INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad-500043

MECHANICAL ENGINEERING

TUTORIAL QUESTION BANK

Course Title	**STATISTICS FOR MANAGEMENT**				
Course Code	CMBB05				
Programme	B.Tech				
Semester	III	MBA			
Course Type	Foundation				
Regulation	**IARE - R18**				
Course Structure	**Theory**			**Practical**	
	Lectures	**Tutorials**	**Credits**	**Laboratory**	**Credits**
	4	-	4	-	-
Chief Coordinator	Ms. G Joseph Mary, Assistant Professor				
Course Faculty	Ms. G Joseph Mary, Assistant Professor				

COURSE OBJECTIVES:

The course should enable the students to:	
I	Understand the various statistical techniques and solve problems effectively in the statistics.
II	Analyze the different types of skewness and know about the coefficient of variations of skewness.
III	Understand the application of statistical measures of central tendency and also statistical measures of dispersion.
IV	Understand application of ANOVA, other non-parametric test and analyze the recent trends.
V	Apply the time series analysis and also trend analysis of data and also know its importance for solving the problems arising.

COURSE OUTCOMES (COs):

CMBB05.01	Recognize the significance, limitations, origin and development of statistics.
CMBB05.02	Acquire the knowledge about different managerial applications of statistics in various fields in modern times and analyze the use of computers in statistics.
CMBB05.03	Discuss various types of measures of central tendency and measures of dispersion.
CMBB05.04	Analyze the different types of coefficient of skewness and the coefficient of variation.
CMBB05.05	Understand the tabulation and classification of data to draw effective solutions for solving problems.
CMBB05.06	Demonstrate the diagrammatical and graphical representation of data by using different Dimensional diagrams.
CMBB05.07	Examine the differences between uni-variate , bi variate and multi variate data.
CMBB05.08	Apply different types of small sample tests and techniques of ANOVA.
CMBB05.09	Analyze correlation analysis and different types of coefficient of correlation.
CMBB05.10	Describe the regression analysis, time series analysis and trend analysis of data.

TUTORIAL QUESTION BANK

UNIT- I				
INTRODUCTION TO STATISTICS				
Part - A (Short Answer Questions)				
S No	**QUESTIONS**	**Blooms Taxonomy Level**	**Course Outcomes**	**Course Outcomes (COs)**
1	Define the term statistics.	Remember	CO 1	CMBB05.01
2	Differentiate descriptive and inferential statistics.	Understand	CO 1	CMBB05.01
3	Define Graphical Method?	Remember	CO 1	CMBB05.02
4	Define bowleys statistics.	Remember	CO 1	CMBB05.02
5	State whether statistics is a science or art .	Remember	CO 1	CMBB05.01
6	What is the use of statistics in biology and medical sciences?	Remember	CO 1	CMBB05.01
7	What is parametric statistics?	Remember	CO 1	CMBB05.02
8	Write five stages of statistical investigation.	Remember	CO 1	CMBB05.02
9	Differentiate primary data and secondary data.	Remember	CO 1	CMBB05.01
10	Give the example for inductive statistics.	Remember	CO 1	CMBB05.01
11	Define primary data and secondary data.	Remember	CO 1	CMBB05.02
12	How statistics are used in accountancy?	Remember	CO 1	CMBB05.02
13	Define experimental methods.	Understand	CO 1	CMBB05.01
14	Write about descriptive statistics.	Understand	CO 1	CMBB05.01
15	Discuss how statistics is useful in planning in an organization.	Remember	CO 1	CMBB05.02
16	Give two examples of graphical and numerical measures?	Understand	CO 1	CMBB05.02
17	Why presentation of data is important in statistics.	Understand	CO 1	CMBB05.01
18	Define descriptive statistics.	Remember	CO 1	CMBB05.01
19	What is the meaning of inferential statistics?	Understand	CO 1	CMBB05.02
20	Write any two functions of statistics?	Remember	CO 1	CMBB05.02
Part - B (Long Answer Questions)				
1	Define the term statistics and its development.	Understand	CO 1	CMBB05.01
2	Describe the various definitions of statistics.	Understand	CO 1	CMBB05.01
3	What are the managerial applications of statistics and give examples for each field and how it is used?	Understand	CO 2	CMBB05.02
4	What are the various functions of statistics?	Understand	CO 2	CMBB05.02
5	Explain the importance of statistics in management.	Understand	CO 1	CMBB05.01
6	What are the limitations of statistics and also describe about the stages of statistical investigation?	Remember	CO 1	CMBB05.01
7	Explain the role of computers in present day statistics.	Understand	CO 2	CMBB05.02
8	Write in detail about the branches of study.	Remember	CO2	CMBB05.02
9	What are the characteristics features of statistics?	Understand	CO 1	CMBB05.01
10	Describe how statistics has evolved.	Understand	CO 1	CMBB05.01
11	Explain orgin and development of statistics?	Understand	CO 2	CMBB05.02
12	“Statistics is the science of human welfare”comment on this statement	Remember	CO 2	CMBB05.02
13	Distiguish between statistical methods and statistics.	Understand	CO 1	CMBB05.01
14	Discuss the scope and significance of the study of statistics.	Understand	CO 1	CMBB05.01
15	Explain about different managerial applications of statistics in various fields in modern times and analyze the use of computers in statistics	Understand	CO 2	CMBB05.02
16.	Discuss the significance of statistics and mathematics in the managerial sciences.	Remember	CO 2	CMBB05.02
17.	What role does business statistics play in the management of business enterprice?	Remember	CO 2	CMBB05.02
18.	How can statistics be used by managers for taking effective business decisions?	Remember	CO 2	CMBB05.02
19.	Is statistics an all pervading subject?Examine the issue critically.	Remember	CO 2	CMBB05.02
Part - C (Problem Solving and Critical Thinking Questions)				
1	Write about the qualities of a statistician and explain his roles in an Statistical works.	Understand	CO 1	CMBB05.01
2	Explain about the uses of statistics in different fields.	Understand	CO 1	CMBB05.01
3	“Statistical thinking one day be as necessary for effiecient citizenshipas the ability to read and write”comment on this statement.	Remember	CO 2	CMBB05.02

4.	Which do you feel constitutes a higher form statistical analysis and Why?	Understand	CO 1	CMBB05.01
5.	To what uses or functions can statistics put?	Understand	CO 1	CMBB05.01
6.	How do you think eachbe used to solve real world business problems?	Remember	CO 2	CMBB05.02

UNIT-II

MEASURES OF CENTRAL TENDENCY

Part – A (Short Answer Questions)

1	Define arithmetic mean.	Understand	CO 3	CMBB05.03
2	What are the properties of mode?	Remember	CO 4	CMBB05.04
3	Define range? Write about the bi- model and multi- model concepts.	Understand	CO 3	CMBB05.03
4	How actual mean method is calculated?	Remember	CO 4	CMBB05.04
5	Explain about the skewness.	Understand	CO 3	CMBB05.03
6	Describe about the limitations of average.	Remember	CO 4	CMBB05.04
7	Define dispersion. Explain the properties of good measures of dispersion.	Understand	CO 3	CMBB05.03
8	Define mean deviation.	Remember	CO 4	CMBB05.04
9	Explain about the median and its merits and demerits.	Understand	CO 3	CMBB05.03
10	What are the different types of average? Explain how mode is determined graphically with an example.	Remember	CO 4	CMBB05.04
11	What are the applications of averages? Explain requisites of a good average	Understand	CO 3	CMBB05.03
12	Explain the relationship between mean, median, mode.	Remember	CO 4	CMBB05.04
13	What is meant by inter quartile range?	Understand	CO 3	CMBB05.03
14	Write in detail about the positively skewed distribution.	Remember	CO 4	CMBB05.04
15	Explain about the geometric mean with example.	Understand	CO 3	CMBB05.03
16	Define standard deviation.	Remember	CO 4	CMBB05.04
17	Define Harmonic mean.	Understand	CO 3	CMBB05.03
18	What is the meaning of Quartile?	Remember	CO 4	CMBB05.04
19	Describe about quartile deviation.	Understand	CO 3	CMBB05.03
20	Write about kurtosis?	Remember	CO 4	CMBB05.04

Part – B (Long Answer Questions)

1	What are the various factors influencing the selection of averages ?state the applications and limitations of averages?	Understand	CO 3	CMBB05.03
2	What do you mean by dispersion distinguish between measures of central tendency and dispersion?	Remember	CO 4	CMBB05.04
3	What do you mean by measures of central tendency what are its objectives and characteristics? Explain the requisites of good average?	Understand	CO 3	CMBB05.03
4	What is standard deviation? Explain its merits and demerits? what are the methods available for computing standard deviation for individual observations?	Remember	CO 4	CMBB05.04
5	Explain the concept of skewness and its different measures of skewness.	Understand	CO 3	CMBB05.03
6	Describe the steps involved in calculating standard deviation for continuous series.	Remember	CO 4	CMBB05.04
7	calculate the standard deviation and variance from the following data	Understand	CO 3	CMBB05.03
8	Calculate the mode from the following data	Remember	CO 4	CMBB05.04
9	Find the median and mean deviation of the following data.	Understand	CO 3	CMBB05.03
10	From the data given below ,calculate karl persons coefficient of skewness	Remember	CO 4	CMBB05.04
11	Calculate the lower and upper quartiles ,fifth decile and 30th percentile	Understand	CO 3	CMBB05.03

Daily wages	10-12	13-15	16-18	19-21	22-24	25-27	28-30
workers	15	14	17	20	23	26	29

Marks	0-10	10-20	20-30	30-40	40-50
frequency	8	11	26	9	6

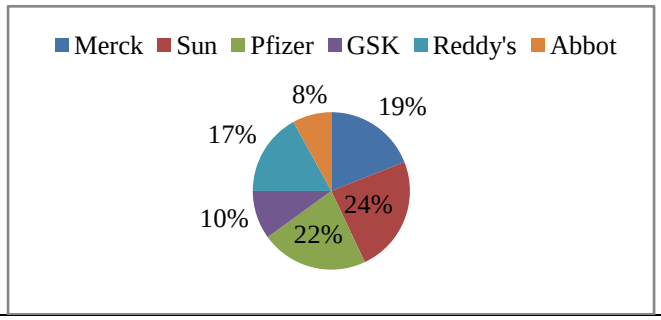
Size	0-10	10-20	20-30	30-40	40-50	50-60	60-70
frequency	7	12	18	25	16	14	8

Age	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60
Person	50	70	80	180	150	120	70	50

Class	0-5	5-10	10-15	15-20	20-25

	frequency | 7 | 18 | 25 | 30 | 20			
12	Calculate the arithmetic mean, median and mode from the following: Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 F | 8 | 10 | 20 | 30 | 25 | 12	Remember	CO 4	CMBB05.04
13	Calculate quartile deviation and coefficient of quartile deviation X | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 F | 4 | 12 | 16 | 22 | 10 | 8 | 6 | 4	Understand	CO 3	CMBB05.03
14	Find karl pearsoms coefficient of skewness Wages | 5-15 | 15-25 | 25-35 | 35-45 | 45-55 | 55-65 | 65-75 Earners | 100 | 80 | 75 | 60 | 55 | 20 | 0	Remember	CO 4	CMBB05.04
15	Calculate the median Q1,Q3 from the following data X | 8 | 12 | 20 | 25 | 30 | 40 F | 9 | 16 | 28 | 46 | 20 | 10	Understand	CO 3	CMBB05.03
16	What are the objectives of central dispersion of frequency distribution?	Understand	CO 3	CMBB05.03
17	Explain utility of measures of dispersion?	Remember	CO 4	CMBB05.04
18	Discuss the different types of skewness and know about the coefficient variations of skewness	Understand	CO 3	CMBB05.03
19	Explain karl pearson coeffiect of skewness with examples?	Remember	CO 4	CMBB05.04
20	Discuss about Bowly's Coeffiecient of skewness?	Understand	CO 3	CMBB05.03
	Part - C (Problem Solving and Critical Thinking Questions)			
1	Calculate quartile deviation and coefficient of quartile deviation X | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 F | 11 | 12.4 | 21 | 12 | 11.8	Understand	CO 3	CMBB05.03
2	From the data given below ,calculate Bowley's coefficient of skewness Age | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 | 50-55 | 55-60 Person | 50 | 70 | 80 | 180 | 150 | 120 | 70 | 50	Remember	CO 4	CMBB05.04
3	Calculate the Mean deviation from the following data Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 frequency | 8 | 11 | 26 | 9 | 6	Understand	CO 3	CMBB05.03
4	calculate the quartile deviation and variance from the following data Daily wages | 10-12 | 13-15 | 16-18 | 19-21 | 22-24 | 25-27 | 28-30 workers | 15 | 14 | 17 | 20 | 23 | 26 | 29	Understand	CO 3	CMBB05.03
5	Calculate the Geometric mean, median and mode from the following: Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 F | 8 | 10 | 20 | 30 | 25 | 12	Remember	CO 4	CMBB05.04
	MODULE -III			
	CORRELATION AND REGRESSION			
	Part - A (Short Answer Questions)			
1	Define tabulation.	Understand	CO5	CMBB05.05
2	Discuss the Simple Tabulation	Remember	CO 6	CMBB05.06
3	Explain about the various types of tabulation.	Understand	CO 5	CMBB05.05
4	Give an example for complex table.	Understand	CO5	CMBB05.05
5	What do you mean by data classification?	Remember	CO 6	CMBB05.06
6	Describe about the bivariate tabulation and multivariate tabulation.	Understand	CO 5	CMBB05.05
7	Write the differences between quantitative and qualitative classification.	Understand	CO5	CMBB05.05
8	Write the types of Bar diagram.	Remember	CO 6	CMBB05.06
9	What do you mean by Percentage Bar Diagram	Understand	CO 5	CMBB05.05
10	Define about Sub-divided Bar Diagram	Understand	CO5	CMBB05.05
11	Describe about the multiple Bar Diagram.	Understand	CO5	CMBB05.05
12	Write about the Pie diagram	Remember	CO 6	CMBB05.06
13	Describe about the various types of bar diagrams.	Understand	CO 5	CMBB05.05

14	What are ogives curves?	Understand	CO5	CMBB05.05
15	Explain about the Pie-Chart.	Remember	CO 6	CMBB05.06
16	Write about the types of diagrams.	Understand	CO 5	CMBB05.05
17	Describe about the sub divided bar diagram.	Understand	CO5	CMBB05.05
18	Write about the multiple bar diagram.	Remember	CO 6	CMBB05.06
19	Define Histogram	Understand	CO 5	CMBB05.05
20	What is Deviation Bar Diagram?			
	Part – B (Long Answer Questions)			
1	Explain the advantages of graphical presentation and objectives of Classification?	Understand	CO5	CMBB05.05
2	What is tabulation? Discuss the purpose and methods of tabulation.	Remember	CO 6	CMBB05.06
3	What is classification? state the differences between classification and tabulation and explain the types of classification?	Understand	CO 5	CMBB05.05
4	Write about the need and usefulness of diagrammatic representation of data. describe any two types of diagrams.	Understand	CO5	CMBB05.05
5	Explain the different types of bar diagram with examples.	Remember	CO 6	CMBB05.06
6	Draw a pie diagram to represent the following data of proposed expenditure by a state government for the year 2015-16. **ITEMS** / **EXPENDITURE** Agriculture 4200 Industries 1500 Health 1000 Education 500	Understand	CO 5	CMBB05.05
7	Write the types of Bar Diagram	Understand	CO5	CMBB05.05
8	Draw a bar diagram for the following data Years: 1990, 1991, 1992, 1993, 1994, 1995 Data: 12, 56, 45, 40, 63, 12	Remember	CO 6	CMBB05.06
9	Draw a pie chart from the data Movies: A, B, C, D, E x: 6, 7, 9, 10, 4	Understand	CO 5	CMBB05.05
10	Draw a multiple bar diagram from the following data Yr: 2001, 2002, 2003, 2004, 2005, 2006, 2007 Export: 1000, 1400, 5000, 1200, 3900, 3800, 2500 Import: 1200, 4000, 6900, 5000, 5900, 2000, 1400	Understand	CO 5	CMBB05.05
11	Draw sub divided bar diagram from the following data Science: 12, 13, 45, 12 Maths: 12, 13, 33, 45 Hindi: 11, 22, 61, 10 Telugu: 12, 10, 18, 14	Understand	CO5	CMBB05.05
12	Represent The following data by sub division bar diagrams: **Year** / **2006** / **2007** / **2008** **Gross income**: 405, 480, 550 **Gross expenditure (in lakhs)**: 400, 450, 500 **Net income**: 5, 30, 50	Remember	CO 6	CMBB05.06
13	The following is the distribution of weights (in kgs) of 50 persons Weight: 50-55, 55-60, 60-65, 65-70, 70-75, 75-80, 80-85, 85-90 Persons(nos): 12, 8, 5, 4, 5, 7, 6, 3	Understand	CO 5	CMBB05.05
14	Draft an appropriate table to show the following i. Gender(male,female,transgender) ii. Three ranks (supervisor,assistants,clerks) iii. Year 2011,2012,2013,2014 and 2015 iv. Age groups 18-50 years over 50 years	Understand	CO5	CMBB05.05
15	Prepare frequency table and cumulative freaquency table.Having prepared the table ,	Remember	CO 6	CMBB05.06

	i. The highest marks,the lowest marks and the range. ii. How many students received marks below 40? iii. How many students received 75 marks and above? iv. What percentage of students passed this test,taking 40 marks as the minimum marks required to pass the test?			
16	From the pie chart shown below,prepare a suitable table form to represent data 	Understand	CO5	CMBB05.05
17	Represent the data shown in the following table by using suitable graphical method **Dept** / **Town A** (Male, Female, Total) / **Town B** (Male, Female, Total) **Tea**: 40, 5, 45, 25, 15, 40 **Coffee**: 20, 35, 55, 30, 30, 60 **Total**: 60, 40, 100, 55, 45, 100	Remember	CO 6	CMBB05.06
18	Draw suitable diagram for the following **Expenditure** / **Family A** / **Family B** Monthly Income: 30000, 36000 Expences food: 9000, 12000 Clothing: 7500, 6000 Education: 1500, 10500 Others: 11500, 9000 Savings: 500, 1500	Understand	CO 5	CMBB05.05
19	Represent the following data by using simple bar diagram **Years**: 1999, 2000, 2001, 2002, 2003, 2004 **Sales**: 8, 8.8, 9.2, 10.2, 7.6, 12.5	Understand	CO5	CMBB05.05
20	Explain different types of bar diagrams?	Remember	CO 6	CMBB05.06
	Part – C (Problem Solving and Critical Thinking)			
1	Draw less than ogive and more than ogive for the following frequency distributions Marks: 0-10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-70 No of students: 4, 8, 11, 15, 12, 6, 3	Understand	CO5	CMBB05.05
2	The following data shows the number of accidents sustains by 313 drivers of public utility company over a period of 5 years. Draw the frequency polygon Accidents: 0, 1, 2, 3, 4, 5, 6, 7, 8 Drivers: 80, 65, 50, 39, 25, 19, 7, 5, 3	Remember	CO 6	CMBB05.06
3	Draw sub divided bar diagram from the following data Science: 18, 15, 16, 20 Maths: 12, 17, 18, 21 Hindi: 13, 16, 19, 22 Telugu: 14, 18, 20, 25	Understand	CO 5	CMBB05.05
4	Represent The following data by sub division bar diagrams: **Year** / **2009** / **2010** / **2011**	Understand	CO5	CMBB05.05

	Gross income	510	520	620			
	Gross expenditure (in lakhs)	670	850	700			
	Net income	25	35	55			
5.	Draw a pie diagram to represent the following data of proposed expenditure by a state government for the year 2017-18. **ITEMS** / **EXPENDITURE** Agriculture: 7000 Industries: 8500 Health: 6000 Education: 5000				Understand	CO 5	CMBB05.05
6.	Represent the following data by using simple bar diagram **Years**: 2001, 2002, 2003, 2004, 2005, 2006 **Sales**: 9.2, 8., 10.5, 12.2, 13.5, 15.2				Understand	CO 6	CMBB05.06
	UNIT -IV						
	SMALL SAMPLE TESTS						
	Part – A (Short Answer Questions)						
1	Describe about the small sample tests.				Understand	CO 7	CMBB05.07
2	Write the types of ANOVA.				Remember	CO 8	CMBB05.08
3	What do you mean by correlation				Understand	CO 7	CMBB05.07
4	Write the Assumptions of Anova.				Understand	CO 7	CMBB05.07
5	Explain the Applications of Anova.				Remember	CO 8	CMBB05.08
6	Describe about the scatter diagram.				Understand	CO 7	CMBB05.07
7	Write the formula for paired t distribution.				Understand	CO 7	CMBB05.07
8	Define null hypothesis.				Remember	CO 8	CMBB05.08
9	Define alternative hypothesis.				Understand	CO 7	CMBB05.07
10	What is Paired t-test				Understand	CO 7	CMBB05.07
11	Write the degrees of freedom of chi square test.				Remember	CO 8	CMBB05.08
12	Define small sample test and t distribution				Understand	CO 7	CMBB05.07
13	Write the uses of Chi-Square Test.				Understand	CO 7	CMBB05.07
14	What is Goodness of Fit				Remember	CO 8	CMBB05.08
15	Define Hypothesis				Understand	CO 7	CMBB05.07
16	Write the formula for paired t distribution.				Understand	CO 7	CMBB05.07
17	Define ANOVA				Remember	CO 8	CMBB05.08
18	Explain the properties of student's t distribution				Understand	CO 7	CMBB05.07
19	Explain the properties of correlation distribution				Understand	CO 7	CMBB05.07
	Part – B (Long Answer Questions)						
1	Define small sample test and t distribution. Explain the properties of student's t distribution and its applications.				Understand	CO 7	CMBB05.07
2	What is ANOVA? What are its assumptions and applications?				Remember	CO 8	CMBB05.08
3	What is chi-square? Explain its application. What are chi-square statistics and state its assumptions?				Understand	CO 7	CMBB05.07
4	Define correlation? What are the various methods of correlation?				Understand	CO 7	CMBB05.07
5	Explain the Goodness of Fit and Independence?				Understand	CO 7	CMBB05.07
6	Calculate spearman's coefficient of correlation between marks assigned to 10 students by judges X and Y in a certain competitive test as shown below S.No: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 X: 52, 53, 42, 60, 45, 41, 37, 38, 25, 27 Y: 65, 68, 43, 38, 77, 48, 35, 30, 25, 50				Remember	CO 8	CMBB05.08
7	Compute the correlation coefficient by Karl pearsons method between x and y and interpret its valve from the following: **x**: 3, 7, 8, 9, 2, 4, 7				Understand	CO 7	CMBB05.07

	y 7 9 2 1 4 6 9				
8	Calculate the t -distribution from the following data: **Persons** 1 2 3 4 5 6 **Before** 13 16 60 30 40 50 **After** 10 45 58 25 30 44	Understand	CO 7	CMBB05.07
9	200 digits are chosen at random from a set of tables. The frequencies of digits are as follows, use chi-square test to assess the correctness of hypothesis that the digits were distributed in equal numbers in the tables from which they were chosen? **X** 0 1 2 3 4 5 6 7 8 **F** 12 23 23 21 16 25 22 20 21	Understand	CO 7	CMBB05.07
10	Explain the steps for one-way anova with example?	Remember	CO 8	CMBB05.08
11	Explain the Difference between One way Anova and Two way Anova	Understand	CO 7	CMBB05.07
12	Samples of two different company's bulbs are tested for length of life, and the following data are obtained, Particulars: COMPANY A: COMPANY B Sample size: 8: 7 Sample mean: 1234: 1136 Sample S.D: 36: 40	Understand	CO 7	CMBB05.07
13	A die is rolled 100 times with the following distribution, at the 0.01 level of significance, determine whether die is true or uniform Number 1 2 3 4 5 6 Observed Frequency 17 14 20 17 17 15	Understand	CO 4	CMBB05.19
14	Discuss in detail Paired T test?	Understand	CO 7	CMBB05.07
15	The mean price of shares of Andhra bank during 2004 was $64.inthe year 2005 the mean price $20 randomly selected days is found to be $84 with S,D of $4.50.test whether there is significance difference in the price of shares for the two years at 5% significance level	Remember	CO 8	CMBB05.08
16	Two different types of drugs A and B were tried on certain patients for increasing weight.6 persons were given drug A and 8 were drug B. DrugA 7 10 13 12 4 8 - - Drug B 12 8 3 18 16 9 8 3	Understand	CO 7	CMBB05.07
17	11 sale excecutive trainees are assigned selling jobs right after their recruitement.After a fortnight they are withdrawn from their field duties and given a month training. Sales (Before training): 23,20,19,21,18,20,18,17,23,16,19 Sales (After training): 24,19,21,18,20,22,20,20,23,20,27	Understand	CO 7	CMBB05.07
18	Test whether A,B,C,D are significantly different **Block** **A** **B** **C** **D** **X** **5** **9** **11** **10** **Y** **4** **7** **8** **10** **Z** **3** **5** **8** **9**	Remember	CO 8	CMBB05.08
19	Support your answer with appropriate statistical analysis. a. Do the salesman differ significantly in performamance b. Is there significant different between seasons **Season** / **Salesmen**: **A** **B** **C** **D** **Total** Summer 36 36 21 36 129 Winter 28 29 31 31 119 Monsoon 26 28 29 29 112 Total 90 93 81 96 360	Understand	CO 7	CMBB05.07

<table>
<tr><td>20</td><td>Three technicians operated 4 machines each produced the following no.of units Anlyze the data and comment using 5% significance level.
<table>
<tr><th rowspan="2">Technician</th><th colspan="5">Machine</th></tr>
<tr><th>P</th><th>Q</th><th>R</th><th>S</th><th>Total</th></tr>
<tr><td>A</td><td>12</td><td>10</td><td>18</td><td>16</td><td>56</td></tr>
<tr><td>B</td><td>13</td><td>15</td><td>18</td><td>12</td><td>58</td></tr>
<tr><td>C</td><td>10</td><td>12</td><td>16</td><td>14</td><td>52</td></tr>
<tr><td>Total</td><td>35</td><td>37</td><td>52</td><td>42</td><td>166</td></tr>
</table></td><td>Understand</td><td>CO 7</td><td>CMBB05.07</td></tr>
<tr><td colspan="5">Part – C (Problem Solving and Critical Thinking)</td></tr>
<tr><td>1</td><td>Perform a analysis of variance on the data given and interpret the results.use 1% significance level.
<table>
<tr><th rowspan="2">Fertilizers</th><th colspan="3">Varieties</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>P</td><td>55</td><td>72</td><td>47</td></tr>
<tr><td>Q</td><td>64</td><td>66</td><td>53</td></tr>
<tr><td>R</td><td>58</td><td>57</td><td>74</td></tr>
<tr><td>S</td><td>59</td><td>57</td><td>58</td></tr>
</table></td><td>Understand</td><td>CO 7</td><td>CMBB05.07</td></tr>
<tr><td>2</td><td>Sample mean A is 10 with variables of 6.5,9.2,7.5,8.0,10,15,6.2,7.3,4.5,10.8and Sample mean B is 8 with variables of 8.2,3.5,4.1,6.2,7,4.3,5.4,4.6 on the basis of data test of significance level?</td><td>Remember</td><td>CO 8</td><td>CMBB05.08</td></tr>
<tr><td>3</td><td>A group of 5 patients treated with medicine A 42,39,48,60,41kgs.second group of 7 patients weigh 38,42,56,64,68,69,and 62Kgs. Do you agree with the clain od medicin B increases the weight significantly.</td><td>Understand</td><td>CO 7</td><td>CMBB05.07</td></tr>
<tr><td>4</td><td>In an investigation on the machine performance, the following results are obtained.
<table>
<tr><th></th><th>No.of units inspected</th><th>No.of defective</th></tr>
<tr><td>Machine1</td><td>375</td><td>17</td></tr>
<tr><td>Machine2</td><td>450</td><td>22</td></tr>
</table></td><td>Understand</td><td>CO 7</td><td>CMBB05.07</td></tr>
<tr><td>5</td><td>A survey of 240 families with 4 children each revealed the following distribution.
<table>
<tr><td>Male Births</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>No of families</td><td>10</td><td>55</td><td>105</td><td>58</td><td>12</td></tr>
</table>
Test whether the male and female births are equally popular.</td><td>Remember</td><td>CO 8</td><td>CMBB05.08</td></tr>
<tr><td>6</td><td>Samples of students were drawn from two universities and from their weights in kilograms mean and S.D are calculated and shown below make a large sample test to the significance of difference between means.
<table>
<tr><th></th><th>Mean</th><th>Standard Deviation</th><th>Sample Size</th></tr>
<tr><td>University A</td><td>55</td><td>10</td><td>10</td></tr>
<tr><td>University B</td><td>57</td><td>15</td><td>20</td></tr>
</table></td><td>Understand</td><td>CO 7</td><td>CMBB05.07</td></tr>
<tr><td>7</td><td>The measurements of the output of two units have given the following results. Assuming that both samples have been obtained from the normal populations at 10% significant level, test whether the two populations have the same variance.
<table>
<tr><td>Unit- A</td><td>14.1</td><td>10.1</td><td>14.7</td><td>13.7</td><td>14.0</td></tr>
<tr><td>Unit - B</td><td>14.0</td><td>14.5</td><td>13.7</td><td>12.7</td><td>14.1</td></tr>
</table></td><td>Understand</td><td>CO 7</td><td>CMBB05.07</td></tr>
<tr><td>8</td><td>The nicotine in milligrams of two samples of tobacco were found to be as follows. Test the hypothesis for the difference between means at 0.05 level.
<table>
<tr><td>Sample-A</td><td>24</td><td>27</td><td>26</td><td>23</td><td>25</td><td>-</td></tr>
<tr><td>Sample-B</td><td>29</td><td>30</td><td>30</td><td>31</td><td>24</td><td>36</td></tr>
</table></td><td>Remember</td><td>CO 8</td><td>CMBB05.08</td></tr>
<tr><td>9</td><td>From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees.
<table>
<tr><th>Soft drinks</th><th>Clerks</th><th>Teachers</th><th>officers</th></tr>
<tr><td>Pepsi</td><td>10</td><td>25</td><td>65</td></tr>
<tr><td>Thumsup</td><td>15</td><td>30</td><td>65</td></tr>
<tr><td>Fanta</td><td>50</td><td>60</td><td>30</td></tr>
</table></td><td>Understand</td><td>CO 7</td><td>CMBB05.07</td></tr>
</table>

10	Pumpkins were grown under two experimental conditions. Two random samples of 11 and 9 pumpkins. the sample standard deviation of their weights as 0.8 and 0.5 respectively. Assuming that the weight distributions are normal, test hypothesis that the true variances are equal.	Understand	CO 7	CMBB05.07

UNIT -V

REGRESSION ANALYSIS

Part - A (Short Answer Questions)

1	Define Regression Analysis.	Understand	CO 9	CMBB05.09
2	Discuss Additive Model of Time series	Remember	CO 10	CMBB05.10
3	Explain Seasonal Variation in the Series.	Understand	CO 10	CMBB05.10
4	Define Multiplicative Model.	Understand	CO 7	CMBB05.07
5	Define time series analysis? Write the models of time series analysis	Understand	CO 9	CMBB05.09
6	Describe about the components of time series analysis	Remember	CO 10	CMBB05.10
7	Define trend analysis	Understand	CO 10	CMBB05.10
8	Write about the method of semi averages	Understand	CO 9	CMBB05.09
9	Define index method.	Remember	CO 10	CMBB05.10
10	Describe the features of index numbers.	Understand	CO 10	CMBB05.10
11	Write the formula for Paashe's Method	Understand	CO 9	CMBB05.09
12	Write the formula for Laspeyress Method	Remember	CO 10	CMBB05.10
13	Define consumers price index.	Understand	CO 10	CMBB05.10
14	Write the formula for Fisher's Index Method	Understand	CO 9	CMBB05.09
15	Write about the two lines of regression.	Remember	CO 10	CMBB05.10

Part – B (Long Answer Questions)

1	What is regression analysis. Discuss the Properties of regression coefficient.	Understand	CO 9	CMBB05.09
2	Discuss the Models of Time series with Examples?	Remember	CO 10	CMBB05.10
3	What do you mean by regression line? What are the two equations of regression line?	Understand	CO 10	CMBB05.10
4	What are the various methods which can be used for measuring trend component in time series?	Understand	CO 9	CMBB05.09
5	Define Time Series. What are the various components of time series?	Remember	CO 10	CMBB05.10
6	Compute two regression equations and also calculate coefficient of correction: **X** 2 4 6 8 **Y** 5 10 7 14	Understand	CO 10	CMBB05.10
7	Construct a trend line using the method of semi averages from given **Year** 2001 2002 2003 2004 2005 2006 2007 **Output** 700 900 1100 900 1300 1000 1600 data	Understand	CO 9	CMBB05.09
8	Compute price and quantity index numbers for 1993 with 1991 as base year from the following: **year** **P-A** **Q -A** **P-B** **Q-B** **P- C** **Q-C** 1991 5 10 8 6 6 3 1993 4 12 7 7 5 4	Remember	CO 10	CMBB05.10
9	Fit a trend line to the following data by the free hand method **Years** 2001 2002 2003 2004 2005 2006 2007 2008 2009 **Sales** 19 22 24 20 23 25 23 26 25	Understand	CO 9	CMBB05.09
10	Using the following data fit a trend line using method of semi averages, Year 1996 1997 1998 1999 2000 2001 2002 Output 700 900 1100 900 1300 1000 1600	Remember	CO 10	CMBB05.10
11	Use of five early moving average method to calculate trend for the following data. ar 2005 2006 2007 2008 2009 2010 2011 2012 2013 20 duction 133 248 267 299 321 500 350 450 399 55	Understand	CO 10	CMBB05.10
12	Compute the seasonal index for the following data	Understand	CO 9	CMBB05.09

Quarter	2000	2001	2001	2003	2004	2005
I	3.5	3.5	3.5	4.0	4.1	4.2
II	3.9	4.1	3.9	4.6	4.4	4.6
III	3.4	3.7	3.7	3.8	4.2	4.3
IV	3.6	4.8	4.0	4.5	4.5	4.7

13	Use of four early moving average method to calculate trend for the following data.	Understand	CO 9	CMBB05.09

Year	1999	2000	2001	2002	2003	2004	2005	2006
Output	506	620	1036	673	588	696	1116	738

14	Determine the regression equation which best fit to the following data:	Remember	CO 10	CMBB05.10

x	10	12	13	16	17	20	25
y	10	22	24	27	29	33	37

15	The ranks of 16 students in Mathematics and Statistics are as follows (1,1),(2,10),(3,3),(4,4),(5,5),(6,7),(7,2),(8,6),(9,8),(10,11),(11,15),(12,9),(13,14),(14,12),(15,16),(16,13). Calculate the rank correlation coefficient for proficiencies of this group in mathematics and statistics.	Understand	CO 10	CMBB05.10
16	A sample of 12 fathers and their elder sons gave the following data about their elder sons. Calculate the coefficient of rank correlation.	Understand	CO 9	CMBB05.09

Fathers	65	63	67	64	68	62	70	66	68	67	69	71
Sons	68	66	68	65	69	66	68	65	71	67	68	70

17	Following are the rank obtained by 10 students in two subjects, Statistics and Mathematics. To what extent the knowledge of the students in two subjects are related?	Understand	CO 9	CMBB05.09

Mathematics	48	33	40	9	16	16	65	24	16	57
Statistics	13	13	24	6	15	4	20	9	6	19

18	Give the following data compute multiple coefficient of correlation of X_3 on X_1 and X_2.	Remember	CO 10	CMBB05.10

X_1	3	5	6	8	12	14
X_2	16	10	7	4	3	2
X_3	90	72	54	42	30	12

19	Find the most likely production corresponding to a rainfall 40 from the following data:	Understand	CO 10	CMBB05.10

	Rain fall(X)	**Production(Y)**
Average	30	500Kgs
Standard deviation	5	100Kgs
Coefficient of correlation	0.8	-

20.	The heights of mothers and daughters are given in the following table. From the two tables of regression estimate the expected average height of daughter when the height of the mother is 64.5 inches.	Understand	CO 9	CMBB05.09

Height of the mother(inches)	62	63	64	64	65	66	68	70
Height of the daughter(inches)	64	65	61	69	67	68	71	65

Part – C (Problem Solving and Critical Thinking)

1	Find coefficient of correlation between X and Y for the following data.				

X	10	12	18	24	23	27
Y	13	18	12	25	30	10

2	Ten competitors in a musical test were ranked by the three judges A, B and C in the following order.	Remember	CO 10	CMBB05.10

Rank A	1	6	5	10	3	2	4	9	7	8
Rank B	3	5	8	4	7	10	2	1	6	9
Rank C	6	4	9	8	1	2	3	10	5	7

Using rank correlation method, discuss which pair of judges has the nearest approach to common likings in music.

3.	Obtain the rank correlation coefficient for the following data.	Understand	CO 9	CMBB05.09

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

4.	Prove that the coefficient of correlation lies between -1 and 1.	Remember	CO 10	CMBB05.10

<table>
<tr><td></td><td>The ranks of the 15 students in two subjects A and B are given below, the two numbers within the brackets denoting the ranks of the same student in A and B respectively.
(1,10), (2,7), (3,2), (4,6), (5,4), (6,8), (7,3), (8,1), (9,11), (10,15), (11,9), (12,5), (13,14), (14,12), (15,13)
Use Spearman's formula to find the rank correlation coefficient.</td><td>Understand</td><td>CO 9</td><td>CMBB05.09</td></tr>
<tr><td>5.</td><td>A panel of two judges P and Q graded seven dramatic performances by independently awarding marks as follows:
<table>
<tr><td>Performance</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>Marks by P</td><td>46</td><td>42</td><td>44</td><td>40</td><td>43</td><td>41</td><td>45</td></tr>
<tr><td>Marks by Q</td><td>40</td><td>38</td><td>36</td><td>35</td><td>39</td><td>37</td><td>41</td></tr>
</table>
The eight performance, which judge Q would not attend, was awarded 37 marks by judge P. If judge Q had also been present, how many marks would be expected to have been awarded by him to the eight performance.</td><td>Understand</td><td>CO 10</td><td>CMBB05.10</td></tr>
<tr><td>6.</td><td>What are the various methods which can be used for measuring trend component in time series?</td><td>Understand</td><td>CO 9</td><td>CMBB05.09</td></tr>
<tr><td>7.</td><td>Find the multiple linear regression equation of X_1 on X_2 and X_3 from the data given below:
<table>
<tr><td>X_1</td><td>2</td><td>4</td><td>6</td><td>8</td></tr>
<tr><td>X_2</td><td>3</td><td>5</td><td>7</td><td>9</td></tr>
<tr><td>X_3</td><td>4</td><td>6</td><td>8</td><td>10</td></tr>
</table></td><td>Remember</td><td>CO 10</td><td>CMBB05.10</td></tr>
<tr><td>8</td><td>Calculate the regression equation of Y on X from the data given below, taking deviations from actual means of X and Y.
<table>
<tr><td>Price(Rs.)</td><td>10</td><td>12</td><td>13</td><td>12</td><td>16</td><td>15</td></tr>
<tr><td>Amount Demanded</td><td>40</td><td>38</td><td>43</td><td>45</td><td>37</td><td>43</td></tr>
</table>
Estimate the likely demand when the price is Rs. 20.</td><td>Understand</td><td>CO 9</td><td>CMBB05.09</td></tr>
</table>

Prepared by:
Ms. G Joseph Mary, Assistant Professor

HOD, MBA