QUANTITATIVE METHODS-II (SEMESTER - 2)

CS/MBA (N)/SEM-2 (FT & PT)/MB-203/09

1. .....
Signature of Invigilator

2. .....
Signature of the Officer-in-Charge

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

CS/MBA (N)/SEM-2 (FT & PT)/MB-203/09

ENGINEERING & MANAGEMENT EXAMINATIONS, MAY – 2009

QUANTITATIVE METHODS-II (SEMESTER - 2)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

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FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B			Group – C			***Total Marks***	***Examiner's Signature***
Question Number																		
Marks Obtained																		

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Head-Examiner/Co-Ordinator/Scrutineer

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QUANTITATIVE METHODS-II

SEMESTER - 2

Time : 3 Hours] [Full Marks : 70

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) Root mean square deviation is minimum when deviations are taken about

a) Mean b) Median

c) Mode d) any value.

ii) If A, G and H represent respectively the A.M., G.M. and H.M. of two positive variate values x_1 and x_2, then

a) $A^2 = G.H$ b) $G^2 = A.H$

c) $H^2 = A.G$ d) none of these.

iii) A symmetric distribution has its skewness

a) 1 b) – 1

c) 0 d) 2.

iv) If $b_{xy} = 0{\cdot}4$ and $b_{yx} = 0{\cdot}9$, then r_{xy} is equal to

a) 0·36 b) 1·3

c) 0·6 d) 0·06.

v) If $u = 2x + 5$ and $v = 3y - 5$ and the correlation coefficient between x and y is 0·75, then the correlation coefficient between u and v is

a) 0·86 b) 0·75

c) – 0·75 d) none of these.

vi) The mean of the binomial distribution with parameters 10 and $\frac{1}{5}$ is

a) 1·5 b) 2

c) 2·5 d) 1.

vii) If $x + 3y - 7 = 0$ and S.D. of y is 5, then the S.D. of x is

a) 15 b) 18

c) 8 d) 12.

viii) If X be a continuous random variable distributed uniformly in [0, 1], then the mean and variance of X is

a) mean = $\frac{1}{2}$, variance = $\frac{1}{12}$ b) mean = 1, variance = 1

c) mean = 1, variance = 0 d) none of these.

ix) Which method can be used to find seasonal variation ?

a) Ratio to trend method b) Method of moving average

c) Periodogram Analysis d) Free Hand Curve method.

x) The range of multiple correlation coefficient is

a) – 1 to 1 b) 0 to 1

c) – 1 to 0 d) – ∞ to ∞.

xi) The term $1 - \beta$ is called

a) level of significance b) power of the test

c) size of the test d) type I error.

xii) The standard deviation of the sampling distribution of a statistic is referred to as

a) Sampling error b) Standard error

c) Mean error d) None of these.

xiii) Let S^2 be the sample variance of a sample of size n with divisor n. Then the statistic s^2 is an unbiased estimastor of σ^2 where s^2 is equal to

a) $\frac{n}{n+1} S^2$ b) $\frac{n-1}{n} S^2$

c) $\frac{n}{n-1} S^2$ d) $\frac{n+1}{n} S^2$. ☐

xiv) The maximum likelihood estimate of p for the population having Binomial distribution with parameters n and p is

a) $\frac{\overline{x}}{n}$ b) $n\ \overline{x}$

c) $\overline{x}$ d) none of these. ☐

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following questions. $3 \times 5 = 15$

2. If a continuous random variable X has exponential distribution with parameter λ, then prove that its mean is $\frac{1}{\lambda}$ and variance is $\frac{1}{\lambda^2}$.

3. The mean and standard deviation of a binomial distribution are respectively 4 and $\sqrt{\frac{8}{3}}$. Find the values of n and p. Hence evaluate $P(X = 0)$.

4. If 2% of the electric bulbs manufactured by a certain company are defective, find the probability that in a sample of 200 bulbs, (a) less than 2 bulbs, (b) more than 3 bulbs are defective. (Given $e^{-4} = 0{\cdot}0183$)

5. In a sample of 500 people in Kerala, 280 are tea drinkers and the rest are coffee drinkers. Can we assume that both coffee and tea are equally popular in Kerala at 1% level of significance ?

6. A random sample of size 49 is drawn from a normal population with mean μ and standard deviation 2. The sample mean is 3. Find 99% confidence interval for the population mean μ.

7. A simple random sample of size 49 is drawn from a population of size 145. If the population S.D. is 12, find the standard error of the sample mean when the sample is drawn (a) with replacement and (b) without replacement.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following questions. 3 × 15 = 45

8. a) Find the trend for the following series using a three year weighted moving average with weights 1, 2, 1.

Year :	2000	2001	2002	2003	2004	2005	2006
Values :	3	4	5	8	8	10	11

b) Calculate Rank correlation coefficient for the following data of marks obtained by the students in Mathematics and Statistics :

Roll No. :	1	2	3	4	5	6	7	8	9	10
Marks in Math. :	80	45	90	40	75	80	70	50	60	65
Marks in Stat. :	85	50	92	30	70	85	60	45	50	60

7 + 8

9. a) A die was thrown 72 times with the following results :

Face :	1	2	3	4	5	6	Total
Frequency :	9	10	14	10	14	15	72

Are the data consistent with the hypothesis that the die is unbiased ?

(Given $\chi^2_{0\cdot05}$ = 11·07 for 5 degree of freedom)

b) Two samples are drawn from two normal populations. From the followng data, test whether the two samples have the same variance at 5% level.

Sample I	60	65	71	74	76	82	85	87		
Sample II	61	66	67	85	78	63	85	86	88	91

(Given tabulated value of *F* at 5% level with 9 and 7 degree of freedom is 3·68).

7 + 8

10. a) Two groups X and Y consist of 100 people each who have a disease. A medicine is given to group X but not to Y. It is found that in groups X and Y, 75 and 65 people respectively recover from the disese. Test the hypothesis that the medicine helps to cure the disease.

(Use 5% level where critical value of Z is 1·645)

b) The following observations constitute a random sample from an unknown population. Estimate the mean and S.D. of population. Also find estimate of S.E. of sample mean.

Observations : 15, 16, 17, 20, 22. 7 + 8

11. a) For a normal distribution with mean 3 and variance 16, find the value of y of the variate such that the probability of the variate lying in the interval (3, y) is 0·4772. (Given that $P (Z \leq 2) = 0·9772$).

b) A radioactive source emits on an average 1·5 particle per second. Calculate the probability that 2 or more particles will be emitted in an interval of 2 seconds.

(Given $e^{-3} = 0·0498$) 7 + 8

12. a) i) What is meant by Stratified Random Sampling ?

ii) Define Simple Random Sampling with replacement and without replacement.

b) Abinash and Ramesh play for a prize of Rs. 121. The prize is to be won by a player who first throws 5 with one die. Abinash first throws and if he fails, Ramesh throws and if he fails, Abinah throws again and so on. Find Abinash's expectation. 3 + 4 + 8

END