Subject	Business Statistics		
Roll No.		Marks	60 Marks
Total No. of Questions	7	Duration	3 Hours
Total No. of printed pages	4	Date	21.12.2015

Note: Q1 is compulsory and solve any FOUR from the remaining SIX questions.

Q1) 20 Marks (Compulsory)
Give appropriate answer with justification. (Any 10)
1. A distribution that is bell shaped is said to be:
    A. skewed to the right   B. symmetric
    C.   platykurtic   D. assymetric

2 .The following are the marks a professor gave on the first test in a statistics class:
52,90,88,61,75,82,75,83,88,and 86
What was the median score on this test?
    A.   82   B. 82.5   C. 78.5   D. 88

3. The mean weight of three gemstones is 20 grams. The weights of two of the stones are 15 grams and 17 grams. What is the weight of the third stone?
    A.16 grams   B.10 grams   C. 28 grams   D. not enough information.

4. Find the variance of the following set of values :2, 5, 8, 6, and 1
    A. 2.88   B. 4.4   C. 8.3   D none of the above.

5. The graph of a cumulative frequency distribution is called?
    A . ogive.   B . pie chart.   C .frequency polygon   D barchart

6. The mode for certain data set is 15. If 2 new no.s 15 & 21 are added ,which value of below will not change ?
    A . Mode   B. Median   C. Mean   D. Median and Mean

7. The average amount of time required to fill orders at drive –up window has been observed to be 120 seconds, with a standard deviation of 10 seconds. Assuming that the required order fill time follows Normal distribution , which of the following statements is correct regarding a random sample of 1,000 observations?
    A We would expect to see approximately 680 of the order fill- times falling in the interval form 110 seconds to 120 seconds
    B We would expect to see approximately 955 of the order fill-times fallingin the interval from 100 seconds to 140 seconds
    C We would expect to see approximately 270 orders with required fill-times of less than 90 seconds
    D All of the above are correct

8. When there is no linear correlation between two variables, what will be value of r ?
    A. -1   B. +1   C .0   D. none of the above

9 . An insurance company wants to predict sales from the amount of money they spend on

advertising. Which would be the independent variable?

    A Sales   B Advertising   C insufficient information to decide   D Any one can be

10. An r value of 0.80 indicates:

    A. no correlation at all   B . Perfect correlation

    C. Cannot say anything about correlation.   D some correlation.

11. The coefficient of determination , R, can take on any value within what range?

    A. $R \geq 1$ B. $0 \leq R \leq 1$ C R >= 1   D Any Value

12. If two variables have a correlation coefficient of 30, what percentage of one variable is accounted for by the other variable?

    A. 30   B. 70   C. 10   D. 9

13)   ANOVA is test for equality of

    A   Means   B   variances   C   proportion   D   any 2 parameter

14) Management wants to test if employee turnover is same in all 4 departments. 6 employees from each department were selected.

The ANOVA table is given below:

Source of variation	SS	DF	MS	F Calc
Due to departments				1.35
Error				
Total	36			

Complete the table above & give your recommendation.

15) For testing equally of means 2 samples of size 10 & 15 were selected. The data is given below.

Sample 1   Mean =7.2   s..d = 1.738

       2   Mean = 6.2   s.d = 1.627

Find 5% critical value of appropriate distribution .

Attempt Any FOUR from the Remaining SIX Questions

Q2) *Any two from (a) or (b) or (c)* ———— *(5x2) = 10 Marks*

a)   In a certain experiment to compare two types of food A and B, the following results of increase in weights were observed in subjects:

Subject →		1	2	3	4	5	6	7	8	Total
Increase in weight	Food A	49	53	51	52	47	50	52	53	407
	Food B	52	55	52	53	50	54	54	53	423

Assume that the two samples have been drawn from a normal population. Is there any Significant difference in the weight gains in case of Food A and Food B? Test at 5% level of significance.

(b) A market survey conducted in four cities pertained to preference for brand A of soap. The responses are given below are of females:

City→ Opinion↓	Delhi	Kolkata	Chennai	Mumbai
prefer	45	55	60	50
Do not prefer	35	45	35	45
No opinion	5	5	5	5

What is the probability that a consumer selected at random preferred brand A?
Given that a consumer preferred brand A, what is the probability she was from Mumbai?
Find the probability that a consumer preferred brand A given she was from Delhi ?

c) Explain the applications of T-test in field of HR

Q3) *Any two from (a) or (b) or (c) ——————— (5x2) = 10 Marks*

(a) The income of a group of 10000 persons was found to be normally distributed with mean Rs.750 per month and standard deviation Rs.50. How many persons had income exceeding Rs.668? What was the lowest income among the richest 100 persons?

(b) In a large consignment of apples, a random sample of 500 apples revealed that 65 apples were bad. Construct a 95% confidence interval of bad apples in the consignment.

(c) Explain properties of Normal Distribution.

Q4) *Any two from (a) or (b) or (c) ——————— (5x2) = 10 Marks*

a) A plastic manufacturer tests the tensile strength of different types of polythene material. A sample of three measurements is taken for each material type and data in pounds per square inch are as follows:

Type I	Type II	Type III
200	260	245
215	255	248
218	277	272

Determine if the mean tensile strength of the three different types of materials differ significantly. State your conclusion

(b) A manufacturer claims that at least 90% of the goods supplied by him conform to specifications. A random sample of 100 items has shown that 20 were faulty. Test the claim of the manufacturer at 5% level of significance. (CV=1.96) State your conclusion.

(c) Explain properties of Binomial Distribution

Q5) *Any two from (a) or (b) or (c)* ————— *(5x2) = 10 Marks*

Consider following data set of employee productivity when employees are trained by different trainers using different training methods.

		Trainer A	B	C
Training	P	25	37	41
Method	Q	29	36	19
	R	35	19	20
	S	38	25	33
	T	21	18	33

(a) Test at 5% level of significance if the trainers are equally effective
(b) Test at 5% if employee productivity is same for trainers A & B
(c) Explain the applications of oneway ANOVA in Marketing

Q6) *Any two from (a) or (b) or (c)* ————— *(5x2) = 10 Marks*

(a) The mean number of hours spent by the Management students on the computer is 3.1 hours per day. Assume that the standard deviation is 0.5 hours. Find the proportion and hence the %age of students spending between 2.0 to 3.5 hours per day on the computer. Assume that the time spent is normally distributed
(b) Explain Probability Theorems with example for each
(c) Explain the applications of Statistics in Insurance Industry.

Q7) *Any two from (a) or (b) or (c)* ————— *(5x2) = 10 Marks*

a) A pharmaceutical company claims that the amount of drug in the bottles
manufactured by it is at least 10 ml. with a standard deviation of 0.2 ml. A sample of 30 bottles is checked to verify this claim and the average was found to be 9.9 ml. Test at 5% level of significance if the claim is valid.

(b) State use of statistics in Quality control.

(c) What is meant by Mode? Where is it used?