MIZORAM PUBLIC SERVICE COMMISSION

TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO INSPECTOR OF STATISTICS UNDER PLANNING & PROGRAMME IMPLEMENTATION DEPARTMENT, FEBRUARY, 2017

PAPER - III
STATISTICS

Time Allowed : 3 hours | Full Marks : 100

Marks for each paper is marked against it.
Attempt all questions.

A. Short Answer Type (Questions 1 - 10) **(10×2=20)**

1. The standard deviation for the given data set is:

Data: 2, 2, 2, 2, 2, 2, 2, 2, 2

(a) 2 .0 (b) 0.67

(c) 0 (d) 1.52

2. The data obtained by governmental and non-governmental sources are called as

(a) First hand data (b) Secondary data

(c) Primary data (d) Both Primary and Secondary data

3. An unbiased dice rolled on a plane. What is the probability of getting 1 or 2 or 6 on its face?

(a) 1.0 (b) 3.5

(c) 0.75 (d) 0.50

4. Pearson's correlation coefficient (r) is lies between:

(a) $0.2 < r < 2$ (b) $-1 \le r \le 1$

(c) $0 < r < 1$ (d) None of the above

5. Density function of Standard normal variate is given by

(a) $\frac{1}{\sqrt{2\pi}} e - \frac{1}{2} x^2$ (b) $\frac{1}{\sigma\sqrt{2\pi}} xe - \frac{1}{2} x^2$

(c) $\frac{1}{\sqrt{2\pi\sigma}} e - \frac{1}{2\sigma} x^2$ (d) None of these

6. Let $x_1, x_2, \ldots x_n$ are the random sample of size n from Poisson distribution with parameter k. The standard error of the sample mean is

(a) $\sqrt{k}$ (b) $\sqrt{nk}$

(c) $\sqrt{\frac{k}{n}}$ (d) k

7. In following sentence which type of error is

$P(x \in w \mid H_1 \, is \, true)$; where w be the critical region

(a) Type-I
(b) Power f the test
(c) No error
(d) Type-II

8. Sampling errors are present in

(a) Sample survey
(b) Census survey
(c) In sample as well as census survey both
(d) None of the above

9. The correct expression for population mean square is

(a) $S^2 = \frac{1}{N}\sum_{i=1}^{N} X^2 - \frac{n}{n-1}\bar{X}^2$
(b) $S^2 = \frac{1}{N-1}\sum_{i=1}^{N} X^2 - \frac{N}{N-1}\bar{X}^2$
(c) $S^2 = \sum_{i=1}^{N} X^2 - \frac{1}{n-1}\bar{X}^2$
(d) $S^2 = N\sum_{i=1}^{N} X^2 - \frac{N}{n-1}\bar{X}^2$

10. The Laspeyres and Paasche index numbers are examples of:

(a) Aggregate index numbers
(b) Weighted price index only
(c) Weighted index numbers
(d) Weighted quantity index only

B. Short Answer Type (Questions 11 - 15) **(5×4=20)**

11. Explain skewness and kurtosis.

12. Let X and Y are the two independent random variable. Find covariance between X and Y.

13. Explain types of error in testing of hypothesis.

14. Explain life table and its important usage.

15. Define crude death rate (CDR) and crude birth rate (CBR).

C. Long Answer Type (Questions 16 - 25) : *(Attempt* ***<u>any six</u>*** *of the followings)* **(6×10=60)**

16. Explain mean, median and mode with their merits and demerits. Also find the mode of the given data (X)

X: 1,1,2,2,5,4,7,5,4,8,5,4,7,9,6,2,2,2,3,2,3,1,3,2,2,2,2,7,8,8,9

17. What are the different measures of dispersion? Define variance and let X is a random variable with variance 2. Hence, find the variance of the followings.

(a) Z=3X+4
(b) W=6X-2

18. Define correlation and regression and show that correlation coefficient is geometric mean of regression coefficient.

19. What are the criterions of a good estimator? Explain any two of them.

20. What do you meant by chi-square distribution? Show that sum of n independent chi-square variates is also chi-square variates.

21. Explain simple random sampling and if a population U= (11, 13, 19) include three units then draw all random sample of size n=2 under SRSWOR and SRSWR

22. Define moment generating function of a random variable X. Hence find the m.g.f. of the given probability distribution

$$P(X = x) = p^x (1-p)^{1-x} \qquad ; x = 0,1$$

23. Define Fisher index number and show that it satisfied time reversal and factor reversal test.

24. Define time series and also mention its important uses. What are the different components of time series?

25. What are the different methods of estimation? Find the maximum likelihood estimate for the parameter for the given density.

$$f(x, \mu, \sigma^2) = \begin{cases} \frac{1}{\sqrt{2\pi}\sigma} e - \frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2 & ; -\infty \le x \le \infty - \infty \le \mu \le \infty, \sigma^2 > 0 \\ 0 & ; \text{otherwise} \end{cases}$$

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