DU MA MSc Statistics

Topic:- DU_J18_MA_STATS_Topic01

1) In analysis of variance problem involving 3 treatments with 10 observations each, SSE= 399.6. Then the MSE is equal to: [Question ID = 2313]

1. 14.8 [Option ID = 9252]
2. 133.2 [Option ID = 9249]
3. 30 [Option ID = 9251]
4. 13.32 [Option ID = 9250]

Correct Answer :-

- 14.8 [Option ID = 9252]

2) If the variability due to chance decreases, the value of F: [Question ID = 2309]

1. Decreases [Option ID = 9234]
2. Stay the same [Option ID = 9235]
3. Increases [Option ID = 9233]
4. Nothing can be said from given information [Option ID = 9236]

Correct Answer :-

- Increases [Option ID = 9233]

3) If an unbiased coin is flipped till a first Head occurs, then the sample space is: [Question ID = 2284]

1. $\{H, TH\}$ [Option ID = 9135]
2. $\{H, TH, TTH, TTTH, ...\}$ [Option ID = 9136]
3. $\{TH\}$ [Option ID = 9134]
4. $\{H\}$ [Option ID = 9133]

Correct Answer :-

- $\{H, TH, TTH, TTTH, ...\}$ [Option ID = 9136]

4) The listing of elements in population with distinct identifiable number is classified as: [Question ID = 2305]

1. Regularity experimental frame [Option ID = 9219]
2. Frame for experiment [Option ID = 9220]
3. Direct experimental frame [Option ID = 9217]
4. Indirect experimental frame [Option ID = 9218]

Correct Answer :-

- Frame for experiment [Option ID = 9220]

5) When there is rough linearity between the principal variable Y and the auxiliary variable X, but there is no proportionality, the link between Y and X can be exploited to improve simple random sample estimator by using:

[Question ID = 2307]

1. Both Ratio estimator and Regression estimator [Option ID = 9227]
2. Combined estimator [Option ID = 9228]
3. Regression estimator [Option ID = 9226]
4. Ratio estimator [Option ID = 9225]

Correct Answer :-

- Regression estimator [Option ID = 9226]

6) In LSD with 5 treatments and one missing plot, the error degrees of freedom is: [Question ID = 2310]

1. 15 [Option ID = 9238]

2. 11 [Option ID = 9239]
3. 12 [Option ID = 9240]
4. 16 [Option ID = 9237]

Correct Answer :-

- 11 [Option ID = 9239]

7) In the context of characteristic function of a random variable, which one of the following statements is false? [Question ID = 2293]

1. It always exists. [Option ID = 9169]
2. It is uniformly continuous on R. [Option ID = 9170]
3. It is not independent of change of origin and scale. [Option ID = 9171]
4. If characteristic function of sum of two random variables is same as the product of their individual characteristic functions, then the variables are independent. [Option ID = 9172]

Correct Answer :-

- If characteristic function of sum of two random variables is same as the product of their individual characteristic functions, then the variables are independent. [Option ID = 9172]

8) The area under a normal curve between one standard deviation on either side of the mean is: [Question ID = 2285]

1. 95% [Option ID = 9138]
2. 68% [Option ID = 9139]
3. 60% [Option ID = 9140]
4. 99% [Option ID = 9137]

Correct Answer :-

- 68% [Option ID = 9139]

9) In case of two attributes A and B if (A) = 30, (B) = 40, N = 200, then for A and B to be negatively associated the frequency of the class AB will be:

[Question ID = 2289]

1. $0 < (AB) < 6$ [Option ID = 9155]
2. $(AB) = 6$ [Option ID = 9154]
3. $(AB) = 0$ [Option ID = 9153]
4. $(AB) > 6$ [Option ID = 9156]

Correct Answer :-

- $0 < (AB) < 6$ [Option ID = 9155]

10) Suppose that there is a chance for a newly constructed building to collapse, whether the design is faulty or not. The chance that the design is faulty is 10%. The chance that the building collapses is 95% if the design is faulty and otherwise it is 45%. If it is seen that the building has collapsed, then the probability that it is due to faulty design is: [Question ID = 2277]

1. 0.95 [Option ID = 9108]
2. 0.19 [Option ID = 9106]
3. 0.45 [Option ID = 9107]
4. 0.1 [Option ID = 9105]

Correct Answer :-

- 0.19 [Option ID = 9106]

11) If ANOVA procedure is applied to the data obtained from 5 samples, where each sample contains 9 observations, then the degrees of freedom for critical value of F are: [Question ID = 2312]

1. 5 and 9 [Option ID = 9245]
2. 4and 44 [Option ID = 9247]
3. 4 and 40 [Option ID = 9248]
4. 4 and 8 [Option ID = 9246]

Correct Answer :-

- 4 and 40 [Option ID = 9248]

12) The ages of 7 family members are 2, 5, 12, 18, 38, 40 and 60 years respectively. After 5 years a new member aged x years is added. If the mean age of the family now goes up by 1.5 years, then the value of x (in years) is: [Question ID = 2287]

1. 2 [Option ID = 9146]
2. 1 [Option ID = 9145]

3. 3 [Option ID = 9147]
4. 4 [Option ID = 9148]

Correct Answer :-

- 2 [Option ID = 9146]

13) Consider the 2^3 factorial experiment in blocks of 4 plots, involving three fertilizers N, P, and K each at two levels.

	Replicate I		Replicate II		Replicate III
Block 1	np, npk,(1),k	Block 3	pk, nk, (1), np	Block 5	(1), npk, nk, p
Block 2	p, n, pk, nk	Block 4	np, npk, p, k	Block 6	n, npk, p ,k

[Question ID = 2311]

1. NK, NPK, PK [Option ID = 9244]
2. PK, NPK,PN [Option ID = 9243]
3. NP, NK, PK [Option ID = 9241]
4. NP, NPK, NK [Option ID = 9242]

Correct Answer :-

14) An urn contains 3 white and 4 black balls. A ball is drawn at random, its colour is noted and returned to urn along with two additional balls of the same colour. If a ball is drawn again from the urn, then the probability that the ball drawn is white, is:

[Question ID = 2274]

1. $\frac{5}{9}$ [Option ID = 9094]
2. $\frac{3}{9}$ [Option ID = 9093]
3. $\frac{3}{7}$ [Option ID = 9095]
4. $\frac{4}{7}$ [Option ID = 9096]

Correct Answer :-

- $\frac{3}{7}$ [Option ID = 9095]

15) Let $A = \left(a_{ij}\right)$, where $a_{ij} = \begin{cases} 1, & i+j, \text{is even} \\ -1 & i+j, \text{is odd} \end{cases}$, be a square matrix of order $2k \times 2k$ and B be a column vector of order $2k \times 1$ with all elements as unity. Then the value of $B'AB$ is:

[Question ID = 2273]

1. 0 [Option ID = 9089]
2. $2k-1$ [Option ID = 9091]
3. $4k^2$ [Option ID = 9092]
4. $2k^2$ [Option ID = 9090]

Correct Answer :-

- 0 [Option ID = 9089]

16) Let X be a single observation from truncated Poisson distribution having probability mass function $P(X=x)=\frac{e^{-\theta}\theta^{x}}{x!\left(1-e^{-\theta}\right)}$; $x=1, 2, 3, \ldots$. The estimator $T=\begin{cases}2, & x=1,3,5,\ldots\\ 0, & x=2,4,6,\ldots\end{cases}$ is unbiased for:

[Question ID = 2302]

1. $1+e^{-\theta}$ [Option ID = 9208]
2. $\frac{1-e^{-\theta}-e^{-2\theta}}{1-e^{-\theta}}$ [Option ID = 9205]
3. $\frac{1-e^{-2\theta}}{1-e^{-\theta}}$ [Option ID = 9206]
4. $\frac{1-2e^{-\theta}}{1-e^{-\theta}}$ [Option ID = 9207]

Correct Answer :-

- $1+e^{-\theta}$ [Option ID = 9208]
- $\frac{1-e^{-2\theta}}{1-e^{-\theta}}$ [Option ID = 9206]

17) If v_r is the absolute moment of order r about origin zero of a distribution, then:

[Question ID = 2281]

1. $v_r^{2r}=v_{r-1}^{r}v_{r+1}^{r}$ [Option ID = 9121]
2. none of the above [Option ID = 9124]
3. $v_r^{2r}\geq v_{r-1}^{r}v_{r+1}^{r}$ [Option ID = 9122]
4. $v_r^{2r}\leq v_{r-1}^{r}v_{r+1}^{r}$ [Option ID = 9123]

Correct Answer :-

- $v_r^{2r}\leq v_{r-1}^{r}v_{r+1}^{r}$ [Option ID = 9123]

18) Suppose that the five random variables $X_1, X_2, \ldots, X_5$ are independent and each has standard normal distribution. A constant c such that the random variable $\frac{c(X_1+X_2)}{\left(X_3^2+X_4^2+X_5^2\right)^{1/2}}$ will have a t-distribution has value:

[Question ID = 2283]

1. $\frac{3}{2}$ [Option ID = 9131]
2. $\sqrt{\frac{3}{2}}$ [Option ID = 9130]

3. $\sqrt{\frac{2}{3}}$ [Option ID = 9132]

4. $\frac{\sqrt{3}}{2}$ [Option ID = 9129]

Correct Answer :-

- $\sqrt{\frac{3}{2}}$ [Option ID = 9130]

19) The two candidates A and B for the presidentship of a Students' Union were asked to rank 4 issues in the order of their perceived importance. Their responses are listed besides the issues.

ISSUE	Ranking by candidates	
	A	B
Crime against girl students	1	2
Corruption in sports	4	3
Education system	3	4
Unemployment	2	1

Based on this data, Spearman's Rank Correlation Coefficient is:

[Question ID = 2291]

1. $\frac{1}{5}$ [Option ID = 9161]

2. $\frac{3}{5}$ [Option ID = 9163]

3. $\frac{4}{5}$ [Option ID = 9164]

4. $\frac{2}{5}$ [Option ID = 9162]

Correct Answer :-

- $\frac{3}{5}$ [Option ID = 9163]

20) If A is non-singular matrix of order 4×4 and determinant of Adj(A) is 4 then the value of $|2\text{Adj}(3A)|$ is:

[Question ID = 2269]

1. $\left(3\sqrt{2}\right)^{12}$ [Option ID = 9074]

2. $\left(2\sqrt{2}\right)^{12}$ [Option ID = 9073]

3. 3^{12} [Option ID = 9075]
4. 2^{12} [Option ID = 9076]

Correct Answer :-

- $\left(3\sqrt{2}\right)^{12}$ [Option ID = 9074]

21) Nine elements of which 4 are of one kind and 5 are of a different kind are arranged in a sequence. If R is the number of runs, then $P(R=2)$ is equal to:

[Question ID = 2280]

1. $\frac{1}{126}$ [Option ID = 9118]
2. $\frac{1}{63}$ [Option ID = 9117]
3. $\frac{1}{56}$ [Option ID = 9119]
4. $\frac{1}{42}$ [Option ID = 9120]

Correct Answer :-

- $\frac{1}{63}$ [Option ID = 9117]

22) Let X be a random variable with probability density function $f \in \left(f_0, f_1\right)$, where $f_0(x)=\begin{cases}2x, & 0<x<1\\ 0, & \text{otherwise.}\end{cases}$, $f_1(x)=\begin{cases}4x^3, & 0<x<1\\ 0, & \text{otherwise.}\end{cases}$ and $W_0=\{x : x>c\}$ is the rejection region for testing null hypothesis $H_0 : f = f_0$ against $H_1 : f = f_1$, with level of significance α. Then power of the most powerful test is:

[Question ID = 2298]

1. $\alpha-2\alpha^2$ [Option ID = 9191]
2. $2\alpha-\alpha^2$ [Option ID = 9189]
3. $2(\alpha-\alpha^2)$ [Option ID = 9192]
4. $\alpha-\alpha^2$ [Option ID = 9190]

Correct Answer :-

- $2\alpha-\alpha^2$ [Option ID = 9189]

23) The estimator T_o is MVU estimator for $\gamma(\theta)$ and T_1 is any other unbiased estimator for $\gamma(\theta)$ with efficiency 0.0169, then correlation between T_o and T_1 is:

[Question ID = 2300]

1. 0.013 [Option ID = 9197]
2. 0.5 [Option ID = 9200]
3. 0.13 [Option ID = 9198]

4. 0.0169 [Option ID = 9199]

Correct Answer :-

- 0.13 [Option ID = 9198]

24) Let X follows exponential distribution with mean θ. For testing the null hypothesis $H_0 : \theta = 3$ against $H_1 : \theta = 5$, a test gives rejection region $W_0 = \{x, x \geq 4.5\}$. The size of the type – II error is:

[Question ID = 2299]

1. e^{-20} [Option ID = 9196]
2. $1 - e^{-20}$ [Option ID = 9194]
3. $1 - e^{-4.5}$ [Option ID = 9193]
4. $e^{-9/2}$ [Option ID = 9195]

Correct Answer :-

25) The area enclosed by curves $y^2 = x$, $y^2 = 3x - 1$ where $0 \leq x \leq \frac{1}{2}$ is:

[Question ID = 2267]

1. $\frac{\sqrt{2}}{3}$ [Option ID = 9066]
2. $\frac{2}{9}$ [Option ID = 9068]
3. $\frac{\sqrt{2}}{9}$ [Option ID = 9065]
4. $\frac{2\sqrt{2}}{9}$ [Option ID = 9067]

Correct Answer :-

- $\frac{2\sqrt{2}}{9}$ [Option ID = 9067]

26) If A is a 3×3 matrix with Given values - 1, 0 and 1 then value of 6A is:

[Question ID = 2265]

1. $\begin{bmatrix} -1 & 5 & 2 \\ 5 & -1 & 2 \\ 2 & 2 & 2 \end{bmatrix}$ [Option ID = 9060]
2. $\begin{bmatrix} 1 & 5 & 3 \\ 5 & 1 & 3 \\ 3 & 1 & 5 \end{bmatrix}$ [Option ID = 9058]

3. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 4 \\ 0 & 0 & 1 \end{bmatrix}$ [Option ID = 9059]

4. $\begin{bmatrix} -3 & 9 & 0 \\ 9 & -3 & 0 \\ 0 & 0 & 7 \end{bmatrix}$ [Option ID = 9057]

Correct Answer :-

27) Let $x_1 = 2.4, x_2 = 9.2, x_3 = 5.2, x_4 = 4.1, x_5 = 2.1$ and $x_6 = 3.1$ be the observed values of a random variable of size 6 from uniform distribution with parameters $(\theta - 2, \theta + 6)$ where $\theta > 0$ is unknown, then MLE of θ is:

[Question ID = 2295]

1. 3.5 [Option ID = 9178]
2. 4.5 [Option ID = 9179]
3. 9.2 [Option ID = 9180]
4. 2.5 [Option ID = 9177]

Correct Answer :-

- 3.5 [Option ID = 9178]

28) Let $X_1, X_2, ..., X_n$ be a random sample from Cauchy distribution with location parameter θ and scale parameter 1. The Cramer Rao lower bound for unknown parameter θ, is:

[Question ID = 2303]

1. $2/n$ [Option ID = 9212]
2. $4/n$ [Option ID = 9211]
3. $1/n$ [Option ID = 9209]
4. $3/n$ [Option ID = 9210]

Correct Answer :-

- $2/n$ [Option ID = 9212]

29) Suppose that p(x, y), the joint probability mass function (p.m.f.) of discrete random variables X and Y, is given by:

$$p(0,0) = 0.4, \quad p(0,1) = 0.2, \quad p(1,0) = 0.1, \quad p(1,1) = 0.3.$$

Then the conditional p.m.f. of X, given that Y=1, is:

[Question ID = 2290]

1. $p_{X|Y}(0|1) = \frac{3}{5}, p_{X|Y}(1|1) = \frac{2}{5}$ [Option ID = 9160]
2. $p_{X|Y}(0|1) = \frac{2}{5}, p_{X|Y}(1|1) = \frac{3}{5}$ [Option ID = 9157]
3. $p_{X|Y}(0|1) = \frac{4}{5}, p_{X|Y}(1|1) = \frac{3}{5}$ [Option ID = 9158]

4. $p_{X|Y}(0|1)=\frac{1}{5}, p_{X|Y}(1|1)=\frac{2}{5}$ [Option ID = 9159]

Correct Answer :-

- $p_{X|Y}(0|1)=\frac{2}{5}, p_{X|Y}(1|1)=\frac{3}{5}$ [Option ID = 9157]

30) The frequency distribution of percentage of marks obtained by a group of 229 students is given below with two missing frequencies marked as f_1 and f_2:

Percentage of marks	No. of students	Percentage of marks	No. of students
10-20	12	50-60	f_2
20-30	30	60-70	25
30-40	f_1	70-80	18
40-50	65		

If the median of the distribution is 46, then the missing values of f_1 and f_2 are:

[Question ID = 2278]

1. $f_1=34, f_2=45$ [Option ID = 9109]
2. $f_1=8, f_2=71$ [Option ID = 9111]
3. $f_1=40, f_2=39$ [Option ID = 9112]
4. $f_1=66, f_2=13$ [Option ID = 9110]

Correct Answer :-

- $f_1=34, f_2=45$ [Option ID = 9109]

31) The equation whose roots are cubes of roots of equation $x^3-x=0$ is:

[Question ID = 2266]

1. $x^3-9x=0$ [Option ID = 9061]
2. $x^3+x=0$ [Option ID = 9063]
3. $x^3-x=0$ [Option ID = 9064]
4. $x^3+x^2+x-1=0$ [Option ID = 9062]

Correct Answer :-

- $x^3-x=0$ [Option ID = 9064]

32) Let $X_1, X_2,...,X_n$ be a random sample of size n from $N(\theta_1, 9\theta_2)$, then the estimate of (θ_1, θ_2) using the method of moments is:

[Question ID = 2296]

1. $\left(\frac{1}{9n}\sum_{i=1}^{n} X_i, \frac{1}{2n}\sum_{i=1}^{n}\left(X_i-\bar{X}\right)^2\right)$ [Option ID = 9183]

2. $\left(\frac{1}{2n}\sum_{i=1}^{n} X_i, \frac{1}{9}\sum_{i=1}^{n} \left(X_i - \bar{X}\right)^2\right)$ [Option ID = 9182]
3. $\left(\frac{1}{9}\sum_{i=1}^{n} X_i, \frac{1}{2n}\sum_{i=1}^{n} \left(X_i - \bar{X}\right)^2\right)$ [Option ID = 9184]
4. $\left(\frac{1}{n}\sum_{i=1}^{n} X_i, \frac{1}{9n}\sum_{i=1}^{n} \left(X_i - \bar{X}\right)^2\right)$ [Option ID = 9181]

Correct Answer :-

- $\left(\frac{1}{n}\sum_{i=1}^{n} X_i, \frac{1}{9n}\sum_{i=1}^{n} \left(X_i - \bar{X}\right)^2\right)$ [Option ID = 9181]

33) If the observations recorded on five sampled items are 3, 4, 5, 6, 7, then the unbiased estimate of the population variance is:

[Question ID = 2276]

1. 0 [Option ID = 9101]
2. 1 [Option ID = 9102]
3. 2 [Option ID = 9103]
4. 2.5 [Option ID = 9104]

Correct Answer :-

- 2.5 [Option ID = 9104]

34) The equation of tangents at origin to the curve $x^2\left(a^2 - x^2\right) = y^2\left(a^2 + x^2\right)$ is:

[Question ID = 2271]

1. $y = \pm ax$ [Option ID = 9084]
2. $y = \pm x$ [Option ID = 9083]
3. $x = \pm ay$ [Option ID = 9081]
4. $y = \pm 2x$ [Option ID = 9082]

Correct Answer :-

- $y = \pm x$ [Option ID = 9083]

35) An urn contains 5 red and 3 black balls. Balls are drawn, one-by-one, with replacement till the 3rd red ball is drawn. The probability that 3rd red ball occurs at the 5th draw is:

[Question ID = 2292]

1. $\frac{5^3}{8^5}$ [Option ID = 9168]
2. $\frac{6.5^3.3^2}{8^5}$ [Option ID = 9165]
3. $\frac{5^3.3^2}{8^5}$ [Option ID = 9166]

4. $\frac{6.5^3}{8^5}$ [Option ID = 9167]

Correct Answer :-

- $\frac{6.5^3.3^2}{8^5}$ [Option ID = 9165]

36) The slope of tangents at double point (x, y) to the curve $f(x,y)=0$ is given by solution of the quadratic equation:

[Question ID = 2272]

1. $\frac{\partial^2 f}{\partial x^2}\left(\frac{dy}{dx}\right)^2+\frac{\partial^2 f}{\partial x\,\partial y}\left(\frac{dy}{dx}\right)+\frac{\partial^2 f}{\partial y^2}=0$ [Option ID = 9087]
2. $\frac{\partial^2 f}{\partial y^2}\left(\frac{dy}{dx}\right)^2+\frac{\partial^2 f}{\partial x\,\partial y}\left(\frac{dy}{dx}\right)+2\frac{\partial^2 f}{\partial x^2}=0$ [Option ID = 9088]
3. $\frac{\partial^2 f}{\partial y^2}\left(\frac{dy}{dx}\right)^2+\frac{\partial^2 f}{\partial x\,\partial y}\left(\frac{dy}{dx}\right)+\frac{\partial^2 f}{\partial x^2}=0$ [Option ID = 9086]
4. $\frac{\partial^2 f}{\partial y^2}\left(\frac{dy}{dx}\right)^2+2\frac{\partial^2 f}{\partial x\,\partial y}\left(\frac{dy}{dx}\right)+\frac{\partial^2 f}{\partial x^2}=0$ [Option ID = 9085]

Correct Answer :-

- $\frac{\partial^2 f}{\partial y^2}\left(\frac{dy}{dx}\right)^2+2\frac{\partial^2 f}{\partial x\,\partial y}\left(\frac{dy}{dx}\right)+\frac{\partial^2 f}{\partial x^2}=0$ [Option ID = 9085]

37) Let $X_1, X_2, ..., X_n$ be a random sample of size n from $N(\theta, \sigma^2)$, σ^2 is known, then pivotal statistics used to find $100(1-\alpha)\%$ confidence interval for θ is:

[Question ID = 2297]

1. $2(\bar{X}-\theta)$ [Option ID = 9185]
2. $\frac{X_{(n)}-\theta}{\sigma}$ [Option ID = 9187]
3. $\frac{X_{(1)}-\theta}{\sigma}$ [Option ID = 9188]
4. $\frac{\sqrt{n}(\bar{X}-\theta)}{\sigma}$ [Option ID = 9186]

Correct Answer :-

- $\frac{\sqrt{n}(\bar{X}-\theta)}{\sigma}$ [Option ID = 9186]

38) The variance of unbiased estimator T of θ satisfy:

[Question ID = 2301]

1. $V_\theta(T) \geq \frac{1}{n E\left(\frac{\partial^2 \log L}{\partial \theta^2}\right)}$ [Option ID = 9203]

2. $V_\theta(T) \geq \frac{1}{-n E\left(\frac{\partial^2 \log L}{\partial \theta^2}\right)}$ [Option ID = 9202]

3. $V_\theta(T) \geq \frac{1}{n E\left(\frac{\partial \log L}{\partial \theta}\right)}$ [Option ID = 9204]

4. $V_\theta(T) \geq \frac{1}{-E\left(\frac{\partial^2 \log L}{\partial \theta^2}\right)}$ [Option ID = 9201]

Correct Answer :-

- $V_\theta(T) \geq \frac{1}{-E\left(\frac{\partial^2 \log L}{\partial \theta^2}\right)}$ [Option ID = 9201]

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39) If the correlation coefficient between two variables X and Y is 0.6, then the correlation coefficient between two new variables

$$U = \frac{X+6}{6} \text{ and } V = \frac{Y-6}{-6}$$

is:

[Question ID = 2286]

1. 0.6 [Option ID = 9143]
2. -0.1 [Option ID = 9142]
3. -0.6 [Option ID = 9144]
4. 0.1 [Option ID = 9141]

Correct Answer :-

- -0.6 [Option ID = 9144]

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40) If $R = \frac{\sum_{i=1}^{n}(x_i - A)^2}{\sum_{i=1}^{n}(x_i - \bar{x})^2}$, $A \neq \bar{x}$, then R is:

[Question ID = 2279]

1. < 1 [Option ID = 9113]
2. $\neq 1$ [Option ID = 9116]
3. 1 [Option ID = 9115]
4. > 1 [Option ID = 9114]

Correct Answer :-

- > 1 [Option ID = 9114]

41) If the area (under a normal density curve) to the left of the point x_1 is 0.4 and to the right of the point x_2 is 0.3, then x_1 and x_2 are such that:

[Question ID = 2288]

1. none of these [Option ID = 9152]
2. $x_1 < x_2$ [Option ID = 9149]
3. $x_1 = x_2$ [Option ID = 9151]
4. $x_1 > x_2$ [Option ID = 9150]

Correct Answer :-

- $x_1 < x_2$ [Option ID = 9149]

42) The solution of the linear differential equation $2e^{3x}\frac{dy}{dx} = 3e^{2y}$ with $y(0) = 0$ is:

[Question ID = 2268]

1. $e^{3x} - e^{-2y} = 0$ [Option ID = 9070]
2. $e^{3x} + e^{2y} = 0$ [Option ID = 9072]
3. $e^{3x} - e^{2y} = 0$ [Option ID = 9071]
4. $e^{-3x} - e^{2y} = 0$ [Option ID = 9069]

Correct Answer :-

- $e^{3x} - e^{2y} = 0$ [Option ID = 9071]

43) An urn contains 2 white and 3 red balls. 15 balls are drawn one-by-one with replacement. The standard deviation of the number of white balls drawn is:

[Question ID = 2282]

1. 1 [Option ID = 9125]
2. $\sqrt{3.6}$ [Option ID = 9128]
3. 2 [Option ID = 9126]
4. 3.6 [Option ID = 9127]

Correct Answer :-

- $\sqrt{3.6}$ [Option ID = 9128]

44) Variances of the sample mean under simple random sampling (V_{ran}), under stratified sampling with proportional allocation (V_{prop}) and sampling with Neyman allocation (V_{opt}) obey which of the following order:

[Question ID = 2304]

1. $V_{ran} \leq V_{opt} \leq V_{prop}$ [Option ID = 9216]
2. $V_{ran} \leq V_{prop} \leq V_{opt}$ [Option ID = 9215]
3. $V_{opt} \leq V_{ran} \leq V_{prop}$ [Option ID = 9213]

4. $V_{opt} \leq V_{prop} \leq V_{ran}$ [Option ID = 9214]

Correct Answer :-

- $V_{opt} \leq V_{prop} \leq V_{ran}$ [Option ID = 9214]

45) If events A and B are independent, consider the statements:

1. A and B^c are independent
2. A^c and B are independent
3. A^c and B^c are independent

Then:

[Question ID = 2275]

1. only 2 and 3 are true [Option ID = 9099]
2. only 1 is true [Option ID = 9097]
3. all 1, 2, and 3 are true. [Option ID = 9100]
4. only 1 and 2 are true [Option ID = 9098]

Correct Answer :-

- all 1, 2, and 3 are true. [Option ID = 9100]

46) The value of $\lim_{x \to 0} \frac{a^x b^x - b^x - a^x + 1}{x^2}$ is:

[Question ID = 2270]

1. log a log b [Option ID = 9078]
2. $\log \frac{a}{b}$ [Option ID = 9079]
3. 1 [Option ID = 9080]
4. $-\log ab$ [Option ID = 9077]

Correct Answer :-

- log a log b [Option ID = 9078]

47) In a trivariate distribution if $r_{12} = r_{23} = r_{31} = \rho \neq 1$, then the value of $R_{1.23}$ is

[Question ID = 2294]

1. $\rho / \sqrt{1+\rho}$ [Option ID = 9174]
2. $1 / \sqrt{1+\rho}$ [Option ID = 9175]
3. $1 / 1+\rho$ [Option ID = 9176]
4. $\sqrt{2}\ \rho / \sqrt{1+\rho}$ [Option ID = 9173]

Correct Answer :-

- $\sqrt{2}\ \rho \Big/ \sqrt{1+\rho}$ [Option ID = 9173]

48) If $\int_0^\infty e^{-\left(a^2x^2+\frac{b^2}{x^2}\right)}dx = \frac{\sqrt{\pi}}{2a}\ e^{-2ab}$, then value of $\int_0^\infty x^{-2}\ e^{-\left(a^2x^2+\frac{b^2}{x^2}\right)}dx$ is equal to:

[Question ID = 2264]

1. $\frac{\sqrt{\pi}}{2b}e^{-2ab}$ [Option ID = 9054]
2. $\frac{\sqrt{\pi}}{2b}e^{-3ab}$ [Option ID = 9055]
3. $\frac{\sqrt{\pi}}{2b}e^{-4ab}$ [Option ID = 9053]
4. 1 [Option ID = 9056]

Correct Answer :-

- $\frac{\sqrt{\pi}}{2b}e^{-2ab}$ [Option ID = 9054]

49) Interviewing all members of a given population is called: [Question ID = 2306]

1. A census [Option ID = 9223]
2. A statistic [Option ID = 9224]
3. A Neilson audit [Option ID = 9222]
4. A sample [Option ID = 9221]

Correct Answer :-

- A census [Option ID = 9223]

50) Which one of the following statement is correct? [Question ID = 2308]

1. Systematic sampling is more precise than SRSWOR if heterogeneity of the whole population is more than the heterogeneity within systematic sample [Option ID = 9231]
2. If $\rho_{wst} > 0$, then systematic sampling is more precise than stratified sampling [Option ID = 9232]
3. Systematic sampling may always yield unbiased estimates if there are periodic features associated with the sampling interval. [Option ID = 9230]
4. Systematic sampling is not very efficient in the presence of linear trend. [Option ID = 9229]

Correct Answer :-

- Systematic sampling is not very efficient in the presence of linear trend. [Option ID = 9229]