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(To be filled in by the candidate)

Statistics

H.S.S.C (11th)-A-2022

Time : 20 Minutes

Paper : I

Objective

Marks : 17

Scanned - 22

Paper Code

| | | | |
|---|---|---|---|
| 6 | 1 | 8 | 1 |
|---|---|---|---|

Note: - You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION-A

| Q.1 | Questions | A | B | C | D |
|-----|---|-----------------------|-------------------|---------------------|---------------------|
| 1. | The uniform of the student is an example of: | Variable | Discrete variable | Continuous variable | Constant |
| 2. | Row caption is also called: | Title | Body | Box-head | Stub |
| 3. | Total angle of the pie-chart is: | 270° | 300° | 320° | 360° |
| 4. | The empirical relationship between mean, median and mode is, mode = | 3 mean - 2 median | 2 mean - 3 median | 3 median - 2 mean | 2 median - 3 mean |
| 5. | Which of the given average cannot be less than zero? | A.M | G.M | H.M | Median |
| 6. | Which average can only be applicable in qualitative data? | A.M | Median | Mode | H.M |
| 7. | The first moment about origin is: | Zero | One | Mean | Variance |
| 8. | In symmetrical distribution $Q_1 = 4, Q_3 = 12$ then median is: | 8 | 4 | 16 | Zero |
| 9. | The first moment about mean is: | Zero | One | Variance | S.D |
| 10. | In a fixed base method which period is taken as 100 (hundred): | Preceding | Following | Base | Current |
| 11. | Cost of living index no. are: | Simple | Composite | Un-weighted | Chain |
| 12. | ${}^n P_r =$ | $\frac{n!}{r!(n-r)!}$ | $\frac{n!}{r!}$ | $\frac{n!}{(n-r)!}$ | $\frac{(n-r)!}{n!}$ |
| 13. | If A & B are two mutually exclusive events, then $P(A \cap B) =$ | 0 | 1 | S | ϕ |
| 14. | The probability function cannot be: | < 0 | > 0 | 0 | Fractional |
| 15. | Expected value of a constant is: | Zero | One | Two | Constant itself |
| 16. | A binomial distribution has variance: | nq | np | npq | \sqrt{npq} |
| 17. | Hypergeometric distribution has parameters: | n, p | n, p, q | N, n, k | n, k |

Note :- Section B is compulsory. Attempt any Three Questions from Section C.

SECTION - B

2. Write short answers to any Eight parts. (8 x 2 = 16)

- i. Define discrete variable and give examples.
- ii. What is primary data?
- iii. Describe any two properties of arithmetic mean.
- iv. What are the desirable qualities of a good average.(any two)?
- v. Describe any two demerits of geometric mean.
- vi. Compute geometric mean by using the basic definition: 45,30,35,40,44,32,42,37
- vii. Compute upper quartile (i.e. third quartile) from the given data: 95.05,94.90,94.50,84.60,88.03 .
- viii. If $\sum p_n \cdot q_n = 272$, $\sum p_o \cdot q_n = 194$, calculate Paasche's index number.
- ix. If Laspeyre's index=104.5 and Paasche's index=103.9. Compute Fisher Index Number.
- x. Describe any two limitations of index numbers.
- xi. Describe the importance of consumer price index numbers.
- xii. If $\sum p_n \cdot q_o = 280.84$, $\sum p_o \cdot q_o = 258.18$, compute C.P.I by aggregative expenditure method.

3. Write short answers to any Eight parts. (8 x 2 = 16)

- i. What is frequency histogram?
- ii. Define Class Frequency with an example.
- iii. Enlist the absolute measures of dispersion.
- iv. Differentiate symmetry and skewness.
- v. Define Standard Deviation.
- vi. Given $X = 4, 6, 8, 8, 10$, find mean deviation from mode.
- vii. If $var(x) = 25$ then find $var(2x + 4)$
- viii. What would be the shape of the distribution if:
 - (a) Mean=Median=Mode
 - (b) Mean>Median>Mode
 - (c) Mean<Median<Mode
- ix. Explain sample space of two coins.
- x. State additional law for not mutually exclusive events.
- xi. Differentiate between simple and compound events.
- xii. What is meant by dependent event? Give an example.

4. Write short answers to any Six parts. (6 x 2 = 12)

- i. Define the Discrete Random Variable.
- ii. If $E(X) = 5$ and $E(X^2) = 50$, find σ^2 .
- iii. Given below is a function. Is it a probability function?

| | | | |
|--------|---------------|---------------|---------------|
| x | 0 | 1 | 2 |
| $P(x)$ | $\frac{5}{8}$ | $\frac{4}{8}$ | $\frac{1}{8}$ |
- iv. What is probability density function?
- v. If $E(X) = 1.15$, then find $E(3X + 5)$.
- vi. If $n = 10$, $p = 0.4$, then find variance of binomial distribution.
- vii. In a binomial distribution $n = 3$, $p = \frac{1}{2}$, find $P(X = 3)$.
- viii. Given that $N = 10$, $n = 4$, $k = 3$, find $P(X = 1)$.
- ix. Write any two properties of binomial experiment.

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(2)

SECTION - C

Each question carries 4 + 4 = 8 Marks

5. (a) Calculate the geometric mean for the following data:

| Marks | 10 - 19 | 20 - 29 | 30 - 39 | 40 - 49 | 50 - 59 |
|-----------------|---------|---------|---------|---------|---------|
| No. of Students | 5 | 25 | 40 | 20 | 10 |

(b) The following table gives the frequency distribution of heights recorded to the nearest inch of 100 students. Find mode.

| Heights | 60 - 62 | 63 - 65 | 66 - 68 | 69 - 71 | 72 - 74 |
|-----------------|---------|---------|---------|---------|---------|
| No. of Students | 5 | 18 | 42 | 27 | 8 |

6. (a) Calculate variance and standard deviation for the data: 3, 6, 2, 1, 7, 5

(b) Calculate first 4 moments about origin from the following data:

| | | | | | |
|-----|---|---|---|----|---|
| x | 1 | 2 | 3 | 4 | 5 |
| f | 2 | 5 | 7 | 10 | 4 |

7. (a) Find the index numbers from the following data taking 2010 as base year.

| Year | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------|------|------|------|------|------|
| Prices | 15 | 19 | 21 | 30 | 37 |

(b) A and B are two independent events. If $P(A) = 0.4$, $P(B) = 0.3$

Find (i) $P(A \cap B)$

(ii) $P(A \cup B)$

8. (a) A continuous random variable "X" has the probability density function given by $f(x) = \frac{x+1}{8}$ $2 < x < 4$

Find (i) $P(2 < x < 4)$

(ii) $P(x < 3.5)$

(b) A discrete random variable "X" has a probability function given by $P(x) = C(3 - X)$ for $X = 0, 1, 2, 3$. Find the value of "C". Also find $E(X)$ and $E(X^2)$.

9. (a) Find the value of "n" and "p" in a binomial distribution. Which has mean 15 and standard deviation 5.

(b) A committee of size 3 is to be selected from 4 women and 6 men. Obtain the probability distribution of number of men in the committee.