# 2014

# M B A

### 1st Semester Examination

### QUANTITATIVE TECHNIQUES

### PAPER—MBA-103

*Full Marks* : 100

*Time* : 3 Hours

*The figures in the right-hand margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

1. Answer any *eight* questions from the following :     5×8

   (a) A precious stone worth Rs. 7,800 is accidentally dropped and broken into 3 pieces the weight of which are in the ratio of 5:7:8. The value of the stone is proportional to the square of the weight. Calculate the loss thus incurred by the breakage.

   (b) A company sets aside a sum of Rs. 20,000 annually to enable it to pay off debenture issue of Rs. 2,30,000 at the end of 10 years. Assuming that the sum accumulates at 4 per cent per annum compound, find the surplus after paying off the debenture stock.

   (c) The sum of p terms of a series is $3p^2 + 5p$. Prove that the terms of the series form an arithmetic progression.

(d) Find the sum of :

$5 + 55 + 555 + \ldots$ upto $n$ terms.

(e) If $n$ is a positive integer greater than 2, show that

$2^n > 1 + \sqrt[n]{2n-1}$ .

(f) Industrial bulletin of a certain year shows profit (in lacs) of 260 companies, as given below. Find the third quartile $(Q_3)$ and ninth decile $(Dq)$ :

| Profit : | 161–167 | 167–173 | 173–179 | 179–185 | 185–191 | 191–197 |
|---|---|---|---|---|---|---|
| Frequency : | 79 | 92 | 60 | 22 | 5 | 2 |
| Cumulative Frequency : | 79 | 171 | 231 | 253 | 258 | 260 |

(g) If the cost price of a product is Rs. 150 and profit will be charged at a rate of 20% on selling price, determine the selling price of the product.

(h) A sample of size 15 has mean 3.5 and another sample of size 22 has mean 4.7 . If the two samples are polled together, find the mean of the combined sample.

(i) The median and mode of the following frequency distribution are known to be 27 and 26 respectively. Find the values of 'a' and 'b' :

| Values : | 0–10 | 10–20 | 20–30 | 30–40 | 40–50 |
|---|---|---|---|---|---|
| Frequency : | 3 | a | 20 | 12 | b |

(j) The coefficient of rank correlation of the marks obtained by 10 students in two particular subjects was found to be 0.5 . It was later discovered that the difference in ranks in two subjects obtained by one of the students was wrongly taken as 3 instead of 7. What should be the correct value of coefficient of rank correlation ?

*(Continued)*

(k) Prove that Fisher's formula is an ideal index number.

(l) In a moderately skewed distribution, Mean = 24.6 and the mode = 26.1. Find the value of the Median.

2. Answer any *four* questions from the following :  10×4

(a) If the equation of two regression lines obtained in a correlation analysis are 3x + 12y = 19 and 3y + 9x = 46, find the means, correlation coefficient and ratio of the variances of x and y.

(b) The scores of two batsmen, A and B, in ten innings during a certain season, are as under :

A : 32  28  47  63  71  39  10  60  96  14

B : 19  31  48  53  67  90  10  62  40  80

Find which of the batsmen is more consistent in scoring.

(c) (i) The value of Spearman's rank correlation coefficient for certain pairs of number of observations, was found to be 2/3. The sum of square of the differences between corresponding ranks was 55. Find the number of pairs.

(ii) If correlation coefficient between random variables x and y is +ve, comment on the following statements :

(1) Correlation coefficient between –x and –y is +ve ;

(2) We cannot infer about the sign of correlation between x and –y ;

(3) Interpret the result $r^2 = 0.64$, where $r^2$ is coefficient of determination.

5+5

(d) Construct Index numbers by Chain base method of the following data of wholesale prices of cotton :

| Year : | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| Price : | 75 | 50 | 65 | 60 | 72 | 70 | 75 |

(e) Draw ogives (both 'less than' and 'more than' types) for the following frequency distribution :

| Wages : (Rs.) | 50-59 | 60-69 | 70-79 | 80-89 | 90-99 | 100-109 | 110-119 |
|---|---|---|---|---|---|---|---|
| No. of employees : | 8 | 10 | 16 | 14 | 10 | 5 | 2 |

(f) From the following data, calculate price index numbers for year 2000 with year 1990 as base by :

(i) Laspeyre's method ;

(ii) Paasche's method ;

(iii) Marshall-Edgeworth methods *and*

(iv) Fisher's Ideal method.

| | 1990 | | 2000 | |
|---|---|---|---|---|
| Commodities | Price | Quantity | Price | Quantity |
| A | 20 | 8 | 40 | 6 |
| B | 50 | 10 | 60 | 5 |
| C | 40 | 15 | 50 | 15 |
| D | 20 | 20 | 20 | 25 |

*[ Internal Assessment : 10 Marks ]*