National Testing Agency

Question Paper Name:	Probability and Statistics
Subject Name:	Probability and Statistics
Creation Date:	2018-12-02 12:36:50
Duration:	180
Total Marks:	100
Display Marks:	Yes
Share Answer Key With Delivery Engine:	Yes
Actual Answer Key:	Yes

Probability and Statistics

Group Number :	1
Group Id :	41652997
Group Maximum Duration :	0
Group Minimum Duration :	120
Revisit allowed for view? :	No
Revisit allowed for edit? :	No
Break time:	0
Group Marks:	100

Probability and Statistics

Section Id :	41652997
Section Number :	1
Section type :	Online
Mandatory or Optional:	Mandatory
Number of Questions:	50
Number of Questions to be attempted:	50
Section Marks:	100
Display Number Panel:	Yes
Group All Questions:	No

Sub-Section Number:	1
Sub-Section Id:	416529102
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 4165297751 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

If $A \subset B$, the relation between P(A) and P(B) is

a) P(A) Less than P(B)

b) P(A) Less than or equal to P(B)

c) P(A) Greater than P(B)

d) P(A) Greater than or equal to P(B)

Question Number : 2 Question Id : 4165297752 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

If $A \subset B$, then relation between P(A|C) and P(B|C) is

a) Less than b) Less than or equal to c) Greater d) Greater than or equal to

Question Number : 3 Question Id : 4165297753 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

$P(A) = p_1$, $P(B) = p_2$ and $P(AB) = p_3$ then $P(A^cB)$ is

a) $p_1 + p_2$ b) $p_2 + p_3$ c) $p_2 - p_3$ d) $p_1 - p_2$

Question Number : 4 Question Id : 4165297754 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

A random variable X with possible values 1, 2, 3, 4 and 5 having F(4.2) =0.90.

P(X = 5) is ------

(a) 0.8 (b) 0.9 (c) 0.1 (d) 0.5

Question Number : 5 Question Id : 4165297755 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Geometric mean of two numbers 1/16 and 4/25 is

(a) $\frac{1}{10}$ (b) $\frac{1}{100}$ (c)10 (d) 100

Question Number : 6 Question Id : 4165297756 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Sum of n independent geometric r.vs follows

a) Extended Geometric b) Negative binomial

c) Binomial d) Hypergeometric

Question Number : 7 Question Id : 4165297757 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

The probability of getting at least one 6 when two unbiased dice are thrown is

(a) $\frac{6}{36}$ (b) $\frac{1}{36}$ (c) $\frac{11}{36}$ (d) $\frac{21}{36}$

Question Number : 8 Question Id : 4165297758 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

There are two unbiased coins and one biased coin with tail on both sides. A coin is chosen at random and tossed 3 times. If tail occurs all the 3 times, what is the probability that the biased coin has been chosen?

(a) $\frac{4}{10}$ (b) $\frac{6}{10}$ (c) $\frac{8}{10}$ (d) $\frac{9}{10}$

Question Number : 9 Question Id : 4165297759 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

In a school 22% of all students play football and cricket and 40% of all students play football. What is the probability that a student plays cricket given that the student plays football?

(a) 0.50 (b) 0.55 (c) 0.60 (d) 0.65

Question Number : 10 Question Id : 4165297760 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

First two moments about the value 5 of a distribution are 2 and 20. The mean, of X is,
(a) 2 (b) 7 (c) 10 (d) 16

Question Number : 11 Question Id : 4165297761 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

Cumulant generating function is
(i) $\log_e \phi_X(t)$ (b) $\log_e M_X(t)$ (c) $\log_e M_{aX+b}(t)$ (d) $\log_e \phi_{aX+b}(t)$

Question Number : 12 Question Id : 4165297762 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

If X follows B(n, p), then (n-X) follows
a) B(n, 1-p) b) B(n, p) c) NB(n, p) d) NB(n, 1-p)

Question Number : 13 Question Id : 4165297763 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

. Suppose $f(x)=\frac{1}{2a}; -a<x<a$ be the p.d.f. Then μ_2 is

(a) $\frac{a^2}{3}$ (b) $\frac{a^2}{4}$ (c) $\frac{a}{3}$ (d) $\frac{a}{4}$

Question Number : 14 Question Id : 4165297764 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

. Given the p.m.f., f(x) of X with possible values 1, 2, 3 and 4 as $\frac{c}{6}x$. The value of c is ----

(a) 1 (b) 0.6 (c) 0.4 (d) 0.2

Question Number : 15 Question Id : 4165297765 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Given the p.d.f. of X as, $f(x)=\begin{cases}\frac{x}{c}, & when\ \ 0\le x\le 2\\ 0, & elsewhere\end{cases}$,then the value of c is,

(a) $\frac{1}{2}$ (b) 2 (c) $\frac{1}{3}$ (d) 3

Question Number : 16 Question Id : 4165297766 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

For any two r.v.s X and Y , $E(E(X^2/Y))-\left[E(E(X/Y))\right]^2$ is

(a) V(Y) (b) V(X) (c) $E(X^2)$ (d) $E(Y^2)$

Question Number : 17 Question Id : 4165297767 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Given the P(A)=1/3, P(B)=1/4, P(A|B)=1/6, then P(B|A)=

a) 1/4 b) 3/4 c)1/8 d) 1/2

Question Number : 18 Question Id : 4165297768 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

When an unbiased die is thrown, showing up the sides 4 or 6 is considered as a success.

In repetition of the experiment, find the expectation of the number of failures before the 5^{th} success.

(a) 2 (b) 5 (c)10 (d) 30

Question Number : 19 Question Id : 4165297769 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

The value of c, if the p.d.f. of X is given by $f(x)=ce^{-|x|}$, $-\infty<x<\infty$ is -----

(a) 1/14 (b) 1/7 (c) 1/2 (d) 1/4

Question Number : 20 Question Id : 4165297770 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

The moment generating function of a U(2, 5) r.v. is

(a) $\frac{e^{2t}-e^{5t}}{3t}, t\neq 0$ b) $\frac{e^{5t}-e^{2t}}{3t}, t\neq 0$ c) $\frac{e^{2t}-e^{5t}}{3t}$ d) $\frac{e^{5t}-e^{3t}}{3t}$

Question Number : 21 Question Id : 4165297771 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

. A random variable X is having pm.f. $f(x)=\left(\frac{1}{2}\right)^x$, $x=1,2,3,...$ Then E(X) is,

(a) 2 (b) 1 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

Question Number : 22 Question Id : 4165297772 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

A continuous random variable with p.d.f $f(x)=\begin{cases}3e^{-3x}, x>0\\ 0, \textit{otherwise}\end{cases}$. Find E(3-X)+5

(a) 0 (b) $\frac{23}{3}$ (c) $\frac{8}{3}$ (d) 15

Question Number : 23 Question Id : 4165297773 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

If X is a continuous random variable being the pdf $f(x)=\begin{cases}\frac{1}{3} & -1\le x\le 0\\ \frac{2}{3} & 0\le x\le 1\end{cases}$

Then E(X^2) is equal to

(a) $\frac{1}{9}$ (b) $\frac{2}{3}$ (c) $\frac{5}{12}$ (d) $\frac{1}{3}$

Question Number : 24 Question Id : 4165297774 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

The distribution function of a rectangular distribution of a variable X lying in the interval (a, b) is

(a) $\frac{1}{b-a}$ (b) $\frac{b-a}{x-a}$ (c) $\frac{x-b}{b-a}$ (d) $\frac{x-a}{b-a}$

Question Number : 25 Question Id : 4165297775 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

mgf of a random variable X following gamma distribution with a single parameter p is

(a) $(1-t)^{-p}, t<1$ (b) $(1-2t)^{-p}, t<1$ (c) $(1-t)^{p}, t<1$ (d) $(1-2t)^{p}, t<1$

Question Number : 26 Question Id : 4165297776 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Number of conditions for mutual independence of n events

(a) 2^n-n-1 (b) 2^n (c) n (d) $n-1$

Question Number : 27 Question Id : 4165297777 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

For two random variable X and Y with joint p.d.f. $f(x,y)=\begin{cases} c(6-x-y), & when\ 0\le x\le 2\ ;\ 2\le y\le 4 \\ 0, & elsewhere \end{cases}$, then the value of c is

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{6}$ (d) $\frac{1}{8}$

Question Number : 28 Question Id : 4165297778 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

The probability of throwing an odd sum with two fair dice is

a) 1/4 b) 1/6 c) 1 d) ½

Question Number : 29 Question Id : 4165297779 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

If the first 25 percent observations of a series are 20 or less and 25 percent observations of a series are 50 or more, the quartile deviation is:

(a) 26 (b) 35 (c) 15 (d) 30

Question Number : 30 Question Id : 4165297780 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

The variance of 3X-5 where X follow Poisson distribution with mean 2 is

a) 6 b) 18 c) 13 d) 23

Question Number : 31 Question Id : 4165297781 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

If the mean and variance of binomial distribution are 2 and 1 respectively,then $P(X\le 1)$ is equal to

(a) 5/16 b) 2/16 c) 6/26 d) 3/16

Question Number : 32 Question Id : 4165297782 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

A continuous r.v X has a pdf f $f(x)=kx^2e^{-x};\ x\ge 0$, then the variance of X is

(a) 1 b) 2 c) 3 d) 4

Question Number : 33 Question Id : 4165297783 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

If X is uniformly distributed over (-a,a), then the value of a so that P(|x| <1) = P(|x|) > 1 is

(a) 1 b) 2 c) 3 d) 4

Question Number : 34 Question Id : 4165297784 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 2 Wrong Marks : 0

The mean and variance of a binomial random variable X are 6 and 4 respectively. P(X = 0) is -------

(a) $\left(\frac{1}{3}\right)^{18}$ (b) $\left(\frac{2}{3}\right)^{18}$ (c) $18\left(\frac{1}{3}\right)^{18}$ (d) $18\left(\frac{2}{3}\right)^{18}$

Question Number : 35 Question Id : 4165297785 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

A and B are independent events with $P(A)=0.6$, $P(B)=k$ and $P(A\cup B)=0.7$, then k is

(a)0.25 (b) 0.30 (c) 0.35 (d) 0.40

Question Number : 36 Question Id : 4165297786 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

For a random variable X , E[X(X-1)]-E(X)[E(X)-1] is,

(a) $E(X^2)$ (b) $E(X^3)$ (c) $V(X)$ (d) $V(X)-E(X)$

Question Number : 37 Question Id : 4165297787 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

A distribution is mesokurtic and has fourth central moment 27. Then variance is

a) 9 b) 3 c) -3 d) -9

Question Number : 38 Question Id : 4165297788 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Life of a machine follows normal distribution with mean 700 days and standard deviation 140 days. Probability that the machine will have a life time greater than 700 days is

(a) 0.25 (b) 0.50 (c) 0.75 (d) 1

Question Number : 39 Question Id : 4165297789 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

The expected number of failures preceding the first success in a series of Bernoullian trials with constant a constant probability p of success is

(a) $p(1-p)$ (b) $2p/(1-p)$ (c) $(1-p)/p$ (d) np

Question Number : 40 Question Id : 4165297790 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

If correlation between X and Y is 0.4, the correlation between $\frac{X-2}{5}$ and $\frac{Y-3}{4}$ is ------

(a) 0 (b) 0.4 (c) 0.8 (d) 0.6

Question Number : 41 Question Id : 4165297791 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

The a random variable X is with p.d.f. $f(x)=\begin{cases}1, & when\ 0<x<1\\ 0, & elsewhere\end{cases}$,

Then, $P(X\le\frac{1}{2}/X\ge\frac{1}{4})$ is

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{3}$ (d) $\frac{3}{4}$

Question Number : 42 Question Id : 4165297792 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Let X and Y are two random variables with joint pmf $f(x,y)=\frac{x+2y}{18}$ $x=1,2;\ y=1,2$.

Then E(X) is

(a) $\frac{14}{9}$ (b) $\frac{10}{9}$ (c) $\frac{8}{9}$ (d) $\frac{5}{9}$

Question Number : 43 Question Id : 4165297793 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Let X follows geometric distribution on 0, 1, 2, ... Then

a) $P(X>m+n/X\ge m)=P(X\ge m)$

b) $P(X>m+n/X\ge m)=P(X\ge n)$

c) $P(X>m+n/X>m)=P(X\ge n)$

d) $P(X>m+n/X>m)=P(X\ge m)$

Question Number : 44 Question Id : 4165297794 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

The moment generating function of a normal random variable with mean 0 and standard deviation 4 is,

(a) e^{4t^2} (b) e^{2t^2} (c) e^{-2t^2} (d) e^{-4t^2}

Question Number : 45 Question Id : 4165297795 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Given the joint pdf of X and Y, $f(x,y)=3-x-y,\ 0\le x,y\le 1$, conditional distribution of Y given X, $f(y/x)=$

a) $\frac{3-x-y}{\frac{5}{2}-y}$ b) $\frac{3-x-y}{\frac{5}{2}-x}$ c) $\frac{\frac{5}{2}-x}{\frac{5}{2}-y}$ d) $\frac{\frac{5}{2}-y}{\frac{5}{2}-x}$

Question Number : 46 Question Id : 4165297796 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Given the joint pdf of X and Y, $f(x,y)=e^{-[x+y]}\quad x>0,\ y>0$, E(XY) is -----

(a) 0 (b) 1 (c) 3/2 (d) 2

Question Number : 47 Question Id : 4165297797 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

Given the joint pdf of X and Y, $f(x,y)=3-x-y,\ 0\le x,y\le 1$, the correlation coefficient between X and Y is

(a) $\frac{-1}{2}$ (b) $\frac{3}{7}$ (c) $\frac{-1}{4}$ (d) $\frac{-3}{7}$

Question Number : 48 Question Id : 4165297798 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

X and Y are jointly distributed with coefficient of correlation 0.40. SD(X) = 3; SD(Y)=4. Cov(X,Y) is

(a)12 (b) 2.8 (c) 1.6 (d) 4.8

Question Number : 49 Question Id : 4165297799 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

By Tchebycheff's inequality, the probability of the value of a random variable differ from its mean by more than twice the standard deviation is less than,

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) $\frac{1}{8}$

Question Number : 50 Question Id : 4165297800 Question Type : MCQ Option Shuffling : No Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 2 Wrong Marks : 0

The steady state probabilities of the states A and B of a Markov chain with t.p.m.,

$$\begin{array}{c} \\ A \\ B \end{array}\begin{array}{c} \begin{array}{cc} A & B \end{array} \\ \begin{bmatrix} 0.9 & 0.1 \\ 0.5 & 0.5 \end{bmatrix} \end{array}$$

(a) $[\frac{5}{6}\ \ \frac{1}{6}]$ (b) $[\frac{4}{6}\ \ \frac{2}{6}]$ (c) $[\frac{3}{6}\ \ \frac{3}{6}]$ (d) $[\frac{1}{6}\ \ \frac{5}{6}]$