NAME: AMIT SINGH

ID: 15478

SUBJECT: PRBABILITY AND STATISTICS

SEMESTER: 3RD

PROGRAMME: BS (SOFTWARE ENGINEERING)

1.

a) **Mean and variance of binomial distribution is 4 and 9. Find n and p.**

Answer: np = 4, npq = 9

b) **Define Critical region.**

ANSWER:

Abstract. In a test of a null hypothesis, the **critical region defines** the set of possible outcomes that would lead to **rejection** of the hypothesis, these being chosen to have predetermined probability called the size of the test. In a simple example, the distinction is made between one- and two-tailed tests.

c) **Write the properties of t-distribution.**

Answer:

Following are the properties of t-distribution 1.

The mean of the **distribution** is equal to 0 .

2. The variance is equal to $v / (v - 2)$, where v is the degrees of freedom (see last section) and $v \geq 2$.
3. The variance is always greater than 1, although it is close to 1 when there are many degrees of freedom. With infinite degrees of freedom, the t distribution is the same as the standard normal distribution.

d) **Write a short note on analysis of variance.**

Answer:

Analysis of variance, or **ANOVA**, is a statistical method that separates observed **variance** data into different components to use for additional tests.

e) **Define R.B.D Answer:**

Answer

A randomized block design, or **RBD**, splits up experimental units into groups, or blocks, of equal size, and then assigns a treatment to each group randomly.

f) **Define Statistical quality control.**

Answer:

Statistical quality control, the use of **statistical** methods in the monitoring and maintaining of the **quality** of products and services. One method, referred to as acceptance sampling, can be used when a decision must be made to accept or reject a group of parts or items based on the **quality** found in a sample.

g) **Define the terms " Chance causes and assignable causes".**

Answer:

Difference between " Chance causes and assignable causes".

Chance cause :A process that is operating with only **chance causes** of variation present is said to be in statistical control. In other words, the **chance causes** are an inherent part of the process.

Assignable cause :**assignable cause** is an identifiable, specific **cause** of variation in a given process or measurement.

h) **Define traffic intensity.**

Answer:

traffic intensity is a measure of the average occupancy of a server or resource during a specified period of time, normally a busy hour. ... Telecommunication operators are vitally interested in **traffic intensity**, as it dictates the amount of equipment they must supply

i) **Write the characteristics of queuing theory.**

Answer:

A queuing system is specified completely by the following five basic **characteristics**: The Input Process. It expresses the mode of arrival of customers at the service facility governed by some probability law. The number of customers emanate from finite or infinite sources.

2.

(a) Derive mean and variance of binomial distribution.

Answer

Mean and Variance of Binominal Distribution

Nx = n(p) =MEAN (expected value}

Sigma $x2$ = n(p) (q) =variance

(b) **A car hire firm has two cars, which it hires out day by day. The number of demands for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the proportion of days on which:**

(i) Neither car is used. (ii) The proportion of days on which some demand is refused?

Answer:

Let X denote number of cars which are hired out per day.

For Poisson distribution mean = m = 1.5

$$P(X=x)=e^{-m}.m^x/x!= e^{-1.5}.1.5^x/x!$$

1) P(neither car is used)

$$P(X=0)=e^{-1.5}.1.5^0/0.2231$$

2) P(Some demand is refused) = P(Demand is more than 2 cars per days)

$$P(x>2)$$

$$=1-P(x\leq 2)$$

$$=1-[P(x=0)+P(x=1)+P(x=2)]$$

$$=1-[e^{1.5}\ 1.5^0/0!+ e^{1.5}\ 1.5^1/1!+e^{1.5}\ 1.5^2/2!]$$

∴∴ Proportion of days on which neither car is used = 0.2231 = 22.31 %

And Proportion of days on which some demand is refused = 0.1912 = 19.12 %

3. A set of 5 assembles of 15 sub-groups.

Group No.	No. of defects	Group No.	No. of defects
1	75	9	47
2	64	10	77
3	75	11	59
4	45	12	57
5	93	13	84
6	55	14	40
7	49	15	95
8	65	-	-

Draw a suitable chart and give your comment