## PU Ph D Statistics

### 1 of 100
160 PU_2015_149
The pdf of the three-parameter Weibull reduces to that of the two parameter exponential distributon, when $\beta$ takes the value:-

- $\beta = 1$
- $\beta > 1$
- $\beta < 1$
- $\beta = 0$

### 2 of 100
162 PU_2015_149
A one year guarantee is given based on assumption that no more than 10% of the items will be returned. Assuming an exponential distribution, what is the maximum failure rate that can be tolerated?

- 0.1054 per year
- 0.2312 per year
- 0.1465 per year
- 0.1271 per year

### 3 of 100
130 PU_2015_149
If $X_1, X_2, \ldots, X_n$ is a random sample from a Uniform distribution over the interval (0, θ), θ >0 then the maximum likelihood estimator of θ is the:-

- Median of the sample
- Mean of the sample
- Biggest sample observation
- Smallest sample observation

### 4 of 100
190 PU_2015_149

$$\text{If } Y = X\beta + \varepsilon \text{ where X is } n \times k+1 \text{ matrix of rank } (k+1) < n \text{ ,then } \hat{\beta} =$$

- $(X'X)^{-1}\sigma^2$
- $(X'X)^{-1}X'Y$
- $(X'X)$
- $(X'X)^{-1}$

**5 of 100**
109 PU_2015_149
Chi-square distribution is the special type of:-

- Pareto distribution
- Weibull distribution
- Erlang distribution
- Rayleigh distribution

**6 of 100**
208 PU_2015_149
The indirect least square method is applied to estimate the coefficients of the:-

- simultaneous equations
- reduced form equations
- structural equations
- linear equations

**7 of 100**
106 PU_2015_149

The rank of the matrix $A=\begin{bmatrix} 1 & 2 & -3 & -2 \\ 1 & 3 & -2 & 0 \\ 3 & 8 & -7 & -2 \\ 2 & 1 & -9 & -10 \end{bmatrix}$ is:-

- 4
- 3
- 2
- 1

**8 of 100**
128 PU_2015_149
A valid t-test to assess an observed difference between two sample mean value requires:-

(i) Both populations are independent.
(ii) the observations to be sampled from normally distributed parent population.
(iii) the variance to be the same for both populations.

- (i) and (ii)
- (ii) and (iii)
- (i) and (iii)
- all the three conditions

**9 of 100**

205 PU_2015_149

Which model leads to get BLUE in estimating the regression model in the presence of heteroscedasticity?

- Two stage regression estimation
- GLS
- MLE
- OLS

**10 of 100**

126 PU_2015_149

A hypothesis is rejected at the level of significance α = 5% by a test. Then which one of the following statements is true regarding the p-value of the test.

- p < 5%
- p > 5%
- p = 5%
- Any one of the above three can be true

**11 of 100**

171 PU_2015_149

Let $y'_{.j}$ be the Total of known values of j$^{th}$ column; $y'_{i.}$ be the Total of known values of i$^{th}$ row; $y'_{..}$ be the Total of all (rt-1) known values; 'r' be the number of blocks and 't' be the number of treatments, then the missing plot in R.B.D is x=

- $\frac{r.y'_{.j}+t.y'_{i.}-y'_{..}}{(r-1)(t-1)}$
- $\frac{r.y'_{.j}-t.y'_{i.}+y'_{..}}{(r-1)(t-1)}$
- $\frac{r.y'_{.j}+t.y'_{i.}-y'_{..}}{(2r-1)(2t-1)}$
- $\frac{r.y'_{.j}+t.y'_{i.}-y'_{..}}{(r+1)(t+1)}$

**12 of 100**

123 PU_2015_149

Let {*Xn*} be a sequence of random variables. *Xn* converges almost surely if and only if:-

- $P(\lim_{n\to\infty} X_n = X) = 1$
- $P(\lim_{n\to\infty} X_n = X) = 0$
- $P(\lim_{n\to\infty} X_n \neq X) = a; 0 < a < 1$
- $P(\lim_{n\to\infty} X_n \neq X) = 1$

## 13 of 100

127 PU_2015_149

If Type-I and Type-II errors are kept fixed, then the power of the test increases:-

- if there is an increase of sample size
- if the test is unbiased
- if sample size remains unchanged
- if there is a decrease of sample size

## 14 of 100

204 PU_2015_149

In Koyck model, the closer the value of λ is to 1, the rate of decline in $\beta_k$ :-

- depends on $\beta_k$
- depends on k
- is faster
- is slower

## 15 of 100

154 PU_2015_149

In M/M/1: ∞/FIFO model, the Average number of customers in the system including the service is equal to:-

- $\rho /(1-\rho)^2$
- $\rho /(1-\rho)$
- $(1-\rho) /\rho$
- $\rho^2 /(1-\rho)$

## 16 of 100

149 PU_2015_149

In the Usual Queue model (A/B/C: E/F), F stands for:-

- Number of Service Channels
- Input/output Processes
- Queue Capacity
- Queue Discipline

**17 of 100**

206 PU_2015_149

The Almon technique of estimating distributed lag model is better than Koyck model because in Koyck model:-

- explanatory variables exhibit multicollinearity
- the lagged explanatory variable form part of the set of explanatory variables creating estimation problem
- the number of lags is decided subjectively
- it is assumed that the beta parameter values decline geometrically

**18 of 100**

132 PU_2015_149

The symmetric variance covariance matrix ∑ will have _____ number of distinct covariances.

- $\frac{p(p+1)}{2}$
- $\frac{(p+1)}{2}$
- $\frac{(p-1)}{2}$
- $\frac{p(p-1)}{2}$

**19 of 100**

209 PU_2015_149

The linearization of a non linear equation is based on the technique of:-

- Hit or miss method
- Taylor's series expansion
- Method of steepest descent
- Direct search method

**20 of 100**

125 PU_2015_149

Critical region of size α which minimizes β amongst all critical regions of size α is called:-

- powerful critical region
- best critical region
- minimum critical region
- worst critical region

**21 of 100**

147 PU_2015_149

If the upper and lower control limits of a process are changed from 3-Sigma units to 2-Sigma units, then:-

- Probability of Type I error will remain constant

- Nothing related with probability of Type I error
- Probability of Type I error will decrease
- Probability of Type I error will increase

**22 of 100**

133 PU_2015_149

Let $X_1, X_2, \ldots, X_n$ be a random sample from a Multivariate Normal Population with mean $\mu$ and covariance mat

- efficient statistics
- consistent estimates
- sufficient statistics
- unbiased estimates

**23 of 100**

163 PU_2015_149

The survival function of Gamma distribution with shape parameter $\gamma$ is:-

- $S(x) = \frac{\Gamma_x(\gamma)}{\Gamma(\gamma)}; \gamma > 0, x \geq 0$
- $S(x) = 1 + \frac{\Gamma_x(\gamma)}{\Gamma(\gamma)}; \gamma > 0, x \geq 0$
- $S(x) = \Gamma(\gamma)\Gamma_x(\gamma); \gamma > 0, x \geq 0$
- $S(x) = 1 - \frac{\Gamma_x(\gamma)}{\Gamma(\gamma)}; \gamma > 0, x \geq 0$

**24 of 100**

146 PU_2015_149

The control limits of a standardized fraction defectives(p) –chart:-

- does not vary with samples
- is a function of the median sample size
- is a function of the mean sample size
- varies with samples

**25 of 100**

201 PU_2015_149

How many rows and columns are available in MS Excel 2007?

- 256 Columns & 65536 Rows
- 16834 Columns & 1045876 Rows
- 265 Columns & 66536 Rows

- 16384 Columns & 1048576 Rows

**26 of 100**

210 PU_2015_149

If the central line of a c-chart is at 4, then the values of the warning limits are:-

- 0 and 8
- 3 and 5
- -2 and 10
- 2 and 6

**27 of 100**

107 PU_2015_149

If $A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 1+a & 1 & 1 \\ 1 & 1 & 1+b & 1 \\ 1 & 1 & 1 & 1+c \end{bmatrix}$ then $|A|$ is equal to:-

- (1+a)(1+*b*)(1+*c*)
- *abc*
- (1+*a*)(1+*bc*)
- 1+*abc*

**28 of 100**

172 PU_2015_149

If population size is infinite, then sample size is:-

- necessarily finite
- un countable
- not necessarily finite
- Un restricted

**29 of 100**

198 PU_2015_149

Which of the following is an Operating system?

- Windows 8
- SPSS
- MS Office
- STATA

**30 of 100**

207 PU_2015_149

In Simultaneous Equation Model (SEM), the endogenous variable in one equation may appear as:-

- dependent variable in other equation
- regressand in other equation
- parameter in other equation
- regressor in other equation

**31 of 100**

150 PU_2015_149

If the frequency of placing order to an item is more, then the risk of running out of stock is:-

- not effected
- Equal
- less
- more

**32 of 100**

188 PU_2015_149

Which of the following is Mallow's p statistic?

- $RSS_p/(s^2-n-2p)$
- $RSS_p/s^2-n+2p$
- $RSS_p/(n-2p)$
- $RSS_p/s^2-(n-2p)$

**33 of 100**

153 PU_2015_149

Balking, Reneging, Priority and Jockeying in Queuing systems refers to:-

- Service Patterns
- Input Mechanisms
- Queue Operational models
- Customer Behaviour in the queue

**34 of 100**

195 PU_2015_149

For what purpose the 'variable view' in IBM SPSS's data editor is used?

- Defining characteristics of variables.
- Viewing output from data analysis.
- Entering data.
- Writing syntax.

**35 of 100**

161 PU_2015_149

Two parallel, identical and independent components have constant failure rate. If it is desired R(1000)=0.95, find the system MTTF.

- 456.3
- 546.7
- 1784.9
- 5926.5

**36 of 100**

134 PU_2015_149

Out of the following statements which one is true for a random variable X which has a multivariate normal distribution:-

- a) Linear combination of the components of X are not normally distributed
- b) All subsets of the components of X have a Multivariate Normal distribution
- c) The conditional distributions of the components are multivariate normal
- d) The above statements (b) and (c) both are true

**37 of 100**

189 PU_2015_149

If $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$ then $E(Y), V(Y)$ are :-

- $0, \sigma^2 I$
- $\beta_0 + \beta_1 \bar{X}, 0$
- $\beta_0, 0$
- $\beta_1 \bar{X}, 0$

**38 of 100**

197 PU_2015_149

What is the extension for an SPSS data file?

- .sov
- .sav
- .spv
- .ssv

**39 of 100**

165 PU_2015_149

Which of the following designs are based on the mathematical models of one way and two way classifications respectively?

- LSD,CRD
- RBD,LSD
- CRD,RBD
- RBD,CRD

**40 of 100**

131 PU_2015_149

A sufficient condition for an estimator $T_n$ to be consistent for θ is that:-

- Var $(T_n)$ /E $(T_n) \rightarrow 0$ as $n \rightarrow \infty$
- E $(T_n) \rightarrow \theta$ & Var $(T_n) \rightarrow 0$ as $n \rightarrow \infty$
- Var $(T_n) \rightarrow 0$ as $n \rightarrow \infty$
- E $(T_n) \rightarrow \theta$ as $n \rightarrow \infty$

**41 of 100**

152 PU_2015_149

The Term EOQ model in the context of Inventory Modeling is related to:-

- Economic Organizational Quality
- Economic Order Quality
- Equal Optimal Quantity
- Economic Order Quantity

**42 of 100**

175 PU_2015_149

If the population of 100 size is divided in to two stratums with sizes 60 and 40 respectively. If a sample of 20 observations to be drawn from the total population, then what are the sizes of samples from the first and second stratums respectively?

- 15,5
- 16,4
- 14,6
- 12,8

**43 of 100**

174 PU_2015_149

In simple random sampling with replacement variance of sample mean is equal to:-

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

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

**44 of 100**

122 PU_2015_149

If X has probability density function (p.d.f.) $f(x)=e^{-x};x>0$ and $Y=\begin{cases} X\ if\ X\geq 3 \\ 2X+3\ if\ X<3 \end{cases}$ , then the expected value of Y is:-

- $7 - 5e^{-3}$
- $5 - 7e^{-3}$
- $5 - 7e^{-5}$
- $7 - 5e^{-5}$

**45 of 100**

164 PU_2015_149

In $2^2$ factorial design, the interaction effect AB is defined as:-

- $\frac{1}{2}[[ab]-[a]-[b]-[1])]$
- $\frac{1}{2}[[ab]-[a]-[b]+[1])]$
- $\frac{1}{2}[(ab)+(a)+(b)+(1)]$
- $\frac{1}{2}[(ab)-(a)-(b)+(1)]$

**46 of 100**

129 PU_2015_149

If $T_n$ is unbiased and consistent for θ then:-

- $T_n^2$ is unbiased and consistent for $\theta^2$.
- $T_n^2$ is biased but consistent for $\theta^2$.
- $T_n^2$ is unbiased but not consistent for $\theta^2$.
- $T_n^2$ is biased and not consistent for $\theta_2$.

**47 of 100**

203 PU_2015_149

According to Akaike's Information Criterion (AIC) while comparing two or more models, that model is selected which has:-

- AIC value >1
- AIC value <1

- highest AIC value
- lowest AIC value

**48 of 100**

148 PU_2015_149

Which of the following are relevant with respect to convex sets?

(1) Union of Two Convex Sets;
(2) Intersection of two convex sets;
(3) Convex Hull

- One and Three are true
- Two and Three are true
- One and Two are True
- One, Two and Three are True

**49 of 100**

187 PU_2015_149

Let {X(t)=n}be a stochastic process such that $\Pr\{X(t)=n\}=\frac{(at)^{n-1}}{(1+at)^{n+1}}, n=1,2,\ldots;$

$\Pr\{X(t)=n\}=\frac{at}{1+at}$ ; for n=0, with E{X(t)}=1 and V{X(t)}=2at+1, then {X(t)} is:-

- Evolutionary Process
- Markov Process
- Stationary Process
- Logarithmic Process

**50 of 100**

105 PU_2015_149

The solution of

$$\begin{aligned} 2x+y-z&=3\\ x+y+z&=1\\ x-2y-3z&=4 \end{aligned}$$

- (0,1,2)
- (-2,1,0)
- (2,1,0)
- (2,-1,0)

**51 of 100**

120 PU_2015_149

The connection between almost sure convergence (a.s), convergence in probability (p) and convergence in $r^{th}$ mean (m) is:-

- a.s ⇒ m ⇒ p
- a.s ⇒ p; p ⇒ m
- a.s ⇒ p; m ⇒ p
- m ⇒ a.s ⇒ p

**52 of 100**

121 PU_2015_149

A non-empty class of subsets of Ω that is closed under countable unions and compliments containing the null set Φ is known as:-

- Probability Space
- Sigma Field
- Field
- Sample Space

**53 of 100**

108 PU_2015_149

Which of the following distributions are having the moments without moment generating function?

- Pareto, Exponential and F-distributions
- Pareto, Student-t and F-distributions
- Pareto, Chi square and F-distributions
- Pareto, Weibull and F-distributions

**54 of 100**

124 PU_2015_149

A test T for which maximum risk under $H_0$ and $H_1$ is not more than the maximum risk of any other test T* under $H_0$ and $H_1$ is called:-

- an unbiased test
- an admissible test
- uniformly most powerful test
- minimax test

**55 of 100**

196 PU_2015_149

In SPSS, how many cases need to appear in one category for chi-square?

- 2
- 1
- 5

- 6

**56 of 100**

199 PU_2015_149

Which of the following is a programming language?

- C & C++
- MS Excel
- SPSS
- Windows 98

**57 of 100**

202 PU_2015_149

The range of Durbin-Watson test statistic is:-

- 0 to 4
- 2 to 4
- 0 to 2
- 4 ± 2

**58 of 100**

200 PU_2015_149

What is the wizard used to create the tabulation reports in MS EXCEL?

- Pivot Table
- Function
- Cross Tabulation
- All the above

**59 of 100**

110 PU_2015_149

If the distribution of a random variable X is symmetric about origin, then the characteristic function $\phi_X(t)$ is:-

- Real
- One
- Zero
- Complex

**60 of 100**

173 PU_2015_149

To collect the data from Indian professors settled in various parts of world, the following method of data collection is more optimal in all respects:-

- placing questionnaire in website
- direct observation method
- data collection through email questionnaire
- direct interview method

**61 of 100**

243 PU_2015_149

Let $X_{ij}$ be the sample observation belong to i[th] treatment and j[th] in an experiment of 'k' treatments and 'r' blocks analysis of variance, $\bar{X}_{\bullet\bullet} = \sum_{i=1}^{k}\sum_{j=1}^{r} x_{ij} / rk$ , $\bar{X}_{\bullet j} = \sum_{i=1}^{k} x_{ij} / k$ and $\bar{X}_{i\bullet} = \sum_{j=1}^{r} x_{ij} / r$ then $\sum_{i=1}^{k}\sum_{j=1}^{r}\left(x_{ij} - \bar{x}_{\bullet\bullet}\right)^2$ ; $\sum_{i=1}^{k}\left(\bar{x}_{i\bullet} - \bar{x}_{\bullet\bullet}\right)^2$ ; $\sum_{i=1}^{r}\left(\bar{x}_{\bullet j} - \bar{x}_{\bullet\bullet}\right)^2$ and $\sum_{i=1}^{k}\sum_{j=1}^{r}\left(X_{ij} - \bar{X}_{i\bullet} - \bar{X}_{\bullet j} + \bar{X}_{\bullet\bullet}\right)^2$ are respectively:-

- Treatment Sum of squares, Error sum of squares, Blocks sum of squares and Total sum of squares
- Total sum of squares, Treatment Sum of squares, Blocks sum of squares and Error sum of squares
- Error sum of squares , Total sum of squares, Blocks sum of squares and Treatment Sum of squares
- Blocks sum of squares, Treatment Sum of squares, Total sum of squares and Error sum of squares

**62 of 100**

246 PU_2015_149

If $V\left(\bar{y}_{st}\right)$ is minimum for fixed total size of the sample size (n) and If $n_i = n$ $n(N_i S_i) / \sum_{i=1}^{k} N_i S_i$ ; $P_i = (N_i / N)$ then $V\left(\bar{y}_{st}\right)_{Opt} =$

- $\left(\sum_{i=1}^{k} p_i S_i\right)^2 - \left(\sum_{i=1}^{k} p_i S_i^2\right)$
- $\frac{1}{N}\left(\sum_{i=1}^{k} p_i S_i\right)^2 - \frac{1}{N}\left(\sum_{i=1}^{k} p_i S_i^2\right)$
- $\frac{1}{n}\left(\sum_{i=1}^{k} p_i S_i\right)^2 - \frac{1}{N}\left(\sum_{i=1}^{k} p_i S_i^2\right)$

- $\frac{1}{N}\left(\sum_{i=1}^{k} p_i S_i\right)+\frac{1}{n}\left(\sum_{i=1}^{k} p_i S_i^2\right)$

**63 of 100**

252 PU_2015_149

What is the wizard used to create the tabulation reports in excel?

- Pivot Table Wizard
- Function Wizard
- Cross Tabulation Wizard
- Conditional Formatting

**64 of 100**

224 PU_2015_149

The mean of non-central F distribution with $n_1$ and $n_2$ degrees of freedom and non-centrality parameter $\lambda_1$ is:-

- $\frac{n_1}{n_2}\frac{n_2-2}{n_1+\lambda_1}$
- $\frac{n_1+\lambda_1}{n_2-2}$
- $\frac{n_2}{n_1}\frac{n_1+\lambda_1}{n_2-2}$
- $\frac{n_1}{n_2}\frac{n_2-2}{n_1}$

**65 of 100**

250 PU_2015_149

The unbiased Estimator of $\sigma^2$ for the model, If $Y = X\beta+\varepsilon$ where X is $n\times k+1$ matrix of rank $(k+1)<n$.

- $\hat{\sigma}^2=\frac{E(SSE)}{n-k-1}$
- $\hat{\sigma}^2=\frac{E(SSE)}{k-1}$
- $\hat{\sigma}^2=\frac{E(SSE)}{n-1}$
- $\hat{\sigma}^2=\frac{E(SSE)}{n-k+1}$

**66 of 100**

251 PU_2015_149
Which function is used to compute the compound growth rate using MS EXCEL?

- LOGEST
- TREND
- FORECAST
- LINEST

## 67 of 100

225 PU_2015_149

If the pdf of Normal distribution is given by f(x)= $\frac{1}{\pi} e^{-\frac{x^2}{4}+\frac{x}{2}-1}$ , then the mean and variance are:-

- $\frac{1}{\sqrt{2}}, 2$
- $\left(\sqrt{2}, \sqrt{2}\right)$
- $\left(2, \frac{1}{\sqrt{2}}\right)$
- $\left(\sqrt{2}, \frac{1}{\sqrt{2}}\right)$

## 68 of 100

237 PU_2015_149
Rejectable quality level denotes:-

- the best level of in-coming lot quality that consumer is willing to reject
- the worst level of in-coming lot quality that consumer is willing to reject
- the worst level of in-coming lot quality that consumer is willing to accept
- the best level of in-coming lot quality that consumer is willing to accept

## 69 of 100

245 PU_2015_149
If the population size is ‘N’ and sample size is ‘n’, then total number of possible samples that can be obtained through SRSWR and SRSWOR respectively are:-

- $n^N; \binom{N}{n+1}$
- $N^{n+1}; \binom{N}{n+1}$
- $N^n; \binom{N}{n}$

- $N^{n+1}, \binom{N}{n}$

**70 of 100**

244 PU_2015_149

Complete the following ANOVA table :

| Source of | D.F. | S.S. | M.S. |
|---|---|---|---|
| Blocks | x – 1 | 90 | 30 |
| Treatments | 4 | y | 25 |
| Error | Z | 120 | 10 |
| Total | 19 | -- | -- |

- x=4;y=100;z=10
- x=4;y=100;z=12
- x=3,y=100;z=12
- x=4;y=90;z=12

**71 of 100**

241 PU_2015_149

The exponential failure rates of three components are $0.065 * 10^{-3}$, $0.18 * 10^{-3}$ *and* $0.96 * 10^{-3}$ per hours. The reliability at 500 hours if these components are connected in series (parallel).

- R(500) = 0.9989 (0.5474)
- R(500) = 0.4412 (0.6342)
- R(500) = 0.6342 (0.4412)
- R(500) = 0.5474 (0.9989)

**72 of 100**

223 PU_2015_149

If the joint P.M.F. of (X, Y) is $P(x, y) = \frac{e^{-\lambda}\lambda^x p^y (1-p)^{x-y}}{y!(x-y)!}$; x = 0,1, ….; y=0,1,2,3,……x; then the probability mass functions of X given Y and Y given X $P_{Y/X}(y/x)$ and $P_{X/Y}(x/y)$ correspond to:–

- Poisson and Poisson
- Binomial and Binomial

- Binomial and Poisson
- Poisson and Binomial

**73 of 100**
242 PU_2015_149

The exponential failure rates of three components are $0.065 * 10^{-3}$, $0.18 * 10^{-3}$ *and* $0.96 * 10^{-3}$ per hours. MTTF of a system if these components are connected in series is:-

- 350 hrs.
- 230 hrs.
- 550 hrs.
- 830 hrs.

**74 of 100**
247 PU_2015_149

Let $Pr\{X_n=j/X_{n-1}=j-1\}=p$; $Pr\{X_n=j/X_{n-1}=j+1\}=q$; where $0<p,q<1$; $Pr\{X_n=0/X_{n-1}=0\}=1$; $Pr\{X_n=k/X_{n-1}=k\}=1$; then the above transitions represent:-

- Bivariate random walk of a gambler's ruin problem
- Bivariate random walk of a drunkard
- Univariate random walk of a drunkard
- Univariate random walk of a gambler's ruin problem

**75 of 100**
248 PU_2015_149
Let 'a' and 'b' be two extreme barriers such that $Pr\{X_n=a/X_{n-1}=a\}=1$; $Pr\{X_n=b/X_{n-1}=b\}=0$ then:-

- 'a' is absorbing barrier, 'b' is Elastic barrier
- 'a' is Elastic barrier, 'b' is Reflecting barrier
- 'b' is Absorbing barrier, 'a' is Reflecting barrier
- 'a' is Absorbing barrier, 'b' is Reflecting barrier

**76 of 100**
249 PU_2015_149
Test for randomness can be handling with:-

- Durbin-Watson Test
- Bon-Ferromi Test
- Brensen-Pagen test

- Jenson's test

**77 of 100**

238 PU_2015_149

Let the given LPP has two variable objective function with Maximization type; All the constraints are ≤ type; variables under study are ≥0; all constraints are having the non negative sign on its right hand side, then:-

- The Convex region is bounded, and optimal basic feasible solution does exist in the first quadrant of the graph.
- The Convex region is Unbounded, and it exists in the First quadrant of the graph
- The Convex region does not exist in any quadrant of the graph.
- The Convex region is bounded, and it exists in the second quadrant of the graph.

**78 of 100**

236 PU_2015_149

Identify the wrong statement associated with Shewhart control charts.

- It can provide warning signals for impending trouble
- It can detect shift in process variation
- It can detect large shift in process mean
- It can detect small shift in process mean

**79 of 100**

221 PU_2015_149

A set of linear equations in the matrix form AX=B if:-

- A is invertible & its inverse is known.
- A is non-invertible & its inverse is not known
- A is non-invertible & its inverse is known.
- A is invertible & its inverse is not known.

**80 of 100**

222 PU_2015_149

$$\text{Let } M = \begin{pmatrix} 3 & 4 & 0 & 0 & 0 \\ 2 & 5 & 0 & 0 & 0 \\ 0 & 9 & 2 & 0 & 0 \\ 0 & 5 & 0 & 6 & 7 \\ 0 & 0 & 4 & 3 & 4 \end{pmatrix} \text{ then } |M| \text{ is:-}$$

- 42
- 40

- 60
- 64

**81 of 100**

295 PU_2015_149

Robust regression gives an improvement to the least square estimation in the presence of:-

- without outliers
- Censored observation
- truncated observations
- Outliers

**82 of 100**

275 PU_2015_149

Which of the following in not true for variable control chart?

- It can be used only for quality characteristics that are measurable
- It is assumed that the underlying quality characteristic is normally distributed
- It can be used even for quality characteristics that are not measurable
- It requires smaller samples to detect an out of control signal

**83 of 100**

277 PU_2015_149

Which of the following statement is true in the case of Pareto chart?

- It helps in identifying assignable causes that contributes to total 20% of the variation in the process
- It is symmetric in shape
- It helps in identifying assignable causes that contributes to total 80% of the variation in the process
- It is not a useful tool in process control

**84 of 100**

263 PU_2015_149

The characteristic function of the Gamma distribution with parameters α and *n* is:-

- $(\frac{1}{\alpha - it})^n$
- $(1 - \alpha it)^n$
- $(1 - \frac{it}{\alpha})^n$
- $(1 - \frac{it}{\alpha})^{-n}$

**85 of 100**

297 PU_2015_149

If a fair coin is tossed 4 times, then the Mean deviation about Mean of the related probability distribution is:-

- 1/4
- 1
- 2/4
- 3/4

**86 of 100**

291 PU_2015_149

Let a linear model $Y_i = X + \sum_{j=1}^{k} \beta X_{ij} + \varepsilon_i$ for i=1,2,...m then $\varepsilon_{i\sim}$

- $N(x\hat{\beta}, \sigma^2 I)$
- $N(0, \sigma^2 I)$
- $N(\mu, \sigma^2)$
- $N(0,1)$

**87 of 100**

293 PU_2015_149

What is the shortcut button used to close a excel worksheet?

- Ctrl + X
- Ctrl + W
- Ctrl + F4
- Alt + F4

**88 of 100**

272 PU_2015_149

If $A_1, A_2, \ldots, A_q$ are independently distributed with $A_i$ distributed according to $W(\Sigma, n_i)$ then $A = \sum_{i=1}^{q} A_i$ is distributed according to:-

- $W(\Sigma, \sum n_i)$
- $W(\Sigma/n_i, n_i)$
- $W(\Sigma, 1/n_i)$
- $W(\Sigma/n_i, 1/n_i)$

**89 of 100**

271 PU_2015_149

Which of the following criteria is considered for finding the sufficient statistic using the Maximum Likelihood Estimator (MLE)?

- Rao & Blackwell
- Chapman & Kolmogorov
- Fisher & Neyman
- Rao & Cramer

**90 of 100**

290 PU_2015_149

The F-Statistic for $H_0 : \beta_1 = 0$, in a linear model of regression in terms of $R^2$ is:-

- $\frac{R^2/n-k-1}{(1-R^2)/k}$
- $\frac{R^2/k}{(1-R^2)/n-k-1}$
- $\left(\frac{R}{1-R}\right)^2 \frac{(n-k-1)}{k}$
- $\frac{R^2}{1-R^2}$

**91 of 100**

261 PU_2015_149

If $A = \begin{bmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{bmatrix}$ then $|A|$ is equal to:-

- $(a-b)(b-c)(c-a)(a+b+c)$
- $(a-b)(b-c)(c+a)$
- $(a-b)(b+c)(c-a)$

- $(a-b)(b-c)(c-a)$

**92 of 100**

276 PU_2015_149

Which among the following is true for Average Outgoing Quality curve?

- It initially decreases, reaches a minimum and then increases
- It initially increases, reaches a maximum and then decreases
- It is always increasing
- It is always decreasing

**93 of 100**

296 PU_2015_149

If Mean and Variance of Binomial distribution are 4 and 3 respectively, then the mode of the distribution is equal to:-

- 1
- 4 and 3
- 4
- 3

**94 of 100**

274 PU_2015_149

The linear combination of $C^TX = C_1 X1 + C_2 X_2 + C_3 X_3 + \ldots + C_p X_p$ has mean and variance respectively are:-

- cμ and ∑|c|
- $c^1\mu$ and $c^1\sum c$
- cμ and $c^1\mu c$
- |c|μ and $c^1\sum c$

**95 of 100**

280 PU_2015_149

If the primal problem has ‘m’ constraints and ‘n’ unknown variables, all the constraints are ≤ type, It has finite optimum basic feasible solution, then:-

- The dual problem has ‘m’ Constraints and ‘n’ unknown variables, the constraints are of ≥ type, the dual problem has Infeasible solution
- The dual problem has ‘n’ Constraints and ‘m’ unknown variables, the constraints are of ≥ type, the dual problem has finite optimum basic feasible solution
- The dual problem has ‘n’ Constraints and ‘m’ unknown variables, the constraints are of ≤ type, the dual problem has Infeasible solution
- The dual problem has ‘m’ Constraints and ‘n’ unknown variables, the constraints are of ≤ type, the dual problem has Infeasible solution

**96 of 100**

273 PU_2015_149

What is the total sample variance for the following sample variance covariance matrix?

$$S = \begin{bmatrix} 3 & -3/2 & 0 \\ -3/2 & 1 & 1/2 \\ 0 & 1/2 & 1 \end{bmatrix}$$

- 5
- 1/5
- 4/3
- 2

**97 of 100**

262 PU_2015_149

The eigen values of the matrix $B = \begin{bmatrix} 5 & 2 & 2 \\ 3 & 6 & 3 \\ 6 & 6 & 9 \end{bmatrix}$ are:-

- (3,3,10)
- (3,3,14)
- (3,2,10)
- (2,3,14)

**98 of 100**

270 PU_2015_149

Which of the following distributions have involvement in median test?

- Lognormal, Binomial and Normal
- Geometric, Exponential and Normal
- Hypergeometric, Normal and Chi square
- Poisson, Beta and Power series

**99 of 100**

292 PU_2015_149

From which Excel ribbon, we can place header and footer for a excel document?

- Data
- View
- Insert
- Page Layout

294 PU_2015_149

When error terms across time series data are inter-correlated, it is known as:-

- cross correlation
- spatial auto correlation
- serial correlation
- cross autocorrelation