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CS / MHA / SEM-1 / MHA - 108 / 2010-11

2010-11

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.

Graph sheet will be provided by the Institution on demand

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

i) ..... variable may be defined as a numerical event whose value is determined by a chance process.

a) Continuous b) Random

c) Discrete d) Sample.

ii) Which of the following statements is incorrect ?

a) Arithmetic mean is readily understood, hence needs no explanation

b) Arithmetic mean can be treated algebraically

c) Arithmetic mean is very stable and reliable

d) Arithmetic mean is not affected by the presence of outliers.

iii) In a well shuffled deck of cards, the probability of an Ace being obtained on a single draw is

a) 0·1 b) 3

c) 0·009 d) none of these.

iv) The following are the characteristics of binomial distribution except

a) sampling is done without replacement of each sampled item taken from a finite population of items

b) only two mutually exclusive possible outcomes

c) outcomes in the series of trials constitute independent events

d) the probability of success in each trial remains constant from trial to trial.

v) Two unbiased coins are tossed. What is the probability of obtaining at least one head ?

a) 1 b) $\frac{1}{2}$

c) $\frac{3}{4}$ d) $\frac{1}{4}$.

vi) ..... sampling implies equal probability to every unit in the population.

a) Simple Random b) Systematic Random

c) Stratified Random d) Area.

vii) At z score 2.58, the selected proportion of area under the normal curve is

a) 90% b) 95%

c) 99% d) none of these.

viii) The ..... is the value that occurs most frequently in a set of values.

a) Mean b) Median

c) Mode d) Range.

ix) A ..... is a bar graph of a frequency distribution.

a) Ogive b) Frequency polygon

c) Histogram d) none of these.

x) A and B are two independent events such that $P(\overline{A}) = 0 \cdot 7$, $P(\overline{B}) = k$ and $P(A \cup B) = 0 \cdot 8$, then k is

a) $\frac{5}{7}$ b) 1

c) $\frac{2}{7}$ d) none of these.

xi) A single letter is selected at random from the word 'probability'. The probability that it is a vowel is

a) $\frac{3}{11}$ b) $\frac{2}{11}$

c) $\frac{4}{11}$ d) 0.

xii) A person travelled 20 km at 2 km per hour and again 24 km at 4 km per hour. The harmonic mean is

a) 4·5 kmph b) 4·4 kmph

c) 5 kmph d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. Write down the relevance of convenient sampling in social science researches.

3. One marketing research institute provides the following report on the number of foreign patients come to India for receiving treatment in the year 2009 :

Country	**Number of patients**
Bangladesh	2,31,000
Rest of South East Asia	1,58,000
USA	84,000
Continental Europe	53,000

Prepare a percentage pie-chart to convey this information graphically.

4. In the last month, eight sales people of one Medical Insurance firm sold the following number of policies :

8, 11, 5, 14, 8, 11, 16, 11

i) Find the mean, median and mode of the data set.

ii) Mention the skewness of the data with explanation of your answer. 3 + 2

5. a) Determine the probability of obtaining an ace (A), king (K) or a queen (Q) when one card is drawn from a well shuffled deck of cards. (The events are mutually exclusive)

b) What would be the probability of obtaining a card having a king and queen together ? 3 + 2

6. Find the mean from the following distribution :

Age in years	15-19	20-24	25-29	30-34	35-44	45-59	Total
No. of Persons	37	81	43	24	9	6	200

GROUP – C

(Long Answer Type Questions)

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

7. a) If there is an increase in capital investment next year, the probability that crude oil will increase in price is 0·90. If there is no increase in such investment, the probability of an increase is 0·40. Overall, we estimate that there is a 60 per cent chance that capital investment will increase next year.

Suppose that during the next year crude oil price in fact increases. What is the probability that there was an increase in capital investment ?

b) When two dice are thrown, what is the probability that sum of numbers appeared is ≤ 9. 12 + 3

8. Describe in detail the role of Statistics in health care in detail. Mention the limitation of statistics in reaching conclusion. 10 + 5

9. a) Distinguish between probability and non-probability samples. Describe different types of non-probability samples in detail.

   b) An average of five calls for service per hour are received by a machine repair department. Calculate the probability that exactly three calls for service will be received in randomly selected hour. ($e^{-5} = 0.00674$)

3 + 7 + 5

10. a) Calculate the standard deviation from the following distribution of marks obtained by 90 students :

Marks	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Number of students	5	12	15	20	18	10	6	4

   b) Name three measures of dispersion. 12 + 3

11. When two dice are thrown what is the probability that

   a) sum of numbers appeared is 10 ?

   b) a sum that is multiple of 3

   c) sum of numbers is an odd number

   d) numbers shown are equal

   e) sum of numbers appeared is less than 9 ?

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