Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/MHA/SEM-1/MHA-108/2012-13

2012
QUANTITATIVE METHODS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

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

i) The Median of the following data
30, 35, 21, 28, 37, 22, 19, 31, 36, 26
is
a) 28 b) 30
c) 31 d) 29.

ii) The Mode of the following data
7, 8, 12, 14, 15, 8, 12, 20, 47, 12, 52, 58
is
a) 12 b) 8
c) 7 d) 15.

iii) A student was asked to find the arithmetic mean of the numbers 3, 11, 7, 9, 15, 13, 8, 19, 17, 21, 14 and x. He found the mean to be 12. What should be the number in place of x ?
a) 3 b) 17
c) 7 d) 31.

iv) The arithmetic mean of 1, 2, 3, ..., n is

a) $(n + 1) / 2$ b) $(n - 1) / 2$

c) $n / 2$ d) $n/2 + 1$.

v) If mean and median of a frequency distribution are 20 and 17, the mode will be

a) 12 b) 13

c) 11 d) none of these.

vi) The root-mean-square-deviation from mean is known as

a) mean deviation b) standard deviation

c) quartile deviation d) none of these.

vii) Standard deviation is independent of

a) origin only b) scale only

c) both (a) and (b) d) none of these.

viii) If we reject the null hypothesis, we might be making

a) a type II error b) a type I error

c) a correct decision d) either (a) or (b).

ix) If $P(A) = 1/2$, $P(B) = 1/3$ and $P(A \cap B) = 1/4$, then $P(A \cup B) =$

a) 7/12 b) 9/12

c) 3/12 d) 6/12.

x) If an event cannot happen, the probability of the event will be

a) + 1 b) – 1

c) 0 d) none of these.

xi) When two dice are thrown, what is the probability that sum of numbers is an even number ?

a) 19/36 b) 12/36

c) 15/36 d) 18/36.

xii) The probability that a non-leap year has 53 Sundays is

a) 2/7 b) 5/7

c) 1/7 d) 6/7.

GROUP – B

(Short Answer Type Questions)

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

2. Following table has some frequencies missing. Given the total frequency = 90 and median = 57·5. Find the missing frequencies.

Value	30-39	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Total
Frequency	2	12	15	?	18	?	9	4	90

3. In a certain examination, the average grade of all students in class *A* is 68·4 and all students in class *B* is 71·2. If the average of both classes combined is 70, what is the ratio of the number of students in class *A* to the number in class *B* ?

4. A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is

1/7 and that of wife's selection is 1/5. What is the probability that

a) both of them will be selected

b) only one of them will be selected, and

c) none of them will be selected ?

5. Define simple random sampling. Distinguish between simple random sampling and systematic random sampling.

6. What is hypothesis ? Explain level of significance.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Calculate the standard deviation between x and y.

x	23	27	28	29	30	31	33	35	36	39
y	18	22	23	24	25	26	28	29	30	32

b) The mean and standard deviation of a set of 100 observations were worked out as 40 and 5 respectively by a computer which by mistake took the value 50 in place of 40 for one of the observations. Find the correct mean and variance. 10 + 5

8. a) Marks obtained by 2 students in the two fields x and y are written as follows :

x :	41	45	50	68	47	77	90	100	80	100	40	43
y :	60	63	60	48	85	56	53	91	74	98	65	43

Who is more consistent ?

b) The average weekly wage for a group of 25 persons working in a factory was calculated to be Rs. 378·40. Later on it was discovered that one figure misread as 160 instead of the correct value Rs. 200. Calculate the correct mean. 12 + 3

9. Age of 42 employees of a company are given as below in years :

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

a) Arrange the data in the form of a frequency distribution table in 6 classes of equal width.

b) Find the class boundaries and cumulative frequencies (less than type) from the given data.

c) Draw an ogive for the above data and hence obtain the median value graphically. Check it against the calculated value.

d) From the above data, calculate the percentage of the employees have age

i) less than 35.

ii) between 35 and 60 and

iii) above 60.

10. a) The percentage of literacy in West Bengal is shown below separately for males and females for 4 years :

years	1941	1951	1961	1971
Males	27·4	34·1	40·1	44·8
Females	3·9	12·3	17·0	22·1

b) Represent the following data of the distribution of expenditure by suitable diagram :

Particulars	Expenditure (Rs. in Lakhs)
Raw materials	1689
Taxes	582
Manufacturing expenses	543
Employees	470
Other expenses	286
Depreciation	94
Dividends	75
Retained income	51
Total Expenditure	3790

7 + 8