brand 1, brand 2 and brand 3. The researcher has also divided the age groups into four groups: 15 to 25, 26 to 2, 26 to 45 and 46 to 55. The observations of the researcher are provided in the following table:

Brand / Age	Brand 1	Brand 2	Brand 3	Row Total
15 to 25	65	75	72	212
26 to 35	60	40	64	164
36 to 45	45	52	50	147
46 to 55	55	65	60	180
Column total	225	232	246	703

Determine whether brand preference is independent of age group. Use $\alpha = 0.05$.

SECTION – B

(Compulsory Question) 01 X 10 = 10 Marks

11 **Case study:**

A dealer of a motor cycle company believes that there is a positive relationship between the number of salespeople employed and the increase in the sales of bikes. Data for 14 randomly selected weeks are given in the following table:

Weeks	No. of salespeople employed	Sales (in units)
1	17	34
2	14	39
3	25	60
4	40	80
5	15	38
6	18	50
7	13	35
8	11	25
9	27	51
10	12	29
11	38	89
12	36	85
13	41	90
14	28	63

Questions:

(a) Develop a regression model to predict sales from the number of salespeople employed.

(b) Predict sales when number of sales people employed are 100.

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Code: 14E00105

MBA I Semester Supplementary Examinations August 2015

BUSINESS STATISTICS

(For students admitted in 2014 only)

Time: 3 hours Max. Marks: 60

Issue of T, F, χ^2, Z values tables at 5% level of significance are permitted in the examination hall

All questions carry equal marks

*****

SECTION – A

Answer the following: (05 X 10 = 50 Marks)

1 Brief out various measures of dispersion.

(OR)

2 Calculate standard deviation from the following data:

Class interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	5	7	16	27	39	53	18	45

3 Calculate correlation coefficient between X and Y series:

X	78	89	96	69	59	79	68	61
Y	125	137	156	112	107	136	123	105

(OR)

4 Discuss the concept and advantages of regression analysis.

5 What is probability? Brief out the significance of probability in business applications.

(OR)

6 Fit a binomial distribution by using direct method for the following data:

X	0	1	2	3	4	5	6	7	8
Frequency	17	64	140	210	132	75	45	56	80

7 Distinguish the features and purpose of ANOVA one and two way classification.

(OR)

8 An IQ test was conducted to 5 persons before and after they were trained. The results are given below.

Candidates	I	II	III	IV	V
IQ before training	110	120	123	132	125
IQ after training	120	118	125	136	121

9 Calculate Chi-Square test from the data given below:

Observed frequency	60	75	50	92	46	74	86	48	94	85
Expected frequency	68	72	43	103	63	35	94	32	75	93

(OR)

10 Brief out the Non-Parametric methods of statistics.

SECTION – B

(Compulsory Question) 01 X 10 = 10 Marks

11 **Problem**:

Analyze one way classification from the following data:

1	10	10	45	44	8	13	41	43
2	29	30	10	8	33	27	12	10
3	37	33	26	27	32	36	27	30
4	39	40	31	32	42	42	32	32

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Code: 14E00105

MBA I Semester Regular Examinations February/March 2015

BUSINESS STATISTICS

(For students admitted in 2014 only)

Time: 3 hours Max. Marks: 60

All questions carry equal marks

Use of T, F, χ^2 and Z value tables at 5% level of significance are permitted.

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SECTION – A

Answer the following: (05 X 10 = 50 Marks)

1 What are the measures of central tendency? Explain the need and advantages of central tendency.

(OR)

2 Calculate standard deviation from the following data:

Class interval	0-5	5-10	10-15	15-20	20-25	25-30	30-35	40-45
Frequency	9	16	12	26	14	12	6	5

3 Define regression analysis. Brief out the significance and types of regression analysis.

(OR)

4 Calculate rank correlation coefficient between X and Y series.

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

5 Fit a Poisson distribution for the following data by using recurrence relation model.

No. of deaths	0	1	2	3	4	5	6	7
Frequency	305	365	210	80	28	9	2	1

(OR)

6 Explain different theories of probability.

7 What is meant by hypothesis? Explain various tests for testing hypothesis.

(OR)

8 The time taken by workers in performing a job by Method-I and Method-II are given below.

Method – I	20	16	26	27	23	22	25
Method – II	27	33	42	35	32	34	38

9 What is Chi-square test? Explain the features and applications of chi-square test.

(OR)

10 The following table shows the distribution of digits in numbers chosen at random from a telephone directory.

Digits	0	1	2	3	4	5	6	7	8	9
Frequency	1026	1107	997	966	1075	933	1107	972	964	853

Using Chi-square test whether the digits may be taken to occur equally frequently in the directory at 5% level.

SECTION – B

(Compulsory Question) 01 X 10 = 10 Marks

11 Case study:

A stenographer claims that she can take the dictation at the rate of 120 words per minute. Can we reject her claim on the basis of 100 trails in which she demonstrates a mean of 116 words with a standard deviation of 15 words? Use Z-test at 5% level of significance.

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