MANAGEMENT PROGRAMME

Term-End Examination

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December, 2011

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MS-8 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours   *Maximum Marks : 100*

(Weightage 70%)

Note : (i) Section - A has six questions, each carrying 15
marks. Attempt any four questions from this section.

(ii) Section - B is compulsory and carries 40 marks.
Attempt both questions.

(iii) Statistical tables may be supplied on request.

SECTION - A

1. What do you understand by a continuous frequency distribution ? Explain various terms that are frequently used in a frequency distribution. Also highlight the difference in inclusive and exclusive methods of classes.

2. Consider the following matrix of transition probabilities of a product available in the market in two brands.

	Brand A	Brand B
Brand A	0.9	0.1
Brand B	0.3	0.7

Determine the market shares of each of the brand in equillibrium position

MS-8   1   **P.T.O.**

3. A manufacturer buys parts from four different vendors numbered 1, 2, 3, and 4. Referring to orders placed on two successive days, (1, 4) denotes the event that on the first day, the order was given to vendor 1 and on the second day it was given to vendor 4. Letting A represent the event that vendor 1 gets at least one of these two orders, B the event that the same vendor gets both orders and C the event that vendors 1 & 3 do not get either order. List the elements of (a) Entire sample space (b) BUC (c) A

4. In a random sample of 500 people of a city, it was found that 160 people have a car from Maruti Suzuki family. Find a 95% confidence interval for the actual proportion of people who have a car from Maruti Suzuki family.

5. Quotations of index numbers of equity shares price of a certain joint stock company and of prices of preference shares are given below :

Year	2003	2004	2005	2006	2007	2008	2009
Equity shares	97.5	99.4	98.6	92.2	95.1	98.4	97.1
Preference shares	75.1	75.9	77.1	78.2	79.0	74.8	76.2

Use the method of Rank correlation to determine the relationship between equity share and preference share prices.

6. Write short notes on *any three* of the following :

(a) Inductive statistics

(b) Skewness

(c) Criterion of pessimism

(d) Double sampling

(e) Auto - correlation & Time series

SECTION – B

7. The incomes of a group of 10,000 people were found to be normally distributed with mean Rs 7500 p.m and standard deviation Rs 500. Show that of this group 95% had incomes exceeding Rs 6680 and only 5% had income exceeding Rs 8320.

8. The following table gives the number of accounting clerks committing errors and not committing errors between trained and untrained clerks working in an organisation :

Clerks	Committing Errors	Not Committing Errors	Total
Trained	70	530	600
Untrained	155	745	900
Total	225	1275	1500

Test the effectiveness of training in preventing errors. Use 0.05 level of significance (Given χ at 1 d.f and a=0.05 =3.841).

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MANAGEMENT PROGRAMME

Term-End Examination

June, 2012

MS-8 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours   *Maximum Marks : 100*
                                   (Weightage 70%)

Note : (i)   *Section A has **six** questions, each carrying **15** marks. Attempt **any four** questions from this section.*

(ii)   *Section B is **compulsory** and carries **40** marks. Attempt **both** questions.*

(iii) *Statistical tables may be supplied on request.*

SECTION-A

1. What is Statistical Decision Theory ? Describe the four different states of decision environment in managerial applications. Which is the most prevalent state ?

2. On 1st January every year, a person buys N.S.Cs (National Savings Certificates) of value exceeding that of his last year's purchase by Rs. 100. After 10 years, he finds that the total value of the certificates held by him is Rs. 54,500.

Find the value of the certificates purchased by him :

(a) In the first year

(b) In the eighth year

3. A certain manufacturing process yield electrical fuses of which, in the long run, 15% are defective. Find the probability that in a sample of 10 fuses selected at random there will be :

(a) no defective

(b) at least one defective

4. A manager at a drug manufacturing wants to estimate what proportion of the adult population of India has high blood pressure. He wants to be 99% sure that the error of his estimate will not exceed 0.02. Census reports indicate that about 0.20 of all adults have high blood pressure. What sample size shall he take ?

5. After 9/11 attack on World Trade Center, a company could partially recover the following record on analysis of correlation :

Variance of $x = 9$

Regression Equations

$$8x - 10y + 66 = 0$$
$$40x - 18y = 214$$

What was :

(a) The correlation coefficient between x and y ?

(b) The standard deviation of y ?

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6. Write short notes on *any three* of the following :
    (a) Algebraic and Transcendental functions
    (b) Quartile Deviation
    (c) Criterion of optimism
    (d) Disproportional Stratified Sampling
    (e) Least Square Criterion

SECTION-B

7. For a set of 1000 observations known to be normally distributed, the mean is 534 cm and SD is 13.5 cm. How many observations are likely to exceed 561 cm ? How many will be between 520.5 and 547.5 cm ?

8. The following table gives the number of aircraft accidents that occurs during the various days of a week. Find whether the accidents are uniformly distributed over the week.

Days	SUN	MON	TUE	WED	THU	FRI	SAT
No.of Accidents	14	16	8	12	11	9	14

Given χ^2 at 6.d.f = 12.59

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MANAGEMENT PROGRAMME

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Term-End Examination
December, 2012

MS-8 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours　　　　　　　　*Maximum Marks : 100*
　　　　　　　　　　　　　　　　　(Weightage 70%)

Note (i)　　*Section-A has six questions, each carrying 15 marks.*
　　　　　Attempt any four questions from this section.

(ii)　　*Section-B has two questions, each carrying 20 marks.*
　　　　Attempt both the questions from this section.

(iii)　　*Tables may he supplied on request use of calculators*
　　　　may be permitted.

SECTION-A

1.　　If an amount of Rs 10,000/- is invested at a simple　**15**
interest of 12% per annum, how much it will
become at the end of 5 years ? And if this amount
is invested at a compound interest of 10% per
annum (the interest being compounded on yearly
basis), how much it will become at the end of
5 years ? Also answer that the invested amount
will be more at the end of 5 years in which case.

2. An insurance company insured 2,000 scooter, 4,000 car, 6,000 truck drivers with their probability of meeting accidents being. .01, .03, .15 respectively. Find the probability that the person who met an accident is a scooter driver.   15

3. Give definitions of less than and more than ogives. After this, draw their graphs for the frequency distribution showing the marks of 60 students in the table below :   15

Marks	Number of students	Marks	Number of students
10-20	4	40-50	20
20-30	6	50-60	18
30-40	10	60-70	2

Table — Frequency distribution showing number of students in intervals of marks.

4. The results of a survey of 320 families with 5 children together with observed and expected frequencies are shown in the table below :   15

Number of boys and girls	5 Boys and 0 girl	4 Boys and 1 girl	3 Boys and 2 girls	2 Boys and 3 girls	1 Boy and 4 girls	0 Boy and 5 girls	Total
Observed frequencies	18	56	110	88	40	8	320
Expected frequencies	10	50	100	100	50	10	320

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Using Chi-square Text of Goodness of Fit, answer whether the hypothesis that the births of boys and girls are equally likely at a significance level of 1 percent.

5. Name the Types of Probability Sampling Methods. **15** Then explain the terms stratified and cluster sampling. While doing so, draw diagrams. Thereafter compare the Two Types of Sampling Methods.

Write short notes on *any three* of the following **15** topics :

(a) Total and Marginal revenues.

(b) Quartile deviation.

(c) Binomial distribution.

(d) Type I and Type II Errors in the context of Hypothesis testing.

(e) Delphi method of forecasting.

SECTION-B

7.   Find the equation of the regression line of y on x 20
for the data given in the table below :

x	1	2	3	4	5
y	5	7	9	10	11

And from the equations of the regression line, find
the value of y corresponding to x = 2.5.

8.   For the system of non homogeneous linear 20
equations.

$$2x_1 + 3x_2 + 4x, = 1$$
$$-2x_1 - 3x_2 + 5x_3 = 8$$
$$4x_1 + 3x_2 + 2x_3 = 1,$$

do the following :

(a)   Prove that the above system of equations is
consistent, i.e., the system has at least one
solution.

(b)   Solve the above system of equations by any
one method out of Cramer's rule, Inverse
matrix method, Gauss-Jordan method.

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MANAGEMENT PROGRAMME

Term-End Examination
June, 2013

MS-8 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours *Maximum Marks : 100*
(Weightage 70%)

Note : (i) *Section-A has six questions, each carrying 15 marks. Attempt **any four** questions from this section.*

(ii) *Section-B has **two** questions, each carrying 20 marks. Attempt both the questions from this section.*

(iii) *Tables may be supplied on request. Use of calculators may be permitted.*

SECTION-A

1. If an amount of Rs. 10,000/- is invested at a simple interest of 15% per annum, how much it will become at the end of 5 years ? And if this amount is invested at a compound interest of 12% per annum (the interest being compounded on yearly basis), how much it will become at the end of 5 years ? Also answer that the invested amount will be more at the end of 5 years in which case.   15

2. In a bolt factory, machines A, B, C manufacture 25%, 35%, 40% bolts respectively. Out of these bolts, 5%, 4%, 12% defective ones came from machines A, B, C respectively. Find the probability that a bolt found to be defective came from machine B. **15**

3. Give definitions of Less than and More than ogives. After this, draw their graphs for the frequency distribution showing the marks of 56 students shown in the table below : **15**

Marks	Number of students
0 - 10	4
10 - 20	8
20 - 30	11
30 - 40	15
40 - 50	12
50 - 60	6

Table - Frequency distribution showing number of students in intervals of marks.

4. The results of a survey of 320 families with 5 children together with observed and expected frequencies are shown in the table below : **15**

Number of boys and girls	5 Boys and 0 girl	4 Boys and 1 girl	3 boys and 2 girls	2 boys and 3 girls	1 boy and 4 girls	0 Boy and 5 girls	Total
Observed frequencies	18	56	110	88	40	8	320
Expected frequencies	10	50	100	100	50	10	320

Using chi-square test of goodness of fit, answer whether the hypothesis that the births of boys and girls are equally likely at a significance level of $\alpha = .05$

5. Name the types of Probability Sampling Methods. Then explain the terms Simple Random and Stratified Sampling. While doing so, draw diagrams wherever required. Thereafter compare the two types of sampling methods. **15**

6. Write short notes on *any three* of the following topics : **15**

   (a) Total and Average revenues

   (b) Standard deviation

   (c) Normal distribution

   (d) Null and Alternative hypothesis

   (e) Opinion polls method of forecasting

SECTION-B

7. Find the equation of the regression line of x on y 20
   for the data given in the table below :

x	1	2	3	4	5
y	5	7	9	10	11

   And from the equation of the regression line, find
   the value of x corresponding to $y = 6$.

8. For the system of non homogeneous linear   20
   equations.

   $$6y_2 + 10y_3 = 2$$
   $$y_1 + 6y_2 + 10y_3 = 3$$
   $$-3y_2 + y_3 = 5,$$

   do the following :

   (a) Prove that the above system of equations is
       consistent i.e, the system has at least one
       solution.

   (b) Solve the above system of equations by any
       one method out of Cramer's rule,
       Inverse matrix method, Gauss - Jordan
       method.

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MANAGEMENT PROGRAMME

Term-End Examination

December, 2013

MS-8 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours   *Maximum Marks : 100*

(Weightage 70%)

Note :   *(i)*   *Section A has **six** questions each carrying 15 marks. Attempt **any four** questions from this Section.*

   (ii)   *Section B is **compulsory** and carries **40** marks. Attempt **Both** questions.*

   (iii)   *Statistical tables may be supplied on request.*

   (iv)   *Use of calculator is allowed.*

SECTION - A

1. Suppose the price p and quantity q of a commodity are related by the equation,
   $$q = -p^2 - 4p + 30$$
   Find
   (a)   Elasticity of demand at p = 2
   (b)   Marginal Revenue (MR)

2. Consider the following data :

Daily sales	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
No. of firms	15	23	27	20	35	25	5

Find the modal daily sales.

3. It is not known whether a coin is fair or unfair. If the coin is fair the probability of a tail is 0.5 but if the coin is unfair the probability of a tail is 0.10. A prior probability given of a fair coin is 0.80 and that of unfair coin is 0.20. The coin is tossed once and tail is the result. What is the probability that the coin is fair ?

4. Explain the concept of the power curve of a test and p-value of a test.

5. Regarding a certain normal distribution concerning the income of the individuals we are given that mean = Rs.500 and standard deviation = Rs.100. Find the probability than an individual selected at random will belong to income-group Rs. 550 to Rs. 650.

6. Write short note on **any three** of the following :
   (a) Step Function
   (b) Harmonic Mean
   (c) Decision Tree Approach
   (d) Double Sampling
   (e) Auto Regressive Models

SECTION - B

7. The table given below shows the data obtained during outbreak of small pox.

	Attacked	Not attacked	Total
Vaccinated	31	469	500
Not vaccinated	185	1315	1500
Total	216	1784	2000

Test the effectiveness of vaccination in preventing attack from small pox at 5% level of significance.

8. Fit a regression line $y = a + bx$ by the method of least squares.

Income X	41	65	50	57	96	94	110	30	79	65
Expenditure Y	44	60	39	51	80	68	84	34	55	48

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MANAGEMENT PROGRAMME

Term-End Examination

June, 2014

MS-8 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours

Maximum Marks : 100

(Weightage 70%)

Note : (i) *Section - A has six questions, each carrying 15 marks. Attempt any four questions from this section.*

(ii) *Section - B is compulsory and carries 40 marks. Attempt both questions.*

(iii) *Statistical tables may be supplied on request.*

(iv) *Use of calculator is permissible.*

SECTION - A

1. Solve the system of simultaneous linear equations by using matrix algebra :

$$2x_1 + 4x_2 + x_3 = 8$$
$$3x_1 + 3x_2 + x_3 = 16$$
$$3x_1 + x_2 + 2x_3 = 8$$

2. Following is the data of sales figure of a company for 100 days :

Sales (Rs. thousands)	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100
No. of days	10	15	25	30	12	8

Compute the Average Deviation.

MS-8   1   P.T.O.

3. Suppose that a manufactured product has 2 defects per unit of product inspected. Use Poisson distribution and calculate the probabilities of finding a product without any defect, with three defects and with four defects.

(Given $e^{-2} = 0.13534$)

4. Discuss the role of Chi-square distribution in testing of hypothesis.

5. A marketing manager wants to know if there is any difference in the proportion of consumers who like the taste of his product. He finds that 40 out of a sample of 85 consumers respond that they like the taste of his product. Similarly 35 out of a second sample of 65 consumers respond that they like the taste of the product when they are administered a product of the next competing brand. Based on these observations what should the marketing manager conclude at a 5% significance level ?

6. Write short notes on **any three** of the following :

(a) Marginal Revenue

(b) Deciles

(c) Marginal Analysis

(d) Non-sampling error

(e) Moving average models

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SECTION - B

7. Suppose the ranks obtained by a set of 10 students in a Mathematics test (X) and a Physics test (Y) are shown below.

Rank (X)	1	2	3	4	5	6	7	8	9	10
Rank (Y)	3	1	4	2	6	9	8	10	5	7

Find the rank correlation.

8. A banker claims that the life of a regular saving account opened with his bank averages 18 months with a standard deviation of 6.45 months. Answer the following :
   (a) What is the probability that there will still be money after 22 months in a savings account opened by a depositor ?
   (b) What is the probability that the account will have been closed before two years ?

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No. of Printed Pages : 3 | **MS-8**

MANAGEMENT PROGRAMME

Term-End Examination

December, 2014

MS-8 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

03761

Time : 3 hours   *Maximum Marks :* **100**
(Weightage **70%***)*

Note : (i) *Section* **A** *has* **six** *questions, each carrying 15 marks. Attempt* **any four** *questions from this Section.*

(ii) *Section* **B** *has* **two** *questions, each carrying 20 marks. Attempt* **both** *the questions from this section.*

(iii) *Use of scientific calculator is permitted.*

SECTION - A

1.   A maruti car is purchased for Rs. 60,000/-. If the depreciation for the first three years is at 15% per annum and for the next two years is at 20% per annum, then calculate the depreciated value of the car at the end of five years.   **15**

2.   It has been observed that on an average one telephone number out of ten is busy. Using binomial distribution find the probability that if five randomly selected telephone numbers are called   **15**
     (a)   not more than two will be busy
     (b)   at least four of them are busy

3. A builder employs three types of workers : male, **15** female and children. He pays Rs. 350, Rs. 250 and Rs. 200 per day to a male, female and child worker respectively. Suppose he employs 40 males, 30 females and 10 children, determine

    (a) Average wage per day paid by the builder

    (b) Average wage per day paid by the builder if the number of males, females and children employed are equal.

4. Two brands of electric bulbs are quoted at the **15** same price. A buyer tested a random sample of 100 bulbs of each brand and found the following :

	Mean Life (in hrs)	Standard Deviation of Life (in hrs)
Brand I	1400	90
Brand II	1350	100

    Test the hypothesis that there is a significant difference in the quality of the two brands of bulbs at 5% level of significance. The critical value of Z at 5% level of significance is 1.96.

5. Explain Binomial and Normal distribution. **15** Mention the conditions under which a random variable having a binomial distribution with parameters n and p can be approximated to a random variable having a normal distribution with parameters μ and σ.

6. Write short notes on **any three** of the following :

    (a) Linear function   **3x5=15**

    (b) Coefficient of variation

    (c) Baye's Theorem

    (d) Stratified sampling

    (e) Correlation coefficient

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SECTION - B

7. Using the method of least squares, find the regression equation of y on x for the data given in the table below :   **20**

x	1	2	3	4	5
y	5	9	14	17	20

And from the regression equation obtained, find the value of y corresponding to $x = 8$

8. Solve the following system of non - homogeneous linear equations using Cramer's rule :   **20**
$x + 2y + 3z = 6$
$2x + 4y + z = 7$
$3x + 2y + 9z = 14$

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MANAGEMENT PROGRAMME

Term-End Examination

June, 2015

MS-8 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours *Maximum Marks : 100*

(Weightage 70%)

Note : (i) *Section A has **six** questions, each carrying 15 marks. Attempt **any four** questions from this Section.*

(ii) *Section B has **two** questions, each carrying 20 marks. Attempt **both** the questions from this section.*

(iii) *Use of scientific calculator is permitted.*

SECTION - A

1. The cost accountant of a company has derived 15 the following expression relating total cost C to the number of units (x) of a product.

$$C = 1440 + 125x + 0.1x^2$$

Find :

(a) The number of units (x) that will minimise the average cost.

(b) The value of average cost and total cost corresponding to above number of units.

2. The residents of Lucknow city were surveyed recently to determine readership of newspapers available. 55% of the residents read the morning paper, 65% read the evening paper, and 30% read both newspapers. Find the probability that a resident selected reads either the morning or evening paper or both the papers. **15**

3. In a factory, four workers are assigned to complete an order received for dispatching 2000 boxes of a particular commodity. Worker A takes 10 minutes per box, B takes 15 minutes per box, C takes 20 minutes per box and D takes 25 minutes per box. Find the average time taken per box by the group of workers. **15**

4. An auto company decided to introduce a new six cylinder car whose mean petrol consumption is claimed to be lower than that of the existing auto engine. It was found that mean petrol consumption for the 100 cars was 15 km per litre with the standard deviation of 5 km per litre. **15**

Test for the company at 5% level of significance whether the claim that the new car petrol consumption is 14.50 km per litre on the average is acceptable. The critical value of Z at 5% level of significance is 1.96.

5. Define Hypothesis. Explain various types of errors in testing of Hypothesis. Describe various steps involved in the "Hypothesis Testing". **15**

6. Write short notes on **any three** of the following :   **3x5**

   (a) Polynomial Function
   (b) Median
   (c) Criterion of pessimism
   (d) Cluster sampling
   (e) Delphi method of forecasting

SECTION - B

7. Using the method of least squares, find the   **20**
   regression equation of x on y for the data given in
   the table below :

x	1	2	3	4	5
y	6	9	12	15	18

   And from the regression equation obtained, find
   the value of x corresponding to $y = 20$.

8. Solve the following system of non-homogeneous   **20**
   linear equations using Cramer's rule :

   $$x + 2y - z = -1$$
   $$3x + 8y + 2z = 28$$
   $$4x + 9y + z = 14$$

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No. of Printed Pages : 3

MS-8

MANAGEMENT PROGRAMME
Term-End Examination
December, 2015

00421

MS-8 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours

Maximum Marks : 100
(Weightage 70%)

Note :   (i)   *Section A has **six** questions, each carrying 15 marks. Attempt **any four** questions from this Section.*

         (ii)   *Section B is **compulsory** and carries 40 marks. Attempt **both** questions.*

         (iii)   *Statistical tables may be supplied on request.*

         (iv)   *Use of calculator is permissible.*

SECTION - A

1. A person pays a total of ₹ 975 through monthly installments each less than the former by ₹ 5. The first installment is ₹ 100. In how many installments will the amount be paid ?

2. Calculate the harmonic mean from the following frequency distribution :

Class	0 - 10	10 - 20	20 - 30	30 - 40
Frequency	5	8	3	4

3. The incidence of a certain disease is such that on an average 20% of workers suffer from it. If 10 workers are selected at random, find the probability that :

   (a) Exactly two workers suffer from the disease.

   (b) Not more than 2 workers suffer from the disease.

4. Explain the meaning of sampling distribution of a sample statistic. Obtain the sampling distribution of mean in case of sampling from infinite populations.

5. A company wants to study the relation between R and D expenditure (X) and sales (Y) for the ten-year period. Determine the correlation coefficient between these variables.

X (in thousands)	50	50	50	40	30	20	20	15	10	5
Y (in thousands)	700	650	600	500	450	400	300	250	210	200

6. Write short notes on **any three** of the following :

   (a) Identity matrix

   (b) Quantiles

   (c) Axioms of probability

   (d) The power curve of a test

   (e) Mixed Auto-regressive - moving average models

SECTION - B

7. The mean life of a sample of 10 electric bulbs was found to be 1456 hours with a standard deviation of 423 hours. A second sample of 17 bulbs chosen from a different batch showed a mean life of 1280 hours with a standard deviation of 398 hours. Is there a significant difference between the means of the two batches ?

8. What is skewness ? Distinguish between Karl Pearson's and Bowley's coefficient of skewness. Which one of these would you prefer and why ?
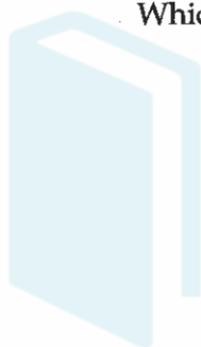
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MS-008

MANAGEMENT PROGRAMME
Term-End Examination
December, 2016

01675

MS-008 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours *Maximum Marks : **100***
*(Weightage **70%**)*

Note : (i) *Section A has **six** questions, each carrying 15 marks. Attempt **any four** questions from this section.*

(ii) *Section B has **two** questions, each carrying 20 marks. Attempt **both** the questions from this section.*

(iii) *Use of scientific calculator is permitted.*

SECTION - A

1. If a person repays a loan of ₹ 3250 by paying ₹ 20 in the first month and then increases the payment by ₹ 15 every month. How long will he take to clear his loan ?

2. What do you understand by 'Central tendency' ? Describe the measures of central tendency. Also, define the related positional measures, like quartiles, deciles and percentiles.

3.   A certain manufacturing process yield electrical fuses of which, in the long run, 15% are defective. Find the probability that in a sample of 10 fuses selected at random there will be :

(a)   no defective

(b)   at least one defective

4.   For a set of 1000 observations known to be normally distributed, the mean is 534 cm and standard deviation is 13.5 cm. How many observations are likely to exceed 561 cm ? How many will be between 520.5 cm and 547.5 cm ? (Given : P $(0 \leq Z \leq 1)$ = 0.3413; P $(0 \leq Z \leq 2)$ = 0.4772)

5.   Before an increase in excise duty on tea, 400 people out of a sample of 500 people were found to be tea drinkers. After an increase in duty 400 people were tea drinkers in a sample of 600 people. Test whether there is a significant decrease in the consumption of tea. You may use a 5% level of significance.

6.   Write short notes on **any three** of the following :

(a)   Less than type ogive.

(b)   Algebraic and Transcendental functions.

(c)   Level of significance.

(d)   Disproportional stratified sampling.

(e)   Criterion of optimism

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SECTION - B

7. Define Hypothesis. Explain various type of errors in testing of Hypothesis. Describe various steps involved in the 'Hypothesis testing'.

8. Given below are the figures of production (in metric tonnes) of a sugar factory :

Year	2008	2009	2010	2011	2012	2013	2014
Production (In m. Tons)	80	90	92	83	94	99	92

Estimate a linear trend equation and use it to forecast the production for 2015.

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MANAGEMENT PROGRAMME
Term-End Examination
June, 2017

MS-008 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours | *Maximum Marks : 100*
(Weightage 70%)

Note : (i) *Section A has six questions, each carrying 15 marks. Attempt any four questions from this section.*

(ii) *Section B has two questions, each carrying 20 marks. Attempt both the questions from this section.*

(iii) *Use of scientific calculator is permitted.*

SECTION - A

1. Define a matrix. Discuss some special matrices. Give examples of some business applications of matrices and determinants.

2. You are given the frequency distribution of 292 workers of a factory according to their average weekly income. Calculate Quartile deviation and its coefficient from the following data :

Weekly income (₹)	Below 1350	1350-1370	1370-1390	1390-1410	1410-1430	1430-1450	1450-1470	1470-1490	1490-1510	1510-1530	1530 and above
No of workers	8	16	39	58	60	40	22	15	15	9	10

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3. Among the examinees in an examination 30%, 35% and 45% failed in Statistics, in Mathematics and in at least one of the subjects respectively. An examinee is selected at random. Find the probabilities that

(a) He failed in Mathematics only

(b) He passed in Statistics if it is known that he failed in Mathematics.

4. The mean length of life of a certain cutting tool is 41.5 hours with a standard deviation of 2.5 hours. What is the probability that a simple random sample of size 50 drawn from this population will have a mean between 40.5 hours and 42 hours ?

(Given : $P(0 \leq z \leq 1.414) = 0.4251$; $P(0 \leq z \leq 2.828)$ $= 0.4980$)

5. A leading company engaged in the production of detergents had vacancies of salesman for which $(N =)$ 15 persons were called for personal interview. The interview board consisted of sales manager and a Psychologist. The ranks given by the two to all the 15 candidates who attended the interview. Using the two set of ranks, compute the coefficient of rank correlation.

Sr No in Interview	1	2	4	5	8	9	10	11	13	14	15	17	18	19	20
Ranking Sales Manager	1	3	2	4	6	5	7	9	8	11	10	12	14	13	15
Ranking Psychologist	2	3	1	5	4	6	8	7	9	10	12	11	13	14	15

6. Write short notes on **any three** of the following :
   (a) Central limit theorem
   (b) Coefficient of variation
   (c) Stratified sampling
   (d) Least square criteria
   (e) Polynomial function

SECTION - B

7. What is probability sampling and non-probability sampling ? Briefly describe the four designs of probability sampling.

8. The following data gives the number of aircraft accidents that occurs during the various days of a week. Find whether the accidents are uniformly distributed over the week.

Days	SUN	MON	TUE	WED	THU	FRI	SAT
No of Accidents	14	16	8	12	11	9	14

Given χ^2 at 6 d.f. $= 12.59$

No. of Printed Pages : **3** | MS-008 |

MANAGEMENT PROGRAMME

Term-End Examination

December, 2017

06341

MS-008 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours *Maximum Marks : **100***

(Weightage 70%)

Note : (i) ***Section A** has **six** questions, each carrying **15** marks. Attempt **any four** questions from this section.*

(ii) ***Section B** is **compulsory** and carries **40** marks. Attempt **both** questions.*

(iii) *Use of calculator is permissible.*

SECTION - A

1. In what three categories statistical methods can be broadly classified. Which of these categories rely heavily on probability theory ? Why ?

2. Minimum day-time temperature in a cosmopolitan city was recorded every third day during June 2016 as under.

Day of June 2016	2nd	5th	8th	11th	14th	17th	20th	23rd	26th	29th
Temperature (°C)	31	33	34	31	32	34	34	34	33	32

Find :
(a) Average day-time temperature in June 2016.
(b) Median day-time temperature.
(c) Mode day-time temperature.

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3. Discuss different approaches to probability theory. All these approaches share some basic axioms. Clearly state these axioms.

4. For a population of 2000 students living in hostels, per head monthly mean expenditure on three meals a day is ₹ 500 with a variance of ₹ 81. Find the probability that a random sample of 36 students shows a per head mean expenditure of less than ₹ 495 per month.

(Given the required area under the standard normal curve from 0 to z is 0.4996)

5. The following table relate to marking expenditure in Rs Lac and the corresponding sales of a product is Rs Crores. Estimate the marketing expenditure to attain a sales target of ₹ 40 Crores.

Marketing Expenditure	10	12	15	20	23
Product Sales	14	17	23	21	25

6. Write short notes on **any three** of the following :

(a) Identity matrix

(b) More than type ogive

(c) Poisson distribution

(d) Central limit theorem

(e) Seasonality

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SECTION - B

7. What is stratification ? How and why a sample based on stratification is more representative of the population ?

8. A sample survey of tax payers belonging to business class and professional class yielded the following results.

	Business Class	Professional Class
Sample size	$n_1 = 400$	$n_2 = 420$
Defaulters in Tax payment	$x_1 = 80$	$x_2 = 65$

Test the hypothesis at $\alpha = 0.01$. Level of significance that proportion of defaulters is the same for the two classes of tax payers. (Given the tabulated value of test statistic is 2.58)

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03970

MANAGEMENT PROGRAMME
Term-End Examination
June, 2018

MS-008 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : *3 hours*   *Maximum Marks :* **100**
                                   (Weightage : **70%***)*

Note : (i)   *Section A has six questions, each carrying 15 marks. Attempt **any four** questions from this section.*

  (ii) ***Section B** is **compulsory** and carries **40 marks**. Attempt **both** questions.*

  (iii) *Use of calculator is permissible.*

SECTION - A

1. What is mode and the modal class ? State the equation of obtaining mode from grouped data. What do the various elements in the equation for mode signify ? Give some merits and demerits of mode.

2. Given that 25 per cent of the bottles in a godown contain milk unfit for consumption. The salesman at a retail outlet offers 5 bottles for sales on demand. Find,
    (a) Average number of bottles containing bad milk
    (b) Variance of the resultant binomial distribution

3. Bring out the points of similarities and differences between stratified sampling and cluster sampling. Which one is preferred in what circumstances ?

4. Nine management graduates appeared before a selection board consisting of two expert members (X and Y) for a post of probationary officer in a certain bank. If the rank order assigned by each of the two members is as given below, find the coefficient of rank correlation.

Rank order (X)	1	5	4	6	8	3	9	2	7
Rank order (Y)	2	6	3	5	8	4	7	1	9

5. It is claimed that a certain brand of video cassettes has an average running life of 75 hours with a variance of 49 hours. In order to verify the claim, a buyer performs a test check on 36 cassettes. He decides to place order for bulk purchase of the average running life is at the most within 2 hours on either side of the claim made. Find the risk of not placing the order when the claim about average running life of cassettes is indeed 75 hours.

(Given area under the standard normal curve from z to ∞ is 0.04363)

6. Write short notes on **any three** of the following :

   (a) Scaler matrix

   (b) Skewness

   (c) Sampling with replacement

   (d) Pascal Distribution

   (e) Exponential Smoothing

SECTION - B

7. Discuss the applications of quantitative techniques in various functional areas of management.

8. A manufacturer of electric tubes finds his tubes have an average life of 1200 hours. To maintain this standard he keeps checking a sample of 18 tubes every now and then for their average life. He remains satisfied with the average life of tubes if the computed t values falls between $-t_{0.01}$ and $+t_{0.01}$. What conclusion should the manufacturer draw if a given sample yields mean life of 1205 hours and standard deviation of 9 hours ?
(Given the tabulated value of t is 2.567)
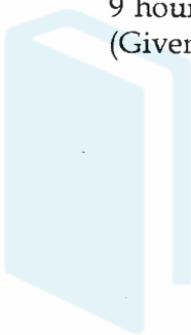
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MS-008

00473

MANAGEMENT PROGRAMME
Term-End Examination
December, 2018

MS-008 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 hours *Maximum Marks : 100*
(Weightage : 70%)

Note : (i) *Section A has six questions, each carrying 15 marks. Attempt **any four** questions from this section.*

(ii) *Section B is **compulsory** and carries 40 marks. Attempt **both** questions.*

(iii) *Use of calculator is permitted.*

SECTION - A

1. What is statistical decision theory ? Describe the four different states of decision environment in managerial applications. Which is the most prevalent state ?

2. The Revenue function for a product is $R = 600q - 0.5q^2$ and the cost function is $C = 1500 + 140q - 4q^2 + 5q^3$. Determine the profit function and the value of q for which profit is maximum.

3. A certain manufacturing process produces electrical fuses of which, in the long run, 15% are defective.

    Find the probability that in a sample of 10 fuses selected at random there will be :

    (a) no defective

    (b) at least one defective

4. The following table gives the number of aircraft accidents that occurred during the various days of a week. Find whether the accidents are uniformly distributed over the week.

Days	Sun	Mon	Tue	Wed	Thurs	Fri	Sat
No. of Accidents	14	16	8	12	11	9	14

    Given χ^2 at 6 d.f = 12.59

5. What is the major difference between probability and non-probability sampling ? Briefly outline the sampling methods that are covered under probability and non-probability sampling.

6. Write short notes on **any three** of the following :

    (a) Cofactor of an element of matrix

    (b) Exhaustive events

    (c) Standard deviation and standard error

    (d) Criteria of optimism

    (e) Disproportional stratified sampling

SECTION - B

7. A random sample of size 16 has 53 as mean. The sum of squares of the deviations from mean is 135. Can this sample be regarded as taken from the population having 56 as mean ? Obtain 95% and 99% confidence limits of the mean of the population.

    (Given for $n = 15$, $t_{0.05} = 2.13$ and for $n = 15$, $t_{0.01} = 2.95$)

8. 'A' speaks truth in 75% cases and 'B' in 80% of the cases. In what percent of cases are they very likely to contradict each other in narrating the same incident ?

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No. of Printed Pages : 4 | MS-008 |

MANAGEMENT PROGRAMME

Term-End Examination, 2019

MS-008 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 Hours] [Maximum Marks : 100

(Weightage 70%)

Note : Section-A has six questions, each carrying 15 marks. Attempt **any four** questions from this section. Section-B is **compulsory** and caries 40 marks. Attempt both questions. Use of calculator is permitted.

SECTION - A

1. Explain what is meant by descriptive statistics and inferential statistics. Define the types of variables used in statistics and comment on their usage in descriptive and inferential statistics.

2. On 1st Jan. every year, a person buys NSC's (National Saving Certificates) of value exceeding that of his last year's purchase by Rs. 100/- After 10 years, he finds that the total purchase value of the certificates held by him is Rs. 54,500/- Find the value of the certificates

purchased by him : (a) In the first year (b) In the eighth year.

3. For a set of 1000 observations known to be normally distributed, the mean is 534cm and SD is 13.5cm. How many observations are likely to exceed 561 ? How many will be between 520.5 and 547.5 cm ?

$$(\text{Given } P(0 \leq {}^{\text{Variable}}_{\text{used}} \leq 1) = 0.3413,$$

$$P(0 \leq {}^{\text{Variable}}_{\text{used}} \leq 2) = 0.4772$$

4. What do you mean by a Statistical Hypothesis ? Explain characteristics of a good hypothesis. Elaborate the concept of the significance level and the p value of a test.

5. After a natural disaster, a company could partially recover the following records on analysis of correlation :

Variance of $x = 9$

Regression equations :

$$8x - 10y + 66 = 0$$

$$40x - 18y = 214$$

What was :

(a)   the correlation coefficient between x and y ?

(b)   the standard deviation of y ?

6.   Write short notes on **any three** of the following :

(a)   Algebraic and Transcendental functions

(b)   Quartile deviation

(c)   Non-probability sampling methods

(d)   Maximin criteria of Decision-making

(e)   Least square criteria

SECTION-B

7.   A preliminary sample of 100 labourers was selected from a population of 5000 labourers by simple random sampling. It was found that 40 of the selected labourers opt for a new incentive scheme. How large a sample must be selected to have a precision of $\pm 5\%$ with 95% confidence ?

8.   The marks conversion of grades of 8 candidates in MS-08 and MS-95 are given below :

MS-95	76	90	98	69	54	82	67	52
MS-08	25	37	56	12	7	36	23	11

Calculate the rank correlation coefficient.

----- x -----

10198

No. of Printed Pages : 4 | MS-008 |

MANAGEMENT PROGRAMME

Term-End Examination, 2019

MS-008 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 Hours

Maximum Marks : 100

(Weightage : 70%)

Note : Section A has **six** questions, each carrying **15** marks. Attempt **any four** questions from this section. Section **B** is **compulsory** and carries **40** marks. Attempt **both** questions. Use of Calculator is permissible.

SECTION - A

1. Discuss the role of models in decision-making. Describe the classification of OR models on the basis of specified behavior characteristics.

2. Consider the following grouped data which relate to the profits of 100 companies during 2016-2017:

Profits (Rs. Lakhs)	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of Companies	4	8	18	30	15	10	8	7

Calculate Q_2, D_6 and P_{90} from the given data and interpret these values.

3. The average number of customers who appear at a counter of a certain bank per minute is two. Find the probability that during a given minute:

   (a) No customer appears

   (b) Three or more customer appear

   (Given $e^{-2} = 0.1353$)

4. Why sampling is so common in managerial situations ? Distinguish between probability and non-probability sampling. Give some examples of both types.

5. Quotation of index number of equity share price of a certain joint stock company and of prices of preference shares are given below:

Year	2011	2012	2013	2014	2015	2016	2017
Equity Shares	97.5	99.4	98.6	92.2	95.1	98.4	97.1
Preference Shares	75.1	75.9	77.1	78.2	79.0	74.8	76.2

Use the method of rank correlation to determine the relationship between equity share and preference share prices.

6. Write short notes on **any three** of the following :

   (a) Arithmetic Progression (AP)

   (b) Ogives

   (c) Criteria of Pessimism

   (d) The Null Hypothesis

   (e) Exponential Smoothing

SECTION-B

7. What do you understand by time series analysis ? Describe the components of a time series. What relationship is generally assumed between these components ?

8. CFL bulbs of a certain make have a mean life of 800 hours with S.d. of 150 hours. Out of 50 thousand bulbs of that make used for street lighting, how many of them would fuse in first 650 hours, if the distribution of the life of bulbs is assumed to be normal ? How many bulbs would still be burning after 950 hours ?

(Given : Area of normal curve 0 and 1 is 0.34134)

----- X -----
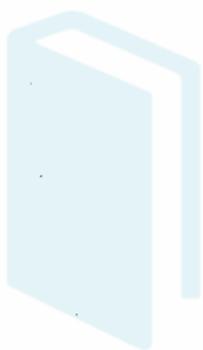
No. of Printed Pages : 4 **MS-08**

MANAGEMENT PROGRAMME (MP)

Term-End Examination

June, 2020

MS-08 : QUANTITATIVE ANALYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 Hours   *Maximum Marks : 100*

Note : *Section A has **six** questions, each carrying 15 marks. Attempt any **four** questions. Section B is compulsory and carries 40 marks. Attempt **both** questions. Use of calculator is permissible.*

Section—A

1. Define matrices. Give examples of some special matrices. How would you represent the data of a transportation problem and a pay-off matrix in the matrix form ?

P. T. O.

2. Consider the following data which relate to the sales of 100 companies :

Sales (in ₹ lakhs)	No. of Companies
40—50	5
50—60	15
60—70	25
70—80	30
80—90	20
90—100	5

Compute the average deviation.

3. Bag A contains 2 white and 3 red balls and bag B contains 4 white and 5 red balls. One ball is drawn at random and is found to be red. Find the probability that it was drawn from bag A.

4. What is a Chi-square distribution ? How would you use it in testing the goodness of fit and testing independence of categorised data ?

5. A supplier of components to an electronic industry makes a product which sometimes fail immediately it is used. He controls his manufacturing process so that the proportion of

faulty products is supposed to be only 5%. Out of 400 units in one batch 26 proved to be faulty. Verify the manufacture's claim. Use 0.05 level of significance. Given value of test statistic at this level of significance is 1.96.

6. Write short notes on any *three* of the following :
    (a) Null matrix
    (b) Skewness
    (c) Poisson distribution
    (d) Systematic sampling
    (e) Rank correlation

Section—B

7. Calculate correlation coefficient from the following data :

X	Y
100	30
200	50
300	60
400	80
500	100
600	110
700	130

[4]   MS-08

8. Describe the concept and significance of measures of central tendency. Define quantiles and discuss how would you compute several quantiles such as quartiles, deciles and percentiles.

MS-08

MANAGEMENT PROGRAMME

(MP)

Term-End Examination

December, 2020

MS–08 : QUANTITATIVE ANLAYSIS FOR MANAGERIAL APPLICATIONS

Time : 3 Hours　　　　　*Maximum Marks : 100*

Note : *(i)* *Section A has six questions, each carrying 15 marks. Attempt any **four** questions from this Section.*

　　　　(ii) *Section B is compulsory and carries 40 marks. Attempt both questions.*

　　　　(iii) Use of calculator is permitted.

Section—A

1. Suppose the price p and quantity q of a commodity are related by the equation :

$$q = 30 - 4p - p^2$$

Lot-II　　　　　　　　　　　　**P. T. O.**

Find :

(i) Elasticity of demand, e_q defined as

$$= \frac{-d_q/q}{d_p/p} \text{ at } p = 2, \text{ and}$$

(ii) Marginal Revenue (MR) defined as $= \dfrac{dR}{dq}$,

where R $= p.q$.

2. Explain arithmetic mean along with its properties. Also explain the relationship among mean, mode and median with the help of a diagram.

3. What do you understand by decision theory ? What are the various key issues in decision theory ? Explain decision tree approach also.

4. A stock-market analyst wants to estimate the average return on a certain stock. A random sample of 15 days yields an average (annualized) rent of 10.37% and sample standard deviation is 3.5. Assuming a normal distribution of returns, give a 95% confidence

interval for the average return on this stock. (The value for given statistic at $n = 14$ is 2.145).

5. What are long-term decisions ? What are the various methods used in forecasting long-term decisions ?

6. Write short notes on any *three* of the following :

   (a)   Classification of statistical methods

   (b)   Guidelines for choosing the classes

   (c)   Random variable

   (d)   Type I and Type II error

   (e)   Correlation coefficient

Section—B

7. A bag contains 4 red and 4 black balls, another bag contains 2 red and 6 black balls. One of the 2 bags is selected at random and a ball is drawn from the bag which is found to be red. Find the probability that it is drawn from 1st bag.

8. In a group of 300 students, each person is asked about his/her favourite subject area. Based on

data given below, is it reasonable to conclude that subject preference is independent of the gender :

Gender	Maths	Science	Humanities	Total
Male	37	41	44	122
Female	35	72	71	178
Total	72	113	115	300

Taking the significance level as 5%.

(The value of test statistic at 2 degree of freedom is 5.991).