Meghalaya Board of School Education

SAMPLE PAPERS

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STATISTICS

Full Marks : 100

Time : 3 hours

The figures in the margin indicate full marks for the questions

General Instructions :

(i) Write all the answers in the Answer Script.

(ii) Attempt Part ——A Objective Questions serially.

(iii) Attempt all parts of a question together at one place.

(PART : A — OBJECTIVE)

(*Marks :* 50)

SECTION – I

(*Marks :* 20)

1. Choose and write the correct answer : $1 \times 10 = 10$

a. Specific Death Rate is calculated on the basis of

(i) standard population

(ii) specified section of the population

(iii) the population as a whole

(iv) None of these.

b. Frequencies are necessary for drawing

(i) Ogive

(ii) Histogram

(iii) Bar-diagram

(iv) Pie-Chart

c. The vertical axis in case of a less than ogive shows

(i) Mid points

(ii) Lower limits

(iii) Upper limits

(iv) Cumulative frequency.

d. The expression for the event 'neither A nor B' is

(i) $A \cap B$

(ii) $(A \cup B)^c$

(iii) $A \cap B^c$

(iv) None of the above.

e. Standard deviation of 6 numbers 5, 5, 5, 7, 7,7 is

(i) 1

(ii) 2

(iii) 6

(iv) 5.5

f. If $\log_4(x+3)=2$, then the value of x is

(i) 13

(ii) 12

(iii) 16

(iv) 4

g. If $f(x)=x(x-1)(x-2)$ and h=1 then the value of $\Delta f(x)$is

(i) $(x+1)\,x\,(x-1)$

(ii) $x(x-2)$

(iii) $3x(x-1)$

(iv) $x(x-1)$

h. If P(A/B) = P(A) then the events A and B are

(i) Complementary

(ii) Independent

(iii) Mutually exclusive

(iv) None of the above.

i. If the occurrence of one event prevents the occurrence of the other event, then the events are said to be

(i) exhaustive

(ii) equally likely

(iii) mutually exclusive

(iv) independent

j. The value of ${}^{n}C_{1}$ is

(i) 0

(ii) n

(iii) 1

(iv) None of the above.

2. Fill in the blanks : $1 \times 5 = 5$

(a) The probability of an impossible event is _____.

(b) The geometric mean of 8 and 50 is _____.

(c) In finite differences, if C is a constant then E(C)= _____.

(d) Crude death rate is a _____ death rate.

(e) A questionaire is filled up by _____.

3. State whether the following statements are *True* or *False.* $1 \times 5 = 5$

(a) The sum of cumulative frequencies of 'less-than type' and 'more-than type' of a class interval is equal to the total frequency.

(b) Variance is always positive.

(c) If P(A) = P(A–B), then A and B are mutually exclusive.

(d) In Newton's forward interpolation formula, values of the argument may not be equidistant.

(e) The Binomial expansion of $(a + b)^n$ has $(n + 1)$ terms.

SECTION — II

(*Marks :* 30)

4. Answer the following questions : $3 \times 10 = 30$

(a) Differentiate between questionaires and schedules.

(b) What are raw data?

(c) If $f(x) = (4x + 3)$ find $\Delta^2 f(x)$.

(d) Define Crude Death rate.

(e) Name different types of averages used for measures of central tendency.

(f) Show that ${}^nC_r = {}^nC_{n-r}$.

(g) Write down the sample space if one dice is thrown twice .

(h) Distinguish between entry and argument.

(i) Differentiate with example between population and sample.

(j) Distinguish between sample point and sample space.

(PART : B — DESCRIPTIVE)

(*Marks :* 50)

Answer any ***four*** questions, taking atleast **one** from each Group.

GROUP — A

5. *(a)* In how many ways can the letters of the word PERMUTATION be arranged if the vowels remain together? 6

(b) Expand $\left(x^2+\frac{3}{x}\right)^4$, $x \neq 0$. $2\frac{1}{2}$

(c) Compute $(98)^5$. 4

6. *(a)* Define the operators Δ and E. Show that $E \equiv 1+\Delta$ 4

(b) Find the value of $\left(\frac{\Delta^2}{E}\right)x^2$, interval of differencing being unity. $2\frac{1}{2}$

(c) State Lagrange's interpolation formula. Find the value of $f(45)$, by Newton's forward interpolation formula from the following table: 6

x :	40	50	60	70	80
$f(x)$:	31	73	124	159	190

GROUP — B

7. *(a)* Define with example: 6

Elementary event, certain event, sample space, mutually exclusive events, exhaustive events and independent events.

(b) Two unbiased dice are thrown. Write down the sample space. Find the probability that the sum of the numbers indicated by the number on the topmost faces of the dice is $6\frac{1}{2}$

(i) a prime number

(ii) divisible by 5

(iii) at least 5

(iv) a perfect square.

8. *(a)* State the theorem of compound probability. In a group of 20 males and 5 females. 10 males and 3 females are service holders. What is the probability that a person selected at random, is a service holder, given that the selected is a male. 6

(b) Two newspapers X and Y are published in a certain city. It is estimated from a survey that 16% read X, 14% read Y and 5% read both the papers. Find the probability that a randomly selected person 6

(i) does not read any newspaper

(ii) reads only Y.

GROUP — C

9. *(a)* Define statistics in two different senses. Mention the important uses and limitations of statistics. $2\frac{1}{2} + 4 = 6\frac{1}{2}$

(b) Show that 6

(i) $AM \geq GM \geq HM$

(ii) $AM \times HM = GM^2$

10. *(a)* Define Vital Statistics. Describe the different sources of vital statistics. $2\frac{1}{2} + 4 = 6\frac{1}{2}$

(b) Write short notes on 6

(i) Age-Specific Death Rate

(ii) Standardised Death Rate

(*iii)* Demographic Statistics.

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