Topic:- STATS MPHIL S2

1) A fraction non-conforming control chart with n=400 has the following parameters; UCL=0.0809, CL=0.05, LCL=0.0191. The corresponding parameters for an equivalent control chart based on the number non conforming are
[Question ID = 4266]
1. (5.92, 32.08) [Option ID = 17058]
2. (6.92, 33.08) [Option ID = 17059]
3. (7.92, 34.08) [Option ID = 17060]
4. (8.92, 35.08) [Option ID = 17061]

Correct Answer :-
- (6.92, 33.08) [Option ID = 17059]

2) In an abridged life table, functions are computed for

[Question ID = 4267]
1. Each year of age

   [Option ID = 17062]
2. Age intervals greater than one year

   [Option ID = 17063]
3. From birth till the death of last member of the group

   [Option ID = 17064]
4. None of these

   [Option ID = 17065]

Correct Answer :-
- Age intervals greater than one year

  [Option ID = 17063]

3) Suppose that a parallel system with identical components has an overall reliability of 0.98. If each component has reliability of 0.25, then the minimum number of components in the system will be
[Question ID = 4268]
1. 12 [Option ID = 17066]
2. 13 [Option ID = 17067]
3. 14 [Option ID = 17068]
4. 15 [Option ID = 17069]

Correct Answer :-
- 14 [Option ID = 17068]

4) The reliability of a series system decreases with

[Question ID = 4269]
1. A decrease in the number of its components

   [Option ID = 17070]
2. An increase in the number of its components

   [Option ID = 17071]
3. Same number of its components

   [Option ID = 17072]
4. None of these

   [Option ID = 17073]

Correct Answer :-
- An increase in the number of its components

  [Option ID = 17071]

5) If a manufacturing process produces a large number of non-conforming units, then the process capability is
[Question ID = 4270]
1. Less than one [Option ID = 17074]
2. Greater than one [Option ID = 17075]
3. Equal to one [Option ID = 17076]
4. Equal to zero [Option ID = 17077]

Answer :-
than one [Option ID = 17077]

6) Octal equivalent of binary number 11000000 is:
[Question ID = 4271]
1. 192 [Option ID = 17078]
2. 300 [Option ID = 17079]
3. 071 [Option ID = 17080]
4. 301 [Option ID = 17081]

Correct Answer :-
- 300 [Option ID = 17079]

7) Converted value of $(53)_8$ to Base 10 is :
[Question ID = 4272]
1. 43 [Option ID = 17082]
2. 63 [Option ID = 17083]
3. 64 [Option ID = 17084]
4. 42 [Option ID = 17085]

Correct Answer :-
- 43 [Option ID = 17082]

8) Researches that are being conducted to study the Novle Coronavirus will be termed as:

[Question ID = 4273]
1. action research

   [Option ID = 17086]
2. applied research

   [Option ID = 17087]
3. longitudinal research

   [Option ID = 17088]
4. empirical research

   [Option ID = 17089]

Correct Answer :-
- action research

  [Option ID = 17086]

9) *Ex post facto* research refers to :

[Question ID = 4274]
1. descriptive research

   [Option ID = 17090]
2. fundamental research

   [Option ID = 17091]
3. analytical research

   [Option ID = 17092]
4. empirical research

   [Option ID = 17093]

Correct Answer :-
- descriptive research

  [Option ID = 17090]

10) The applied research uses the principles of :
[Question ID = 4275]
1. Action research [Option ID = 17094]
2. Fundamental research [Option ID = 17095]
3. Philosophical research [Option ID = 17096]
4. Historical research [Option ID = 17097]

Correct Answer :-
- Fundamental research [Option ID = 17095]

11) Regarding earthquake as a rare phenomenon with the occurrence rate of 2 per week, the probability that at least 3 earthquakes occur during the next 2 weeks is
[Question ID = 4276]

1. [illegible] [Option ID = 17099]
2. [illegible] [Option ID = 17100]
3. [illegible] [Option ID = 17101]
4. $1-12e^{4}$ [Option ID = 17101]

Correct Answer :-

- $12e^{-4}$ [Option ID = 17098]

12) The number of marriages that remain intact when there are a total of m deaths among the N married couples are
[Question ID = 4277]

1. {(2N-m) (2N-m+2) }/ (2N-1) [Option ID = 17102]
2. {(2N-m) (2N-m-1)}/ (2N-1) [Option ID = 17103]
3. {2(2N-m) (2N-m-1)}/ (2N-1) [Option ID = 17104]
4. {(2N-m) (2N-m-1)}/{2 (2N-1)} [Option ID = 17105]

Correct Answer :-

- {(2N-m) (2N-m-1)}/{2 (2N-1)} [Option ID = 17105]

13) The expected sum obtained when 10 independent rolls of a fair dice are made is
[Question ID = 4278]

1. 20 [Option ID = 17106]
2. 30 [Option ID = 17107]
3. 35 [Option ID = 17108]
4. 45 [Option ID = 17109]

Correct Answer :-

- 35 [Option ID = 17108]

14) Ten hunters randomly fire at a swarm of birds flying overhead. Assume that each hunter acts independently and that each hunter hits the target with probability p. The expected number of birds that escape unhurt when a flock of size 10 flies overhead is
[Question ID = 4279]

1. 100(1-p/10) [Option ID = 17110]
2. $[10-(p/10)]^{10}$ [Option ID = 17111]
3. $10(1-p/10)^{100}$ [Option ID = 17112]
4. $10(1-p/10)^{10}$ [Option ID = 17113]

Correct Answer :-

- $10(1-p/10)^{10}$ [Option ID = 17113]

15) Given the fundamental matrix M = $\begin{bmatrix} 5/4 & 3 & 1/2 \\ 1/2 & 3/2 & 1 \\ 1/8 & 3/8 & 5/4 \end{bmatrix}$ **and the submatrix R of the one-step transition probability matrix, which represents transitions from the transient states to the absorbing states such that R =** $\begin{bmatrix} 1/2 & 0 \\ 0 & 0 \\ 0 & 1/2 \end{bmatrix}$**, determine the absorption probability a_{35} where a_{ij} for i = 2,3,4 and j = 4,5 .**

[Question ID = 4280]

1. 5/8

   [Option ID = 17114]
2. 1/4

   [Option ID = 17115]
3. 3/4

   [Option ID = 17116]
4. 15/16

   [Option ID = 17117]

Correct Answer :-

- 3/4

  [Option ID = 17116]

16) In estimating simultaneous equation models by indirect least squares method, which of the following is true?
[Question ID = 4281]

1. GLS is applied to the reduced form equation [Option ID = 17118]
2. GLS is applied to the structural equation [Option ID = 17119]
3. OLS is applied to the reduced form equation [Option ID = 17120]
4. OLS is applied to the structural equation [Option ID = 17121]

Correct Answer :-

- OLS is applied to the reduced form equation [Option ID = 17120]

Which one of these is NOT a possible reason for the presence of heteroscedasticity in a linear regression model?
[Question ID = 4282]

1. As a consequence of error-learning models [Option ID = 17122]
2. Use of data manipulation techniques like data smoothing, interpolation, extrapolation, imputation etc. [Option ID = 17123]
3. Incorrect specification of the functional form of the model [Option ID = 17124]
4. Incorrect transformation of variables [Option ID = 17125]

Correct Answer :-

- Use of data manipulation techniques like data smoothing, interpolation, extrapolation, imputation etc. [Option ID = 17123]

18) While fitting a linear regression model with intercept, using ordinary least squares estimation, the value of Durbin-Watson d statistic came out to be 0. What does it signify?
[Question ID = 4283]

1. Autocorrelation is not present in the disturbances [Option ID = 17126]
2. Autocorrelation is not present in the independent variables [Option ID = 17127]
3. Heteroscedasticity is not present in the model [Option ID = 17128]
4. Evidence of positive autocorrelation of order 1 in the disturbances [Option ID = 17129]

Correct Answer :-

- Evidence of positive autocorrelation of order 1 in the disturbances [Option ID = 17129]

19) Consider the following linear regression model,

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + u_i$$

To test the presence of multicollinearity, we calculate pair-wise correlation coefficients between X_1, X_2, and X_3. Then, high pair-wise correlation coefficients can be treated as
[Question ID = 4284]

1. A necessary condition but not a sufficient condition for high multicollinearity [Option ID = 17130]
2. Both a necessary and a sufficient condition for high multicollinearity [Option ID = 17131]
3. Neither necessary nor sufficient for presence of high multicollinearity [Option ID = 17132]
4. A sufficient condition but not a necessary condition for high multicollinearity [Option ID = 17133]

Correct Answer :-

- A sufficient condition but not a necessary condition for high multicollinearity [Option ID = 17133]

20) Which one of the following critical classical assumptions of least squares estimation of linear regression models does the Koyck transformation (for distributed lag models) not satisfy?
[Question ID = 4285]

1. The values of the explanatory variables are non-stochastic [Option ID = 17134]
2. The regression model is correctly specified [Option ID = 17135]
3. There is no perfect linear relationship between the explanatory variables [Option ID = 17136]
4. The number of observations must be greater than the number of explanatory variables [Option ID = 17137]

Correct Answer :-

- The values of the explanatory variables are non-stochastic [Option ID = 17134]

21) Which of the following relation among modes of convergence is true?
[Question ID = 4286]

1. $X_n \xrightarrow{P} X \Rightarrow X_n \xrightarrow{r^{th}} X$
   [Option ID = 17138]
2. $X_n \xrightarrow{P} X \Leftrightarrow X_n \xrightarrow{d} X$
   [Option ID = 17139]
3. $X_n \xrightarrow{r^{th}} X \Rightarrow X_n \xrightarrow{P} X$
   [Option ID = 17140]
4. $X_n \xrightarrow{P} X \Leftrightarrow X_n \xrightarrow{r^{th}} X$
   [Option ID = 17141]

Correct Answer :-

- $X_n \xrightarrow{r^{th}} X \Rightarrow X_n \xrightarrow{P} X$
  [Option ID = 17140]

22) The necessary and sufficient condition for WLLN to hold for the arbitrary sequence of random variables $\{X_k\}$ is

[Question ID = 4287]

1. Variance should exist.
   [Option ID = 17142]
2. $\lim_{n\to\infty} \frac{B_n}{n^2} = 0$ where, $B_n = Var(X_1 + X_2 + \cdots + X_n)$

[Option ID = 17144]

4. $E(X_k)$ should exist

[Option ID = 17145]

Correct Answer :-

- $E(|X_k|^{1+\delta})$ exists for some $\delta > 0$

[Option ID = 17144]

23) Which of the following statement is correct about the sequence of i.i.d. Cauchy variates having p.d.f. $f(x) = \frac{1}{\pi(1+x)^2}, -\infty < x < \infty$

[Question ID = 4288]

1. WLLN does not hold but CLT holds [Option ID = 17146]
2. CLT does not hold but WLLN holds [Option ID = 17147]
3. Both WLLN and CLT do not hold [Option ID = 17148]
4. Both WLLN and CLT hold [Option ID = 17149]

Correct Answer :-

- Both WLLN and CLT do not hold [Option ID = 17148]

24) Let $X_k, k = 1,2,\ldots,n$ be pairwise independent random variables taking two values k and -k with equal probabilities.

Choose the correct statement

[Question ID = 4289]

1. WLLN does not hold for the sequence $\{X_k\}$

[Option ID = 17150]

2. WLLN holds for the sequence $\{X_k\}$

[Option ID = 17151]

3. WLLN holds if K=1

[Option ID = 17152]

4. WLLN can not be examined

[Option ID = 17153]

Correct Answer :-

- WLLN does not hold for the sequence $\{X_k\}$

[Option ID = 17150]

25) Let $f(x,y) = e^{-(x+y)}, 0 < x < \infty, 0 < y < \infty$. The value of $P[X < Y | X < 2Y]$ is

[Question ID = 4290]

1. $\frac{3}{4}$

[Option ID = 17154]

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

[Option ID = 17155]

3. $\frac{1}{3}$

[Option ID = 17156]

4. 1 [Option ID = 17157]

Correct Answer :-

- $\frac{3}{4}$

[Option ID = 17154]

26) Which of the following is NOT true?

[Question ID = 4291]

1. riance matrix of X is a square matrix

[Option ID = 17158]

2. riance matrix of X is a symmetric matrix

[Option ID = 17159]

3. Covariance matrix of $\underset{\sim}{X}$ and $\underset{\sim}{Y}$ is a square matrix

[Option ID = 17160]

4. Covariance matrix of $\underset{\sim}{X}$ and $\underset{\sim}{Y}$ is the transpose of covariance matrix of $\underset{\sim}{Y}$ and $\underset{\sim}{X}$

[Option ID = 17161]

Correct Answer :-

- Covariance matrix of $\underset{\sim}{X}$ and $\underset{\sim}{Y}$ is a square matrix

[Option ID = 17160]

27) If $\underset{\sim}{X} \sim N_p(\underset{\sim}{\mu}, \Sigma)$, then $(\underset{\sim}{X} - \underset{\sim}{\mu})^T \Sigma^{-1} (\underset{\sim}{X} - \underset{\sim}{\mu})$ follows

[Question ID = 4292]

1. Wishart distribution

[Option ID = 17162]

2. χ^2 distribution

[Option ID = 17163]

3. Hotelling's T^2 distribution

[Option ID = 17164]

4. None of these

[Option ID = 17165]

Correct Answer :-

- χ^2 distribution

[Option ID = 17163]

28) **If** $\underset{\sim}{X} \sim N_2(\underset{\sim}{0}, \Sigma)$, where $\Sigma = \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}$. **For what value of** ρ, $X_1 + X_2$ **and** $X_1 - X_2$ **are independent?**

[Question ID = 4293]

1. 1

[Option ID = 17166]

2. 2

[Option ID = 17167]

3. 0

[Option ID = 17168]

4. -1

[Option ID = 17169]

Correct Answer :-

- 0

[Option ID = 17168]

29) Which of the following technique helps to assign objects to one of the groups among a number of groups?

[Question ID = 4294]

1. Discriminant analysis

[Option ID = 17170]

2. Principal component analysis

[Option ID = 17171]

3. Factor analysis

[Option ID = 17172]

4. None of these

[Option ID = 17173]

Correct Answer :-

- Discriminant analysis

[Option ID = 17170]

30) **If** $Y_{3\times1} \sim N_3(\mu, \Sigma)$, **with** $\mu = \begin{bmatrix} 2 \\ -1 \end{bmatrix}, \Sigma = \begin{bmatrix} 3 & 1 & -2 \\ 1 & 1 & 4 \end{bmatrix}$, **then the joint distribution of** Y_1, Y_3 **and** $\frac{1}{2}(Y_1 + Y_2)$ **is**

[Question ID = 4295]

1. $N_3\left(\begin{bmatrix}2\\1\\0.5\end{bmatrix},\begin{bmatrix}3&-1&2\\-1&2&1\\2&1&1\end{bmatrix}\right)$

   [Option ID = 17174]
2. $N_3\left(\begin{bmatrix}2\\3\\0.5\end{bmatrix},\begin{bmatrix}3&-2&2.0\\-2&2&1.0\\2.0&1.5&1.5\end{bmatrix}\right)$

   [Option ID = 17175]
3. $N_3\left(\begin{bmatrix}2\\3\\0.5\end{bmatrix},\begin{bmatrix}3&-2&2.0\\-2&2&1.0\\2&1&1.5\end{bmatrix}\right)$

   [Option ID = 17176]
4. None of these

   [Option ID = 17177]

Correct Answer :-

- $N_3\left(\begin{bmatrix}2\\3\\0.5\end{bmatrix},\begin{bmatrix}3&-2&2.0\\-2&2&1.0\\2&1&1.5\end{bmatrix}\right)$

  [Option ID = 17176]

31) Let $X_1, X_2, \ldots\ldots, X_n$ be a random sample from a distribution with finite mean μ. Consider an estimator $T = \bar{X}^2$ for estimating μ^2. Which of the following statement is true?

[Question ID = 4296]

1. T is unbiased and consistent

   [Option ID = 17178]
2. T is neither unbiased nor consistent

   [Option ID = 17179]
3. T is biased but consistent

   [Option ID = 17180]
4. T is unbiased but not consistent

   [Option ID = 17181]

Correct Answer :-

- T is biased but consistent

  [Option ID = 17180]

32) Let $X_1, X_2, \ldots\ldots, X_n$ be a random sample from U(-θ,0) distribution. Maximum likelihood estimator of θ is

[Question ID = 4297]

1. $X_{(n)}$, the nth order statistic

   [Option ID = 17182]
2. $-\bar{X}$

   [Option ID = 17183]
3. $X_{(1)}$, the first order statistic

   [Option ID = 17184]
4. $-X_{(1)}$

   [Option ID = 17185]

Correct Answer :-

- $-X_{(1)}$

  [Option ID = 17185]

33) Let $X_1, X_2, \ldots, X_n$ be i.i.d $N(\mu, \sigma^2)$, both μ and σ^2 unknown. Which of the following is a minimal sufficient statistic for (μ, σ^2)?

[Question ID = 4298]

1. $(\bar{X}, s^2)$, where $s^2 = \frac{1}{n}\sum_{i=1}^{n}(X_i - \bar{X})^2$

[Option ID = 17186]

2. $(\bar{X}, S^2)$, where $S^2 = \frac{1}{n-1}\sum_{i=1}^{n}(X_i - \bar{X})^2$

[Option ID = 17187]

3. $(\sum_{i=1}^{n} X_i, \sum_{i=1}^{n} X_i^2)$

[Option ID = 17188]

4. All of these

[Option ID = 17189]

Correct Answer :-

- All of these

[Option ID = 17189]

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34) Which of the following tests can be considered as a non-parametric equivalent of one-way repeated measures ANOVA?
[Question ID = 4299]

1. Kruskal-Wallis test [Option ID = 17190]
2. Mann-Whitney U test [Option ID = 17191]
3. Friedman test [Option ID = 17192]
4. Kolmogorov-Smirnov test [Option ID = 17193]

Correct Answer :-

- Friedman test [Option ID = 17192]

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35) Consider a random sample of size 3 from an exponential distribution with mean θ. Let the critical region for testing $H_0: \theta = 2 \; against \; H_1: \theta = 1$ be defined as, $W = \{\underline{x}: x_1 + x_2 + x_3 \geq 9.5\}$.

Then, the size of the critical region and the power of the test will be, respectively?

[Question ID = 4300]

1. $P[Y \geq 9.5], P[Y \geq 19]; where \; Y \sim \chi^2_{(6)}$

[Option ID = 17194]

2. $P[Y \geq 9.5], P[Y \geq 19]; where \; Y \sim \chi^2_{(3)}$

[Option ID = 17195]

3. $P[Y \geq 9.5], P[Y \geq 19]; where \; Y \sim \exp(3)$

[Option ID = 17196]

4. $P[Y \geq 9.5], P[Y \geq 19]; where \; Y \sim \exp(6)$

[Option ID = 17197]

Correct Answer :-

- $P[Y \geq 9.5], P[Y \geq 19]; where \; Y \sim \chi^2_{(6)}$

[Option ID = 17194]

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36) If X be a negative binomial random variable with parameters *n* and *p*, then for *n*=1, X will become:

[Question ID = 4301]

1. Geometric random variable

[Option ID = 17198]

2. Bernoulli random variable

[Option ID = 17199]

3. Binomial random variable

[Option ID = 17200]

4. Poisson random variable

[Option ID = 17201]

Correct Answer :-

- Geometric random variable

[Option ID = 17198]

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37) What is the minimum sample size necessary in order that we may conclude that a correlation coefficient of 0.32 is significantly greater than zero at a 0.05 level?

[Given $t_{(0.95)}$ = 1.71 (approx.) for 24, 25 and 26 degrees of freedom]

[Question ID = 4302]

[Option ID = 17203]

3. n=26

[Option ID = 17204]

4. n=24

[Option ID = 17205]

Correct Answer :-

- n=28

[Option ID = 17203]

38) Let X be a random variable/vector with sample space χ ⊆ Rq and probability model P_θ. The class of probability models $\boldsymbol{P} = \{P_\theta, \theta \in \Theta\}$ is a one-parameter exponential family with the density/pmf function as :

$$p(x|\theta) = h(x)\exp\{\vartheta(\theta)T(x) - B(\theta)\}$$

here

$h: \chi \to R$

$\vartheta: \Theta \to R$

$B: \Theta \to R$

then for what value of $B(\theta)$ the above pmf will have Binomial distribution?

[Question ID = 4303]

1. $B(\theta) = 1 - \log(\theta)$

[Option ID = 17206]

2. $B(\theta) = +n\log(1-\theta)$

[Option ID = 17207]

3. $B(\theta) = \frac{1}{\log(\theta)}$

[Option ID = 17208]

4. $B(\theta) = -\mathrm{n}\log(1-\theta)$

[Option ID = 17209]

Correct Answer :-

- $B(\theta) = -\mathrm{n}\log(1-\theta)$

[Option ID = 17209]

39) Suppose that dependent variable Y regressed on four regressor variables and a constant. The following information is available:

Number of observations = 30

Total sum of squares (SST) = 400

Sum of Squared Errors (SSE) = 100

Then an unbiased estimate of σ^2 and the value of R^2 are:

[Question ID = 4304]

1. 4 and 0.75

[Option ID = 17210]

2. 4 and 0.70

[Option ID = 17211]

3. 3 and 0.75

[Option ID = 17212]

4. 4 and 0.87

[Option ID = 17213]

Correct Answer :-

- 4 and 0.75

[Option ID = 17210]

40) Which of the following step / assumption in regression modeling impacts the trade-off between under-fitting and over-

the most?
ion ID = 4305]
1. when we learn the weights by matrix inversion or gradient descent [Option ID = 17214]
2. the use of Kernel [Option ID = 17215]
3. the use of a constant-term [Option ID = 17216]
4. the polynomial degree [Option ID = 17217]

Correct Answer :-
- the polynomial degree [Option ID = 17217]

41) Let *N* denote the incidence matrix of a BIBD with parameters $v,\ b,\ r,\ k$ and λ, then the off-diagonal entries of *NN'* are all equal to

[Question ID = 4306]
1. r

   [Option ID = 17218]
2. k

   [Option ID = 17219]
3. λ

   [Option ID = 17220]
4. v

   [Option ID = 17221]

Correct Answer :-
- λ

  [Option ID = 17220]

42) Consider a 2^5 factorial experiment conducted in four blocks of size 8 each. If some of the elements of the key block are: (1), cd, abd, ae, bde, the other elements are

[Question ID = 4307]
1. abe, abde, bd

   [Option ID = 17222]
2. abc, acde, ce

   [Option ID = 17223]
3. abc, acde, bce

   [Option ID = 17224]
4. abe, acde, bce

   [Option ID = 17225]

Correct Answer :-
- abc, acde, bce

  [Option ID = 17224]

43) For a 3^3 factorial experiment, the entries of the key block in a replicate are: (1), bc^2, b^2c, ac^2, a^2c, ab^2, a^2b, abc, $a^2b^2c^2$. The confounded effect is

[Question ID = 4308]
1. ab^2c^2 [Option ID = 17226]
2. abc [Option ID = 17227]
3. ab^2c [Option ID = 17228]
4. abc^2 [Option ID = 17229]

Correct Answer :-
- abc [Option ID = 17227]

44) For a 2^6 factorial experiment conducted in 2^3 blocks of size 2^3each, the total number of confounded effects is:

[Question ID = 4309]
1. 3

   [Option ID = 17230]
2. 7

   [Option ID = 17231]
3. 5

   [Option ID = 17232]
4. None of these

[Option ID = 17233]

Answer :-

- 7

[Option ID = 17231]

45) **In construction of a 2^{5-2} fractional factorial design, the generators $D = AB \text{ and } E = ABC$ are used. The alias set corresponding to the factorial effect BC is**

[Question ID = 4310]

1. $BC = ACD = ACE = BDE$

[Option ID = 17234]

2. $BC = AD = ACE = BDE$

[Option ID = 17235]

3. $BC = ACD = AE = BDE$

[Option ID = 17236]

4. $BC = ACD = AE = DE$

[Option ID = 17237]

Correct Answer :-

- $BC = ACD = AE = BDE$

[Option ID = 17236]

46) **Consider a population of NM elements grouped into N first stage units and M second stage units. A sample of n first stage units is selected. If n = N, this corresponds to**

[Question ID = 4311]

1. Cluster sampling

[Option ID = 17238]

2. SRSWOR

[Option ID = 17239]

3. Stratified sampling

[Option ID = 17240]

4. None of these

[Option ID = 17241]

Correct Answer :-

- Stratified sampling

[Option ID = 17240]

47) **Consider a population of N units divided into two classes – response class (units that respond at first attempt) and non-response class (units that do not respond). n_1 is the simple random sample of respondents drawn from the response class and n_2 is a simple random sample drawn from the non- response class. $n_2 = h_2 f$, where h_2 is the sub sample from the n_2 non-respondents. If S_2^2 is the population mean square for the non response class, variance of the unbiased estimator $\overline{y_w}$ of the population mean $\bar{Y}$ of variable of interest proposed by Hansen and Hurwitz is:**

[Question ID = 4312]

1. $\frac{(f-1)}{n}\frac{n_2}{N}S_2^2$

[Option ID = 17242]

2. $\left(\frac{1}{n}-\frac{1}{N}\right)S^2+\frac{(1-f)}{n}\frac{n_2}{N}S_2^2$

[Option ID = 17243]

3. $\frac{(f-1)}{n}\frac{N_2}{N}S_2^2$

[Option ID = 17244]

4. $\left(\frac{1}{n}-\frac{1}{N}\right)S^2+\frac{(f-1)}{n}\frac{N_2}{N}S_2^2$

[Option ID = 17245]

Correct Answer :-

- $\left(\frac{1}{n}-\frac{1}{N}\right)S^2+\frac{(f-1)}{n}\frac{N_2}{N}S_2^2$

[Option ID = 17245]

pps sampling unit has a higher chance of being included in the sample than a unit _____ than it.

[Question ID = 4313]

1. Greater

   [Option ID = 17246]
2. Smaller

   [Option ID = 17247]
3. Proportional

   [Option ID = 17248]
4. None of these

   [Option ID = 17249]

Correct Answer :-

- Smaller

  [Option ID = 17247]

49) In cluster sampling with unequal clusters, the estimator of the population mean based on simple arithmetic mean of cluster means

[Question ID = 4314]

1. Is unbiased if there is no correlation between cluster mean and cluster size [Option ID = 17250]
2. Is unbiased if there is positive correlation between cluster mean and cluster size [Option ID = 17251]
3. Is unbiased if there is negative correlation between cluster mean and cluster size [Option ID = 17252]
4. Is always unbiased [Option ID = 17253]

Correct Answer :-

- Is unbiased if there is no correlation between cluster mean and cluster size [Option ID = 17250]

50) For estimating loss of forest cover, a scientist wants to estimate the number of dead trees in a 500 acre of forest area. For this, the area is subdivided into 100 plots of equal size. By using photo count as an auxiliary variable, the number of dead trees in a random sample of 10 of these plots is calculated to be 150. The scientist subsequently selects 5 plots out of these 10 plots. The photo count from these 5 plots is 70 while the actual count is 110. The ratio estimate of the population total is:

[Question ID = 4315]

1. 2355 trees [Option ID = 17254]
2. 2357 trees [Option ID = 17255]
3. 2250 trees [Option ID = 17256]
4. 2350 trees [Option ID = 17257]

Correct Answer :-

- 2357 trees [Option ID = 17255]