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Test Series Prepared By
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PAPER-2 (TEST-1)

1. Let $X \sim$ Poisson (λ), where $\lambda > 0$ is unknown. If $\delta(X)$ is the unbiased estimator of $g(\lambda) = e^{-\lambda}(3\lambda^2 + 2\lambda + 1)$, then $\sum_{k=0}^{\infty} \delta(k)$ is equal to ________.

   a. 9   b. 2
   c. 1   d. none of above

2. A random sample (X_1, X_2, X_3) is drawn from $U(0,\theta)$. Let $T = \frac{3X_1 + 2X_2 + aX_3}{3}$.

   If T is U.E for θ, then a is

   a. 1   b. 5
   c. 0   d. -2

3. A random sample of size n is chosen from a population with probability density function

$$f(x,\theta) = \begin{cases} \frac{1}{2} e^{-(x-\theta)}, & x \geq 0 \\ \frac{1}{2} e^{(x-\theta)}, & x < 0 \end{cases},$$

   Then, the maximum likelihood estimator of θ is the

   a. mean of the sample
   b. standard deviation of the sample
   c. median of the sample
   d. maximum of the sample

4. If the probability density function of a random variable X is $f(x,\theta) = \theta e^{-\theta x}, 0 < x < \infty$ then the central 95% confidence limits for large sample size n, for θ are

   a. $\left(1 \pm \frac{1 \cdot 96\bar{x}}{\sqrt{n}}\right)$ b. $\left(1 \pm \frac{1 \cdot 96}{\sqrt{n}}\right)\frac{1}{\bar{x}}$

   c. $\left(1 \pm \frac{1 \cdot 96}{\bar{x}\sqrt{n}}\right)$ d. $\left(1 \pm \frac{2 \cdot 58\bar{x}}{\sqrt{n}}\right)$

5. Let there be three types of light bulbs with lifetimes X, Y and Z having exponential distributions with mean $\theta, 2\theta$ and 3θ, respectively. Then, the maximum likelihood estimator of θ based on the observations X, Y and Z is

a. $(X + 2Y + 3Z)/3$

b. $3(X + 2Y + 3Z)$

c. $\frac{1}{3}\left(X + \frac{Y}{2} + \frac{Z}{3}\right)$

d. $\frac{1}{6}\left(X + \frac{Y}{2} + \frac{Z}{3}\right)$

6. If X is a binomial variate with parameters $(5, \theta)$, the UMVUE for $\psi(\theta) = \theta(1-\theta)$ is

a. $(5X - X^2)/20$ b. $(X^2 - 5X)/20$

c. $X(1-X)/20$ d. $X(X-1)/20$

7. Let X follows exp(θ) with probablity 1/3,and exp(2θ) with probablity 1/4, and exp(3θ) with probablity 5/12. find method of Moments estimate of θ.

a. $\frac{12\overline{X}}{25}$ b. $X_{(1)}$

c. $X_{(n)}$ d. none of above.

8. If $x_1, x_2, \ldots, x_n$ is a random sample from a population $\frac{1}{\theta\sqrt{2\pi}} e^{-x^2/2\theta^2}$, then the maximum likelihood estimator for θ is

a. $\frac{\sum x_i}{n}$ b. $\frac{\sum X_i^2}{n}$

c. $\frac{\sqrt{\sum X_i^2}}{n}$ d. $\sqrt{\sum X_i^2 / n}$

9. Suppose that $X_1, X_2, \ldots, X_n$ is a random sample of size n drawn from a population with probability density function

$$f(x;\theta)=\begin{cases}\frac{x}{\theta^2}e^{-\frac{x}{\theta}}, & \text{if } x>0\\ 0 & \text{otherwise,}\end{cases}$$

where θ is a parameter such that $\theta>0$. The maximum likelihood estimator of θ is

a. $\frac{\sum_{i=1}^{n}X_i}{n}$ b. $\frac{\sum_{i=1}^{n}X_i}{n-1}$

c. $\frac{\sum_{i=1}^{n}X_i}{2n}$ d. $\frac{2\sum_{i=1}^{n}X_i}{n}$

10. Let $X_1, X_2, X_3, \ldots, X_n$ be a random sample from uniform $[1, \theta]$ for some $\theta > 1$. If $X_{(n)}$ = Maximum $(X_1, X_2, X_3, \ldots, X_n)$, then the UMVUE of θ is

(a) $\frac{n+1}{n}X_{(n)}+\frac{1}{n}$ (b) $\frac{n+1}{n}X_{(n)}-\frac{1}{n}$

(c) $\frac{n}{n+1}X_{(n)}+\frac{1}{n}$ (d) none of above

11. Let $X_1=3.5$, $X_2=7.5$ and $X_3=5.2$ be observed values of a random sample of size three from a population having uniform distribution over the interval $(\theta, \theta+5)$, where $\theta\in(0,\infty)$ is unknown and is to be estimated. Then, which of the following is not a Maximum Likelihood estimate of θ?

a. 2.4 b. 2.7
c. 3.0 d. 3.3

12. A random sample of size n is chosen from a population with probability density function

$$f(x,\theta)=\begin{cases}\frac{1}{2}e^{-(x-\theta)}, & x\ge\theta\\ \frac{1}{2}e^{(x-\theta)}, & x<\theta\end{cases}$$

Then, the sufficient estimator of θ is the

a. $\{X_{(1)}, X_{(n)}\}$ is jointly S.E. for θ. b. $X_{(1)}+X_{(n)}$

c. median of the sample d. S.E. does not exist.

13. Suppose the random variable X has a uniform distribution P_θ in the interval $[\theta-1, \theta+1]$, where $\theta \in R$. If a random sample of size n is drawn from this distribution, then P_θ almost surely for all $\theta \in R$, a sufficient estimator for θ

a. exists and is unique
b. exists but may or may not be unique
c. exists but cannot be unique
d. does not exist

14. Suppose that $X_1, X_2, \ldots, X_n$ is a random sample of size n drawn from a population with probability density function

$$f(x;\theta) = \begin{cases} \frac{x}{\theta^2} e^{-\frac{x}{\theta}}, & \text{if } x > 0 \\ 0 & \text{otherwise,} \end{cases}$$

where θ is a parameter such that $\theta > 0$. The sufficient estimator of θ is

a. $\sum_{i=1}^{n} X_i$
b. $\prod_{i=1}^{n} X_i$
c. $\left\{\prod_{i=1}^{n} X_i, \sum_{i=1}^{n} X_i\right\}$ jointly S.E for θ
d. none of above

15. The maximum likelihood estimator (MLE) of θ in the distribution

$f(x,\theta) = \frac{1}{2} e^{-|x-\theta|}, \ -\infty < x < \infty$ is

a. mean
b. median
c. smallest order statistic
d. highest order statistic

16. Let $x_1, x_2, \ldots, x_n$ be a random sample drawn from a normal population $N(\mu, 2)$. Then $T = \frac{1}{n}\sum_{i=1}^{n} x_i^2$, is an unbiased estimator of following

a. μ
b. μ^2
c. $\mu(\mu+1)$
d. none of above

17. Let $X_1, X_2, \ldots, X_n$ be an i.i.d. random sample from poisson distribution with mean μ. Which of the following is an unbiased estimator of μ?

a. X_1
b. $\frac{1}{n-1}(X_2 + X_3 + \ldots + X_n)$
c. $\frac{1}{n}(X_1 + X_2 + X_3 + \ldots + X_n)$
d. all of above

18. Let $X_1, X_2, \ldots\ldots X_n$ are iid poisson with parameter μ. Consider the problem of estimating μ. The MSE (Mean Square error) of the estimate

$T(X) = \frac{X_1 + X_2 + \ldots\ldots + X_n}{n}$ is

a. μ^2
b. $\frac{1}{n+1}\mu^2$
c. $\frac{1}{(n+1)^2}\mu^2$
d. none of above

19. Let $x_1, x_2, \ldots x_n$ be a random sample from a Bernoulli population $p^x(1-p)^{1-x}$. The sufficient statistic for p is

a. maximum $(x_1, x_2, \ldots x_n)$
b. minimum $(x_1, x_2, \ldots x_n)$
c. $\sum_{i=1}^{n} x_i$
d. $\prod_{i=1}^{n} x_i$

20. The standard error of observed sample proportion for large samples is

a. $\frac{PQ}{n}$
b. $\frac{PQ}{\sqrt{n}}$
c. $\frac{\sqrt{PQ}}{n}$
d. $\sqrt{\frac{PQ}{n}}$

21. A random sample $X_1, X_2, \ldots\ldots, X_n$ is observed from $N(\mu, \sigma^2)$, where σ^2 is known. consider the following quantities :

I. $\sum_{i=1}^{n} X_i^2$

II. $\sum_{i=1}^{n} \frac{X_i^2}{\sigma^2}$

III. $\sum_{i=1}^{n} (X_i - \mu)^2$

IV. $\sum_{i=1}^{n} \left(\frac{X_i - \mu}{\sigma}\right)^2$

Which of the above are Statistics?
a. I and II only
b. I, II and III only
c. III and IV
d. I, II, III and IV

22. What is the maximum likelihood estimator of p based on a single observation X from Bernoulli distribution with parameter $p \in \left[\frac{1}{7}, \frac{4}{7}\right]$?

a. $\frac{X+1}{7}$ b. $\frac{2X+1}{7}$

c. $\frac{3X+1}{7}$ d. $\frac{X}{7}$

23. Let $X_1 = \mu + \varepsilon_1$, $X_2 = 2\mu + \varepsilon_2$, ε_1 and ε_2 are independent with same variance σ^2 and expectation zero. Then BLUE of μ is

a. $\frac{2X_1 + X_2}{3}$ b. $\frac{X_1 + 2X_2}{5}$

c. $\frac{2X_1 + X_2}{5}$ d. $\frac{X_1 + X_2}{2}$

24. If X is a binomial variate with parameters $(5, \theta)$, the UMVUE for $\psi(\theta) = \theta(1+\theta)$ is

a. $(5X - X^2)/20$ b. $(X^2 - 5X)/20$

c. $X(3+X)/20$ d. none of above

25. If X_1 and X_2 are random samples from a normal population $N(\mu, \sigma^2)$, the efficiency of $T_1 = \frac{X_1 + 2X_2}{3}$ with respect to $T_2 = \frac{(X_1 + X_2)}{2}$ is

a. $\frac{6}{9}$ b. $\frac{10}{9}$

c. $\frac{5}{9}$ d. $\frac{9}{10}$

26. In a test of difference between proportions, two samples are under consideration. In the first, a sample of size 100 shows 20 successes; in the second, a sample of size 50 shows 13 successes. What is the value of the estimate of proportion p for this situation?

a. $\frac{33}{150} \times \frac{117}{150}$ b. $\frac{20+13}{150}$

c. $\frac{20}{100} \times \frac{13}{50}$ d. $\frac{20 \times 13}{150}$

27. Assuming the normal distribution, suppose that a 95% confidence interval for mean μ is (50, 60). Which of the following NOT possibly be a 99% confidence interval?

a. (52, 58) b. (52, 62)
c. (48, 58) d. all of above

28. In the normal distribution $N(\mu,\sigma^2)$, both μ and σ^2 are unknown. Then based upon a random sample $x_1,x_2,....,x_n$ from the distribution, the maximum likelihood estimators of μ and σ are respectively

a. $\bar{x}, \sqrt{\sum (x_i-\bar{x})^2}$ b. $\bar{x}, \sqrt{\sum (x_i-\bar{x})^2/n}$
c. $\bar{x}, \sqrt{\sum (x_i-\bar{x})^2/(n-1)}$ d. $\sum x_i, \sqrt{\sum (x_i-\bar{x})^2/(n-1)}$

29. If $x_1,x_2,......,x_n$ is a random sample of size n from the Poisson distribution $P(\theta)$, then which one of the following is correct for $T=\sum_{i=1}^{n} x_i$?

a. T is not sufficient for θ b. T is a biased estimator for θ
c. T is an efficient estimator for θ d. T is an unbiased estimator for population variance

30. If t is a consistent estimator of θ based on a random sample of size n, then another consistent estimator is

a. $(n^2+n)t$ b. $t+\frac{1}{n}$
c. $\frac{n^2}{t}$ d. $t+n$

31. Let X_1, X_2 and X_3 be a random sample of size 3 from a normal population with mean μ and variance σ^2. Then the variance of the estimator $T_1=(X_1+X_2-X_3)$ of μ is

a. σ^2 b. $3\sigma^2$
c. $2\sigma^2$ d. $\frac{2}{3}\sigma^2$

32. Let X_1,X_2,X_3 are iid $N(\mu,\sigma^2)$. The efficiency of $T_1=(X_1+X_2-X_3)$ with respect to $\overline{X}=\frac{1}{3}(X_1+X_2+X_3)$ is

a. 1 b. $\frac{1}{3}$
c. $\frac{1}{9}$ d. none of above.

33. Let $X \sim$ Poisson (λ), where $\lambda > 0$ is unknown. If $\delta(X)$ is the unbiased estimator of $e^{-\lambda}$ then $\sum_{k=0}^{\infty}\delta(k)$ is equal to ________.

a. 9 b. 2
c. 1 d. none of above

34. If $X_1, X_2, \ldots, X_n$ is a random sample of size n from Poisson distribution with mean λ, the Cramer-Rao lower bound to the variance of any unbiased estimator of λ is

a. $\frac{e^{-n}}{\lambda}$ b. $\frac{\lambda}{n}$
c. $\frac{\sqrt{\lambda}}{n}$ d. $\frac{e^{-\lambda}}{n}$

35. Let $x_1, x_2, \ldots, x_n$ be a random sample drawn from a normal population $N(\mu, \mu)$. Then $T = \frac{1}{n}\sum_{i=1}^{n} x_i^2$, is an unbiased estimator of following

a. μ b. μ^2
c. $\mu(\mu+1)$ d. none of above

36. A simple random sample of size 10 from $N(\mu, \sigma^2)$ gives 98% confidence interval (20.49, 23.51). Then, the null hypothesis $H_0 : \mu = 20.5$, agains $H_A : \mu \neq 20.5$

a. can be rejected at 2% level of significance.
b. cannot be rejected at 5% level of significance.
c. can be rejected at 10% level of significance.
d. cannot be rejected at any level of significance.

37. A random sample of 100 voters in community produced 59 voters in favour of candidate A. The observed value of the test statistic for testing the null hypothesis $H_0 : P = 0.5$ versus the alternative hypothesis $H_A : P \neq 0.5$ is :

a. 1.80 b. 1.90
c. 1.83 d. 0.59

38. The probability density function of the random variable X is

$$f(x)=\begin{cases}\frac{1}{\lambda}e^{-x/\lambda}, & x>0\\ 0, & x\le 0\end{cases},$$

where $\lambda>0$. For testing the hypothesis $H_0:\lambda=3$ against $H_1:\lambda=5$, a test is given as "Reject H_0 if $X\ge 4.5$". The probability of type I error and power of this test are, respectively,

a. 0.1353 and 0.4966
b. 0.1827 and 0.379
c. 0.2021 and 0.4493
d. 0.2231 and 0.4066

39. p denotes the probability of success in tossing a coin and the null hypothesis H_0 is rejected against the alternative H_1, where $H_0: p=\frac{1}{2}$ and $H_1: p=\frac{3}{4}$, if 5 tosses of the coin give more than 3 successes. Then the probability of committing Type II Eroor is

a. 45/128
b. 3/16
c. 1/2
d. 47/128

40. Let X have a binomial distribution with parameters n and p, $n=3$, for testing the hypothesis $H_0: P=\frac{2}{3}$ against $H_1: P=\frac{1}{3}$, let a test be "Reject H_0, if $X\ge 2$ and accept H_0 if $X\le 1$". Then, the probabilities of type I and type II errors, respectively are

a. $\frac{20}{27}$ and $\frac{20}{27}$
b. $\frac{7}{27}$ and $\frac{20}{27}$
c. $\frac{20}{27}$ and $\frac{7}{27}$
d. $\frac{7}{27}$ and $\frac{1}{27}$

41. Let X be a random variable with probability density function $f\in\{f_0, f_1\}$, where

$$f_0(x)=\begin{cases}2x, & \text{if } 0<x<1\\ 0, & \text{otherwise}\end{cases} \quad \text{and} \quad f_1(x)=\begin{cases}3x^2, & \text{if } 0<x<1\\ 0, & \text{otherwise}\end{cases}$$

For testing the null hypothesis $H_0: f=f_0$ against the alternative hypothesis $H_1: f=f_1$ at level of significance $\alpha=0.19$, the power of the most powerful test is

a. 0.729
b. 0.271
c. 0.615
d. 0.385

42. Let $X_1,....,X_n$ be a random sample from $N(\mu,1)$ distribution, where $\mu \in \left\{0, \frac{1}{2}\right\}$. For testing the null hypothesis $H_0: \mu = 0$ against the alternative hypothesis $H_1: \mu = \frac{1}{2}$, consider the critical region $R = \left\{(x_1, x_2, ..., x_n) : \sum_{i=1}^{n} x_i > c\right\}$, where, c is some real constant. If the critical region R has size 0.025 and power 0.7054, then the value of the sample size n is equal to ______.

a. 9 b. 25
c. 1 d. none of above.

43. Suppose X is a random variable with $p(X = k) = (1-p)^k p$ for $k \in \{0,1,2,....\}$ and some $p \in (0,1,)$. For the hypothesis testing problem $H_0: p = \frac{1}{2}$, $H_1: p \neq \frac{1}{2}$. Consider the test "Reject H_0, if $X \le A$ or if $X \ge B$" where $A < B$ are given positive integers. The type I error of this test is

a. $1 + 2^{-B} - 2^{-A}$ b. $1 - 2^{-B} + 2^{-A}$
c. $1 + 2^{-B} - 2^{-A-1}$ d. $1 - 2^{-B} + 2^{-A-1}$

44. Let $X_1, X_2, X_3, ..., X_n$ be a random sample from the probability density function $f(x) = \begin{cases} \theta\alpha e^{-\alpha x} + (1-\theta)2\alpha e^{-2\alpha x}; & x \ge 0 \\ 0 & \text{otherwise,} \end{cases}$ where $\alpha > 0, 0 \le \theta \le 1$ are parameters. Consider the following testing problem: $H_0: \theta = 1, \alpha = 1$ versus $H_1: \theta = 0, \alpha = 2$.
Which of the following statements are True?
(a) Uniformly Most Powerful test does NOT exist
(b) Uniformly Most Powerful test is of the form $\sum_{i=1}^{n} X_i > c$, for some $0 < c < \infty$
(c) Uniformly Most Powerful test is of the form $\sum_{i=1}^{n} X_i < c$, for some $0 < c < \infty$
(d) Uniformly Most Powerful test is of the form $c_1 < \sum_{i=1}^{n} X_i < c_2$ for some $0 < c_1 < c_2 < \infty$

45. Let X have a binomial distribution with parameters n and p, $n = 3$, for testing the hypothesis $H_0: P = \frac{1}{3}$ against $H_1: P = \frac{2}{3}$, let a test be "Reject H_0, if $X > 2$ and accept H_0 if $X \le 2$". Then, the probabilities of type I and type II errors, respectively are

a. $\frac{20}{27}$ and $\frac{20}{27}$ b. $\frac{7}{27}$ and $\frac{20}{27}$
c. $\frac{1}{27}$ and $\frac{19}{27}$ d. none of above.

46. The probability density function of the random variable X is

$f(x)=\begin{cases}\lambda e^{-\lambda x}, & x>0\\ 0, & x\le 0\end{cases}$, where $\lambda>0$. For testing the hypothesis $H_0:\lambda=3$ against $H_A:\lambda=5$, a test is given as "Reject H_0 if $X\le 4.5$". The probability of type I error and type II error are, respectively,

a. $1-e^{-13.5}$ & $e^{-22.5}$ b. $e^{-13.5}$ & $e^{-22.5}$
c. $1-e^{-13.5}$ & e^{-22} d. none of above.

47. Let X be a random variable with probability density function $f\in\{f_0,f_1\}$, where

$f_0(x)=\begin{cases}3x^2, & \text{if } 0<x<1\\ 0, & \text{otherwise}\end{cases}$ and

$f_1(x)=\begin{cases}4x^3, & \text{if } 0<x<1\\ 0, & \text{otherwise}\end{cases}$.

For testing the null hypothesis $H_0:f=f_0$ against the alternative hypothesis $H_1:f=f_1$ at level of significance $\alpha=0.271$, the power of the most powerful test is

a. 0.729 b. 0.271
c. 0.3439 d. none of above.

48. Suppose that X is a population random variable with probability density function

$f(x;\theta)=\begin{cases}\theta x^{\theta-1}, & \text{if } 0<x<1\\ 0, & \text{otherwise,}\end{cases}$

where θ is a parameter. In order to test the null hypothesis $H_0:\theta=3$ against the alternative hypothesis $H_1:\theta=2$, the following test is used. Reject the null hypothesis if $X_1\le 1/2$ and accept otherwise, where X_1 is a random sample of size 1 drawn from the above population. Then, the power of the test is ________.

a. 0.25 b. 0.87
c. 0.3 d. none of above.

49. Let $X_1,\ldots,X_n$ be a random sample from $N(\mu,1)$ distribution, where $\mu\in\{0,1\}$. For testing the null hypothesis $H_0:\mu=0$ against the alternative hypothesis $H_1:\mu=1$, consider the critical region

$R=\left\{(x_1,x_2,\ldots,x_n):\left|\sum_{i=1}^{n}x_i\right|>1.96\right\}$, find Level of significance where sample size is 25.

a. 0.5 b. 0.9
c. 1 d. none of above.

50. It is proposed to test $H_0 : \theta = 1$ against $H_1 : \theta = 2$ on the basis of one observation drawn from a population with probability density function $f(x,\theta) = \frac{1}{\theta}, 0 < x < \theta$. If the critical region is $x \geq 0 \cdot 5$, then the value of size of type II error is

a. $\frac{1}{2}$ b. $\frac{1}{4}$

c. $\frac{2}{3}$ d. $\frac{3}{4}$

51. Consider the model.

$Y_1 = \beta_1 + \beta_2 + e_1$
$Y_2 = \beta_1 - \beta_2 + \beta_3 - e_2$
$Y_3 = \beta_1 - \beta_2 + e_3$

Then which of the following is estimable.

(a) $\beta_1 + \beta_2 - \beta_3$ (b) $2\beta_1 - \beta_2 + 3\beta_3$

(c) $\beta_1 - \beta_2$ (d) All of above.

52. Consider the following statements.

(1) The g-Inverse of a matrix may or may not exist.
(2) The g-Inverse of a square matrix is always unique.

which of the above statements is/are correct.

(a) 1 only. (b) 2 only.
(c) both 1 and 2. (d) neither 1 nor 2.

53. Consider the model under usual assumption.

$y_i = \beta_0 + \beta_1 x_i + e_i \; ; i = 1,2,3,\ldots,n.$ where $x_j = 1 \forall j = 1,2,\ldots n.$

If $\overline{\beta_0}$ and $\overline{\beta_1}$ are O.L.S. estimator of β_0 and β_1. Find $\overline{\beta_0} + \overline{\beta_1}$

(a) $\bar{x} + \bar{y}$ (b) $1 - \bar{y}$

(c) $\bar{y}$ (d) $2\bar{y}$

54. Consider the following statements

(1) If perfect multicollinearity exist, O.L.S estimator must exist.
(2) If perfect multicollinearity not exist, O.L.S estimator does not exist.

which of the above statements is/are correct.

(a) only 1 (b) only 2
(c) both 1 and 2 (d) neither 1 nor 2

55. Consider the model, under usual assumption.

$y_i = \beta_0 + \beta_1 x_1 + e_i$; $i = 1,2,3,....n$.

which of the following is true.

(a) O.L.S estimator of β_0 and β_1 and not B.L.U.E.

(b) $E(\hat{\beta}_0) = \beta_0$ and $\lim_{n\to\infty} E(\hat{\beta}_1) = \beta_1$

(c) $E(\hat{\beta}_1) = \beta_1$ and $\lim_{n\to\infty} E(\hat{\beta}_0) \neq \beta_0$

(d) none of the above.

56. In ANOVA, fixed effect model, which of the following is true. Under the usual notations.

(a) $E(s_t^2) = E(s_E^2) = \sigma_e^2$ (b) $E(s_t^2) > E(s_E^2)$

(c) $E(s_t^2) \le E(s_E^2)$ (d) none of the above

57. In ANOVA, fixed effect model, Under the usual notation, which of the following is true.

(a) $\frac{s_t^2}{s_E^2} \sim F(k-1, N-k)$ (b) $\frac{s_t^2}{s_E^2} \sim F(k-1, N-1)$

(c) $\frac{S_t^2}{S_E^2} \sim F(k-1, N+k)$ (d) None of above.

58. In ANOVA one-way, random effect model, which of the following is true.

(a) y_{ij}^* are Independent and Identical.

(b) y_{ij}^* are NOT Independent and NOT Identical.

(c) y_{ij}^* are Independent and NOT Identical.

(d) y_{ij}^* are NOT Independent and Identical.

59. In ANOVA one-way, random effect model, Under the usual notation, $COV\left(y_{ij}, y_{ik}\right)$ is.

(a) 0 (b) σ_e^2

(c) σ_a^2 (d) none of above.

60. In ANOVA one-way, random effect model, which of the following is true.

(a) $M.S.E\left(s_E^2\right)$ is always an unbiased estimator for σ_e^2

(b) $M.S.E\left(s_E^2\right)$ is always an unbiased estimator for σ_a^2

(c) $M.S.E\left(s_t^2\right)$ is always an unbiased estimator for σ_e^2, under H_0

(d) $M.S.E\left(s_t^2\right)$ is always an unbiased estimator for σ_a^2, under H_0

61. Consider the following statements:

1. The weightage of food in Consumer Price Index (CPI) is lower than that in wholesale Price Index (WPI).

2. The WPI does not capture changes in the prices of services, which CPI does.

3. Reserve Bank of India has now adopted WPI as its key measure of inflation and to decide on changing the key policy rates.

How many statements given above is/are correct?

(a) Only one (b) Only two

(c) Only three (d) None of above

62. Which of the following goods are included to estimate food inflation in India?

1. Wheat

2. Paddy

3. Tobacco

4. Sugar

How many given above is/are correct?

(a) Only one (b) Only two

(c) Only three (d) All four

63. Which of the following statements are true?

1. GDP mp is the market value of all final Goods and Services produced within the geographical boundary of a country in a year.

2. If the GDP of a country is rising, the welfare may not rise as a consequence.

3. The ratio of nominal GDP to Real GDP is called GDP Deflator.

4. The ratio of real GDP to nominal GDP is called GDP Deflator.

(A) 1, 2 and 3 only

(B) 2, 3 and 4 only

(C) 1, 3 and 4 only

(D) 1, 2 and 4 only

64. Consider the following statements:

1. Members of Parliament Local Area Development Scheme (MPLADS) was launched in 1993, as a Central Sector Scheme fully funded by the Government of India.

2. The basic objective of the scheme is to enable Members of Parliament (MPs) to recommend works of developmental nature with emphasis on the creation of durable community assets based on the locally felt needs to be taken up in their constituencies/eligible areas.

Which of the statements given above is/ are incorrect?

(a) 1 only (b) 2 only

(c) Both 1 and 2 (d) Neither 1 nor 2

65. Consider the following statements about Minimum Support Price (MSP)?

1. MSP is the price at which government purchases food grains from the markets.

2. MSP ensures adequate food grains production in the country.

3. MSP is a direct benefit transfer.

4. MSP is given by CACP (Commission for Agricultural Costs and Prices).

How many statements given above is/are correct?

(a) Only one (b) Only two

(c) Only three (d) All four

66. With reference to India, consider the following statements:

1. The Wholesale Price Index (WPI) in India is available on a monthly basis only.

2. As compared to Consumer Price Index - for Industrial Workers CPI (IW), the WPI gives less weight to food articles.

Which of the statements given above is/ are correct?

(a) 1 only (b) 2 only

(c) Both 1 and 2 (d) Neither 1 nor 2

67. The Livestock Census in India is conducted every:

a) Annually

b) Decennially

c) Five years

d) Continuously

68. The NSSO conducts surveys in both rural and urban areas using a:

a) Quota sampling

b) Stratified random sampling

c) Convenience sampling

d) Judgment sampling

69. The National Family Health Survey (NFHS) is a large-scale survey conducted jointly by:

a) Ministry of Health and Family Welfare (MoHFW) and World Health Organization (WHO)

b) MoHFW and National Sample Survey Organisation (NSSO)

c) MoHFW and United Nations Population Fund (UNFPA)

d) MoHFW and International Labour Organization (ILO)

70. Administrative records can be a valuable source of data for official statistics on:

a) Public health outcomes

b) Education enrolment

c) Environmental quality

d) All of the above

71. Match the following data sources with their corresponding agencies:

i. Consumer Price Index (CPI)

ii. Quinquennial Survey on Industrial Units (QSIU)

iii. Sample Registration System (SRS)

iv. National Crime Records Bureau (NCRB)

a) i - NSSO, ii - MoSPI, iii - Registrar General of India (RGI), iv - Ministry of Home Affairs (MHA)

b) i - MoSPI, ii - Ministry of MSME, iii - RGI, iv - MHA

c) i - NSSO, ii - Ministry of Industry, iii - MoHFW, iv - Ministry of Law and Justice

d) i - RBI, ii - Department of Economics, iii - Ministry of Health, iv - Judiciary

72. The National Register of Citizens (NRC) is a database containing information on:

a) Socio-economic status

b) Educational attainment

c) Citizenship status

d) Employment details

73. The infant mortality rate (IMR) in India is calculated as:

a) Number of infant deaths per 1,000 live births in a year

b) Number of children under five who die per 1,000 live births

c) Percentage of children who do not reach adulthood

d) Ratio of infant deaths to maternal deaths

74. The National Accounts Statistics of India (NAS) provide data on:

a) Government expenditure

b) Private consumption

c) Gross Domestic Product (GDP)

d) All of the above

75. The National Family Health Survey (NFHS) provides data on various aspects of:

a) Education and employment

b) Maternal and child health

c) Agriculture and rural development

d) Industrial production and infrastructure

76. What is the significance of the Human Development Index (HDI) in international official statistics?

a. Measures economic growth
b. Evaluates educational attainment
c. Analyses healthcare quality
d. Integrates multiple indicators to assess development

77. Consider the following statements:

1. The all-India Index of Industrial Production (IIP) is a short-term composite indicator which measures changes in volume of production of a basket of Industrial products with respect to a base period.

2. The current base year of IIP is 2012.

Which of the statements given above is/ are correct?

(a) 1 only (b) 2 only

(c) Both 1 and 2 (d) Neither 1 nor 2

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78. In official statistics, what does the term "stratified sampling" involve?

a) Random selection of samples
b) Dividing the population into subgroups
c) Collecting data from the entire population
d) Focusing only on urban areas

79. Consider the following statements:

1. In the current context, India's GDP is less than GNI.
2. Nominal GDP calculated on Base year (2011-12) price.
3. GDP data is published on monthly basis.
4. There is advance estimate of GDP published.

How many statements given above is/are correct?

(a) Only one

(b) Only two

(c) Only three

(d)All four

80. National Statistical Commission is a -

a) Constitutional Body
b) Statutory body, Independent from MoSPI
c) Executive body under MoSPI
d) None of above