Roll No.............

Sr. No. of Question Paper	:	**2550**
Unique Paper Code	:	**101104**
Name of the Paper	:	**Business Statistics**
Name of the Course	:	**B.F.I.A., 2013**
Semester	:	**I**
Duration	:	**3 hours**
Maximum Marks	:	**75**

Write your Roll No. on the top immediately on receipt of this question paper.

Instructions for the Candidates

All questions are compulsory and carry equal marks (5 marks each).

Use of statistical table is allowed.

Use of non programmable calculator is allowed.

Q.1 Find the missing frequency in the following distribution for 100 students if the median is 30.

Marks	No. of students
0-10	10
10-20	-
20-30	25
30-40	30
40-50	-
50-60	10

Q.2 Prices of a particular commodity in 5 years in two cities are given below:

Prices of City A	20	22	23	16	19
Prices of City B	10	20	12	15	18

Find from the above data the city which had more stable prices.

Q.3 In a certain distribution the following results are obtained:

Mean=45, Median= 48, Coeff. of Skewness= -0.4

The person who gave the data failed to give the value of standard deviation. Estimate the standard deviation with the help of available information.

Q.4 A manufacturing firm employs three analytical plans for the design and development of a particular product. For cost reasons, all three are used at varying times. In fact plans 1, 2 and 3 are used for 30%, 20% and 50% of the products respectively. The "defect rate" is different for the three procedures as follows:

$P(D|P1)=0.01;$ $P(D|P2)=0.03;$ $P(D|P3)=0.02;$

where $P(D|Pj)$ is the probability of a defective product, given plan j. If a random product was observed and found to be defective, which plan was most likely used and thus responsible?

Q.5 The probability that a regularly scheduled flight departs on time is $P(D)= 0.83$; the probability that it arrives on time is $P(A)= 0.82$; and the probability that it departs and arrives on time is $P(D \cap A)=0.78$. Find the probability that a plane

    (i)   Arrives on time given that it departed on time, and

(ii) Departed on time given that it has arrived on time.

Q.6 In a certain industrial facility accidents occur infrequently. It is known that the probability of an accident on any given day is 0.005 and the accidents are independent of each other. What is the probability that in any given period of 400 days there will be an accident on one day?

Q.7 The mean weight of 500 male students in a certain college is 151 lb. and the standard deviation is 15 lb. Assuming the weights are normally distributed, find how many students weigh (i) between 120 and 155 lb and (ii) more than 185 lb.

Q.8 Two ladies were asked to rank 7 different types of lipsticks. The ranks given by them are given below-

Lipsticks	A	B	C	D	E	F	G
Ena	2	1	4	3	5	7	6
Emily	1	3	2	4	5	6	7

Calculate Spearman's rank correlation coefficient.

Q.9 In a partially destroyed laboratory record of an analysis of correlation data, the following results are legible: Variance of X=9;

Regression equations: 8X-10Y+66=0; 40X-18Y=214

Find on the basis of above information

(i) The mean values of X and Y

(ii) Coefficient of correlation between X and Y

Q.10 Write short notes on:

(i) Partial Correlation Coefficient

(ii) Multiple Correlation Coefficient

Q.11 Ten cartons are taken at random from an automatic filling machine. The mean net weight of the 10 cartons is 15.4 kg and the standard deviation is 0.88 kg. Can it be said that there is a significant difference of the sample mean from the intended weight of 16 kg?

Q. 12 A manufacturer of sports equipment has developed a new synthetic fishing line that he claims has a mean breaking strength of 8 kg with a standard deviation of 0.5 kg. Test the

hypothesis that μ=8 kg against that μ≠8 kg if a random sample of 50 lines is tested and found to have a mean breaking strength of 7.8 kgs. Use a 0.01 level of significance.

Q.13 Find the interpolating polynomial which agrees with the table of values given below. Hence obtain the value of f(x) at x=7.5

x	7	8	9	10
f(x)	3	1	1	9

Q.14 What is an index number? Give the advantages and disadvantages of the index number.

Q.15 Find the estimate for the month of September using:

(i)   4 month simple moving average

(ii)   Weighted moving average with weights as 2, 3, 4, 5 for May, June, July and August respectively.

Month	May	June	July	August
Wheat price(Rs)	75	77	70	68

100

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 1221   Roll No..............

Unique Paper Code   : 101104

Name of the Paper   : Business Statistics

Name of the Course   : BFIA

Semester   : I

Duration   : 3 Hours

Maximum Marks   : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **All** questions.
3. All questions carry equal marks.
4. (Non Programmable Calculator is allowed.)

1. Following are the marks obtained by 2 students A and B in 10 examinations :

Examination	1	2	3	4	5	6	7	8	9	10
A's marks	44	80	76	48	52	72	68	56	60	64
B's marks	48	75	54	60	63	69	72	51	57	56

Marks of which student are more consistent.

2. Compute the coefficient of skewness and kurtosis based on moments for the following distribution :

X(Observations)	4.5	14.5	24.5	34.5	44.5	54.5	64.5	74.5	84.5	94.5
f(Frequency)	1	5	12	22	17	9	4	3	1	1

3. Suppose that each of three men at a party throws his hat into the center of the room. The hats are first mixed up and then each man randomly selects a hat. What is the probability that none of the three men select his own hat ?

4. Let X be a random variable with probability density

P.T.O.

$f(x) = c(1-x^2), -1 < x < 1$ else,

$f(x) = 0$

(i) What is the value of c ?

(ii) What is the value of cumulative distribution function of x ?

5. Suppose that two teams are playing a series of games, each of which is independently won by team A with probability p and by team B with probability 1-p. The winner of the series is the first team to win four games. Find the expected number of games that are played.

6. Ten percent of the tools produced in a certain manufacturing process turn out to be defective. Find the probability that in a sample of 10 tools chosen at random, exactly 2 will be defective by using;

   (a) Binomial distribution

   (b) Poisson approximation to the binomial distribution.

7. An electronic goods company arranged a special training programme for one segment of its employees. The company wants to measure the change in the attitude of its employees after the training. For this purpose, it has used a well designed questionnaire, which consists of 10 questions on a 1 to 5 rating scale (1 is strongly disagree and 5 is strongly agree). The company selected a random sample of 10 employees. The scores obtained by these employees are given in the following table :

SCORES OBTAINED BY THE EMPLOYEES BEFORE AND AFTER THE TRAINING

EMPLOYEES	1	2	3	4	5	6	7	8	9	10
SCORES BEFORE TRAINING	25	26	28	22	20	30	22	20	21	24
SCORES AFTER TRAINING	32	30	32	34	32	28	25	30	25	28

Use $\alpha = 0.10$ to determine whether there is significant difference of change in the attitude of employees after the training programme.

8. A random sample of 100 recorded deaths in the United States during the past year showed an average life span of 71.8 years. Assuming a population standard deviation of 8.9 years, does this seem to indicate that the mean life span today is greater than 70 years ? Use 0.05 level of significance.

9. In an experiment to study the dependence of hypertension on smoking habits, the following data were taken on 180 individuals :

	NON SMOKERS	MODERATE SMOKERS	HEAVY SMOKERS
HYPERTENSION	21	36	30
NO HYPERTENSION	48	26	19

Test the hypothesis that the presence or absence of hypertension is independent of smoking habits. Use a 0.05 level of significance.

10. A research company has designed three different systems to clean up oil spills. The following table contains the results, measured by how much surface area (in square meters) is cleared in 1 hour. The data were found by testing each method in several trials. Are the three systems equally effective ? Use the 0.05 level of significance.

System A	System B	System C
55	57	66
60	53	52
63	64	61
56	49	57
59	62	
55		

11. In finance, it is of interest to look at the relationship between Y, a stock's average return, and X, the overall market return. The slope coefficient computed by linear regression is called the stock's beta by investment analysts. A beta greater than 1 indicates that the stock is relatively sensitive to changes in the market; a beta less than 1 indicates that the stock is relatively insensitive. For the following data, compute the beta and test to see whether it is significantly less than 1. Use $\alpha = 0.05$.

| Y (%) | 10 | 12 | 8 | 15 | 9 | 11 | 8 | 10 | 13 | 11 |
| X (%) | 11 | 15 | 3 | 18 | 10 | 12 | 6 | 7 | 18 | 13 |

12. The correlation between a general intelligence test and school achievement in a group of children from 6 to 15 years old is 0.80. The correlation between the general intelligence test and age in the same group is 0.70 and the correlation between school achievement and age is 0.60. What is the correlation between general intelligence and school achievement in children of the same age ? Comment on the result.

13. The Quick Stop Gas Station has been selling road maps to its customers for the past three years. The maps that are sold are of the nearest city, the county gas station is in, the state it is in, and the entire United States. From the following table, calculate the weighted average of relatives price indices for 2011 and 2012 using 2010 as the base year.

MAPS	2010	2011	2012	QUANTITY SOLD (2010)
CITY	$0.75	$ 0.90	$1.10	1000
COUNTY	0.75	0.90	1.00	400
STATE	1.00	1.50	1.50	1000
UNITED STATE	2.50	2.75	2.75	220

14. Using the following percentages of actual to moving average describing the quarterly amount of cash in circulation at a bank over a 4 year period, calculate the seasonal index for each quarter :

YEAR	SPRING	SUMMER	FALL	WINTER
2009	87	106	86	125
2010	85	110	83	127
2011	84	105	87	128
2012	88	104	88	124

15. Find the Newton's interpolating polynomial which agrees with the table of values given below. Hence, obtain the value of $f(x)$ at $x = 1.5$

x	1	2	3	4	5	6
f(x)	10	19	40	79	142	235

(100)****

6247

Your Roll No. ....

BFIA / I Sem. – 2010

BACHELOR OF FINANCIAL & INVESTMENT
ANALYSIS – Paper 104

Business statistics (NS)

(Economics for Financial Manager – I)

Time : 3 hours　　　　　　　*Maximum Marks : 75*

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt **all** *questions.*
Log and Statistical table may be provided.

1.　(a) True or false :

　　　　(i) A multiple bar diagram is used when a
　　　　　　comparison is made between values of two
　　　　　　or more variables.

　　　　(ii) The sum of absolute deviations from the
　　　　　　arithmetic mean is the least.

　　　　(iii) Reducing each and every item by five will
　　　　　　reduce standard deviation by 5.

　　　　(iv) Paasche's index number is a weighted
　　　　　　aggregate index with base year quantity
　　　　　　weights.

　　　　　　　　　　　　　　　　　　P.T.O.

(v) The degrees of freedom used in t distribution
are equal to sample size. $(1 \times 5 = 5)$

(b) Find the missing information in the following table

	A	B	C	Combined
Number of observations	10	8	–	24
Arithmetic Mean	20	–	6	15
Geometric Mean	10	7	–	8.397

(5)

(c) A fund manager is considering investing in shares
on the basis of consistency of return on net worth.
He has option of choosing from firm A or firm B.
The following data has been collected.

Financial Year	Return on net worth	
	A	B
2003-2004	19	20
2005-2006	20	24
2006-2007	16	16
2007-2008	13	15
2008-2009	12	10

In which firm should he invest ?   (5)

2. (a) "Graphs and diagrams are more effective than
any other method of presenting data." Discuss.
(5)

(b) You are given the following information about
advertising expenditure and sales.

	Advertising expenditure (Rs. in lakhs)	Sales (Rs. in lakhs)
	(X)	(Y)
Arithmetic mean	10	90
Standard deviation	3	12

Coefficient of correlation = 0.8

(i) Obtain the two regression equations.

(ii) Find the likely sales when advertisement
budget is Rs. 15 lakhs.

(iii) What should be the advertisement budget if
the company wants to attain sales target of
Rs. 120 lakhs.   (4,3,3)

OR

(a) "Even a high degree of correlation does not mean
that a relation of cause and effect exists between
the two correlated variables." Why ?   (5)

(b) The sum of 50 observations is 500, its sum of
squares is 6000 and median is 12. Find
the coefficient of variation and coefficient of
skewness.   (5)

P.T.O.

(c) Mr. A travels by car for 4 days. He drove 10 hours each day. He drove first day at the speed of 45 km per hour, second day at the speed of 40 km per hour third day at 38 km per hour and fourth day at 37 km per hour. What is his average speed ? (5)

3. (i) Write short notes on any **two** of the following :

  (a) Chi square test statistic

  (b) Usefulness of interpolation in business

  (c) Properties of Normal Probability Distribution. (8)

(ii) A manufacturing unit has four sections A, B, C and D which contribute 30%, 20%, 28% and 22% respectively to the total output. It was observed that these sections produced 1%, 2%, 3% and 4% defective units respectively. If a unit is selected at random and found to be defective, what is the probability that the unit so selected has come from section A or section D ? (7)

OR

Three fair coins are tossed 3000 times. Find the frequencies of the distribution of heads and tails and tabulate the result. Calculate the mean and Standard deviation of the distribution. (7)

4. (i) Index numbers are economic barometers and help in policy formulations." Discuss. (5)

(ii) A manufacturer purchases similar parts from three suppliers that differ in unit price and quantity supplied. The data for 2007 and 2008 are given below :

Supplier	Quantity Index (in 2007)	Unit Price (Rs.) 2007	2008
A	20	18	20
B	40	12	14
C	10	15	16

Construct the weighted average price relative using (a) arithmetic mean (b) geometric mean. (10)

5. (i) For the given data, compute seasonal variations using ratio to trend method.

Year	I	II	III	IV
2000	60	80	72	68
2001	68	104	100	88
2002	80	116	108	96
2003	108	152	136	124
2004	160	184	172	164

Quarter

(8)

OR

A manufacturer needs to buy ten sheets of 0.05 inches in thickness. Thinner sheets will not be useful and thicker sheets will be two heavy. The manufacturer takes a random sample of 100 sheets with width equal to 0.048 inches and standard deviation equal to 0.01 inches. Should the manufacturer buy ten sheets from his suppliers if he wants to make a decision at

(a) 5% level of significance

(b) 1% level of significance   (8)

(ii) What is the relationship between quartile deviation, mean deviation and standard deviation in a normal distribution.

What should be the value of quartile deviation if the standard deviation of a normal distribution is 18 ?   (7)