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**P.E.S. College of Engineering, Mandya - 571 401**

*(An Autonomous Institution affiliated to VTU, Belgaum)*

**First Semester - Master of Business Administration (MBA)**

**Semester End Examination; Jan/Feb - 2016**

**Quantitative Techniques - I**

*Time: 3 hrs*

*Max. Marks: 100*

**Note:** Answer any **FOUR** full questions from **PART - A** and **PART - B** (Case study) is compulsory.

**PART - A**

- 1 a. Define Data. Explain the scope of statistics in Business management. 10
- b. What is Tabulation? Explain parts of Table. 10

**OR**

- 2 a. A computer company received a rush order for as many home computers as could be shipped during a six-week period company records provide the following daily shipments:

22	65	65	67	55	50	65
77	73	30	62	54	48	65
79	60	63	45	51	68	79
83	33	41	49	28	55	61
65	75	55	75	39	87	45
50	66	65	59	25	35	53

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Group these daily shipment figures into a frequency having the suitable number of classes

- b. Present the following information in suitable form:  
 In 1994, out of a total of 1950 workers of a factory, 1400 were members of trade union.  
 The number of women employed was 400 of which 275 did not belong to a trade union. In 1999, the number of union workers increased to 1780 of which 1490 were men. On the other hand, the number of non-union workers fell to 408 of which 280 were men. In the year 2004, there were 2000 employees who belonged to a trade union and 250 did not belong to the trade union. Of all the employees in 2000, 500 were women of whom only 208 did not belong to a trade union. 10

- 3 a. Explain in detail the advantages and disadvantages of Arithmetic Mean. 10

- b. A professor of management has decided to use the weighted average to find the internal assessment grades of his students on the basis of following parameters:

Quizzes – 30 percent

Term paper- 25 percent

Mid-Term test- 30 percent

And class attendance 15 percent.

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From the data given below, compute the final average in the internal assessment of individual students.

Students	Quizzes	Tem paper	Mid-term	Attendance
1	55	59	64	20
2	48	54	58	22
3	64	58	63	19
4	52	49	58	23
5	65	60	62	18

OR

- 4 a. The following distribution gives the pattern of overtime work per week done by 100 employees of a company calculate median, first quartile and seventh decile.

Overtime hours:	10-15	15-20	20-25	25-30	30-35	35-40
No. of employees	11	20	35	20	8	6

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Calculate  $Q_1$ ,  $D_7$  and  $P_{60}$ .

- b. In 500 small-scale industrial units, the return on investment ranged from 0 to 30 percent; no unit sustaining loss. Five percent of the units had returns ranging from zero percent to (and including) 5 percent, and 15 percent of the units earned returns exceeding 5 but not exceeding 10 percent. The median rate of return was 15 percent and the upper quartile 2 percent. The uppermost layer of returns exceeding 25 percent was earned by 50 units.

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(i) Present the information in the form of the frequency table as follows:

Exceeding 0 percent but not exceeding 5 percent.

Exceeding 5 percent but not exceeding 10 percent.

Exceeding 10 percent but not exceeding 15 percent and so on

(ii) Find the rate of return around which there is maximum concentration of units.

- 5 a. Calculate the mean absolute deviation and its coefficient from median from the following data

Year	Sales ( ` thousand)	
	Product A	Product B
1996	23	36
1997	41	39
1998	29	36
1999	53	31
2000	38	47

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- b. You are given the frequency distribution of 292 workers of a factory according to their weekly income.

Weekly Income ( `)	No. of workers	Weekly Income	No. of Workers
Below 1350	8	1450-1470	22
1350-1370	16	1470-1490	15
1370-1390	39	1490-1510	15
1390-1410	58	1510-1530	9
1410-1430	60	1530 & above	10
1430-1450	40		

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Calculate the quartile deviation and its coefficient from the above mentioned data.

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**OR**

- 6 a. The breaking strength of 80 'test pieces' of a certain alloys is given in the following table, the unit being given to the nearest thousand grams per square inch;

Breaking Strength	No. of Pieces
44-46	3
46-48	24
48-50	27
50-52	21
52-54	5

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Calculate the average breaking strength of the alloys and the standard deviation calculate the percentage of observations lying between  $\bar{x} \pm 2\sigma$

- b. The weekly sales of two products A and B were recorded as given below:

Product A	59	75	27	63	27	28	56
Product B	150	200	125	310	330	250	225

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Find out which of the two shows greater fluctuation in sales.

- 7 a. The following data relate to age of employees and the number of days they reported sick in a month.

Employees	1	2	3	4	5	6	7	8	9	10
Age	30	32	35	40	48	50	52	55	57	61
Sick days	1	0	2	5	2	4	6	5	7	8

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Calculate Karl Pearson's coefficient of correlation and interpret it.

- b. The owner of a small garment shop is hopeful that this sales are rising significantly week by week. Treating the sales for the previous six weeks as a typical example of this rising trend, he recorded them in ` 1000's and analysed the results.

Week	1	2	3	4	5	6
Sales	2.69	2.62	2.80	2.70	2.75	2.81

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Fit a linear regression equation to suggest to him the weekly rate at which his sales are rising and use this equation to estimate expected sales for the 7<sup>th</sup> week.

**OR**

- 8 a. The competitors in a beauty contest are ranked by three judges in the following order:

Judge 1	1	6	5	10	3	2	4	9	7	8
Judge 2	3	5	8	4	7	10	2	1	6	9
Judge 3	6	4	9	8	1	2	3	10	5	7

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Use the rank correlation coefficient to determine which pair of judges has the nearest approach

to common tastes in beauty.

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- b. The following table gives the aptitude test scores and productivity indices of the 10 workers selected at random:

Aptitude Scores(x):	60	62	65	70	72	48	53	73	65	82
Productivity Index(y):	68	60	62	80	85	40	52	62	60	81

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Calculate the two regression equations and estimate (a) the productivity index of a worker whose test score is 92 (b) the test score of a worker whose productivity index is 75

**PART - B**

9. **Case Study:**

- a. The following table relates to the tourist arrivals (in millions) during 1994 to 2000 in India:

Year:	1994	1995	1996	1997	1998	1999	2000
Tourist Arrivals:	18	20	23	25	24	28	30

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Fit a straight line method of least squares and estimate the number of tourists that would arrive in the year 2004.

- b. Calculate the weighted average of quantity relative index from the following data:

Commodity	Quantity (units)		Price (Rs/units)
	2000	2002	2000
A	10	12	100
B	15	20	75
C	8	10	80
D	20	25	60
E	50	60	500

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