INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

MECHANICAL ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	**PROBABILITY AND STATISTICS**
Course Code	:	**AHSB12**
Program	:	**B.Tech**
Semester	:	**III**
Branch	:	**Mechanical Engineering**
Section	:	**A & B**
Academic Year	:	**2019 - 2020**
Course Faculty	:	**Dr. S. Jagadha**

COURSE OBJECTIVES:

The course should enable the students to:	
I	Enrich the knowledge of probability on single random variables and probability distributions.
II	Apply the concept of correlation and regression to find covariance.
III	Determine mean and variance of given data by sampling distribution.
IV	Analyze the given data for appropriate test of hypothesis.

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
MODULE-I						
1	Explain probability distribution.	If X is a random variable then P(X=x) is called probability distribution or probability function	Understand	CO 1	CLO 3	AHSB12.03
2	Define predictable experiment?	if the result is unique	Remember	CO 1	CLO 1	AHSB12.01
3	What is Non Predictable experiment?	if the result not unique	Remember	CO 1	CLO 1	AHSB12.01
4	What is outcome?	Result of the experiment	Remember	CO 1	CLO 1	AHSB12.01
5	What is sample space?	The collection of all possible outcomes in any random experiment	Remember	CO 1	CLO 1	AHSB12.01
6	What is continuous random variable?	A random variable is said to be continuous if the range of the random variable is interval of two real numbers	Remember	CO 1	CLO 3	AHSB12.03
7	What is exhaustive event?	The total number of events in any random experiment	Remember	CO 1	CLO 1	AHSB12.01

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8	What is mutually exclusive event?	It two or more events cannot obtain simultaneously in the same random experiment	Remember	CO 1	CLO 1	AHSB12.01
9	What is equally likely event?	Two events are said to be equally likely events if they have equal chance of happening.	Remember	CO 1	CLO 1	AHSB12.01
10	Define independent event.	If one event is effected by the another event the n the two events are called independent events	Remember	CO 1	CLO 1	AHSB12.01
11	What is discrete random variable?	A random variable is said to be discrete if the range of the random variable is finite	Remember	CO 1	CLO 3	AHSB12.03
12	What is favorable event?	The events which are favorable to one particular event in any random experiment	Remember	CO 1	CLO 1	AHSB12.01
13	Define Probability.	Consider any random experiment the total number of events are n out of them m events are favorable to a particular event E then P(E)=Favorable events/ total number of events	Understand	CO 1	CLO 1	AHSB12.01
14	What is conditional event?	Two events are said to be conditional events if they happen simultaneously. If A and B are any two events happening simultaneously then A/B, B/A are called conditional events.	Remember	CO 1	CLO 2	AHSB12.02
15	Define random variable.	In any random experiment the sample space associated with a real number	Remember	CO 1	CLO 3	AHSB12.03
MODULE-II						
1	What is the variance of the binomial distribution	The variance of the binomial distribution is npq	Remember	CO 2	CLO 5	AHSB12.05
2	Define binomial distribution	Consider a random experiment having n trials. Let it succeed x times then the probability of getting x success is p^x , and the probability of n-x failures are q^{n-x} Therefore the probability of getting x success out of n trials are b(x,n,p) = P(X=X) = $n_{c_x} p^x q^{n-x}$, x=0,1,2…….n	Remember	CO 2	CLO 5	AHSB12.05
3	Define Poisson distribution	A random variable X is said to follow a Poisson distribution if it assumes only non-negative values and its probability mass function is given by $f(x,\lambda) = P(X = x) = \frac{e^{-\lambda}.\lambda^x}{x!}, x = 0,1.....\infty$	Understand	CO 2	CLO 7	AHSB12.07

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4	Define Normal distribution	If X is a continuous random variable μ, σ^2 are any two parameters then the normal distribution is denoted by $N(\mu,\sigma^2) = P(X_1 \le X \le X_2) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$	Understand	CO 2	CLO 9	AHSB12.09
5	What is Normal curve	Normal curve is bell shape. It is symmetric about $x = \mu$ and z = 0. The total area in a normal distribution is unity.	Understand	CO 2	CLO 9	AHSB12.09
6	What is Bernuolli trial	It is a random experiment having only two possible outcomes. Which are denoted by success and failure	Remember	CO 2	CLO 5	AHSB12.05
7	What is the mean of the binomial distribution	The mean of the binomial distribution is np	Remember	CO 2	CLO 5	AHSB12.05
8	What is the variance of the Poisson distribution	The variance of the Poisson distribution is λ	Remember	CO 2	CLO 7	AHSB12.07
9	What is the mode of the binomial distribution	The mode of the binomial distribution is $(n+1)p$	Remember	CO 2	CLO 5	AHSB12.05
10	What is the mean of the Poisson distribution	The mean of the Poisson distribution is λ	Remember	CO 2	CLO 7	AHSB12.07
11	What is the median of the normal distribution	The median of the normal distribution is μ	Remember	CO 2	CLO 9	AHSB12.09
12	What is the mode of the Poisson distribution	The mode of the Poisson distribution is λ	Remember	CO 2	CLO 7	AHSB12.07
13	What is the mean of the normal distribution	The mean of the normal distribution is μ	Remember	CO 2	CLO 9	AHSB12.09
14	What is the variance of the normal distribution	The variance of the normal distribution is σ^2	Remember	CO 2	CLO 9	AHSB12.09
15	What is the mode of the normal distribution	The mode of the normal distribution is μ	Remember	CO 2	CLO 9	AHSB12.09
MODULE-III						
1	What is Karle Pearson's Coefficient of correlation?	It is a method to find strength relationship between two variables. It is denoted by r	Understand	CO 3	CLO 13	AHSB12.013

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2	Define simple correlation?	The relationship between only two variables is known as simple correlation	Remember	CO 3	CLO 13	AHSB12.013
3	Define multiple regression coefficient.	Instead of one independent variable, two or more independent variables are used to estimated the values of dependent variable	Remember	CO 3	CLO 11	AHSB12.011
4	Define Correlation?	The relation between the variables is known as correlation	Remember	CO 3	CLO 13	AHSB12.013
5	What is multiple correlations.	The relationship between more than two variables is known as multiple correlation	Remember	CO 3	CLO 11	AHSB12.011
6	What is Rank correlation?	It is also used to find strength of relation between two variables by ranks. It is denoted by ρ .	Understand	CO 3	CLO 13	AHSB12.013
7	State regression line of Y on X?	Regression line of Y on X is Y=a+bX	Remember	CO 3	CLO 15	AHSB12.015
8	Explain Repeated Ranks of Rank correlation.	If there are more items with same value then common ranks are given to repeated items this common rank is average of ranks which items would have assumed.	Understand	CO 3	CLO 13	AHSB12.013
9	What is regression line?	Regression line is a straight line which gives the relation between two variables.	Remember	CO 3	CLO 15	AHSB12.015
10	What are the properties for correlation?	The correlation coefficient is lies between -1 and 1	Remember	CO 3	CLO 13	AHSB12.013
11	What are the properties for rank correlation?	The rank correlation coefficient is lies between -1 and 1	Remember	CO 3	CLO 13	AHSB12.013
12	What is lines of regression of X on Y?	The lines of regression of X on Y is $(x-\bar{x})=b_{xy}(y-\bar{y})$	Remember	CO 3	CLO 15	AHSB12.015
13	State regression line of X on Y?	Regression line of X on Y is X=a+bY	Remember	CO 3	CLO 15	AHSB12.015
14	What is lines of regression of Y on X?	The lines of regression of Y on X is $(y-\bar{y})=b_{yx}(x-\bar{x})$	Remember	CO 3	CLO 15	AHSB12.015
15	Discuss multiple coefficients of correlation.	Multiple correlation coefficients is non-negative. Its value is lies between 0 and 1.	Remember	CO 3	CLO 11	AHSB12.011
MODULE-IV						
1	Define population?	The collection of objects is known as population	Remember	CO 4	CLO 16	AHSB12.016
2	Explain finite population	If the collection of objects are finite	Remember	CO 4	CLO 16	AHSB12.016
3	Explain finite population	If the collection of objects are infinite	Remember	CO 4	CLO 16	AHSB12.016
4	What is sample?	The subset of the population	Remember	CO 4	CLO 16	AHSB12.016
5	Define small sample.	If the sample size is less than 30 then it is called as small sample	Remember	CO 4	CLO 16	AHSB12.016
6	Explain sampling?	The process of choosing samples from the population	Remember	CO 4	CLO 16	AHSB12.016

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7	Define large Sample?	If the sample size is greater than or equal to 30	Remember	CO 4	CLO 16	AHSB12.016
8	Define sampling distribution?	The set all possible samples	Remember	CO 4	CLO 16	AHSB12.016
9	Explain level of significance?	The level of significance is defined as the probability of rejecting a null hypothesis by the test when it is really true, which is denoted by α.	Remember	CO 4	CLO 16	AHSB12.016
10	Define hypothesis?	The statement about the parameter	Remember	CO 4	CLO 17	AHSB12.017
11	Define testing of hypothesis?	The decision making procedure to accept or reject a hypothesis	Remember	CO 4	CLO 17	AHSB12.017
12	What is null hypothesis?	It is the hypothesis which is tested for possible rejection under the assumption that it is true	Remember	CO 4	CLO 17	AHSB12.017
13	What is alternative hypothesis?	It is the hypothesis differ from the given hypothesis	Remember	CO 4	CLO 17	AHSB12.017
14	Define type-I error?	Reject null hypothesis when it is true	Remember	CO 4	CLO 17	AHSB12.017
15	What is one sided test	If you are using a significance level of .05, a one-tailed test allots all of your alpha to testing the statistical significance in the one direction of interest. This means that .05 is in one tail of the distribution of your test statistic.	Remember	CO 4	CLO 17	AHSB12.017
MODULE-V						
1	Define small Sample?	If the sample size is less than 30 then it is called as small sample.	Remember	CO 5	CLO 21	AHSB12.021
2	What is degree of freedom for Student's t-distribution for single mean?	The degree of freedom for Student's t-distribution for single mean is n-1	Remember	CO 5	CLO 21	AHSB12.021
3	Define degrees of freedom?	The number of degrees of freedom is the number of values in the final calculation of a statistic that are free to vary	Remember	CO 5	CLO 21	AHSB12.021
4	Discuss about the conclusion in testing of hypothesis	If Calculated value < Tabulated value then accept null hypothesis. If Calculated value > Tabulated value then accept null hypothesis	Remember	CO 5	CLO 23	AHSB12.023
5	Define student t-distribution for single mean?	Consider a small sample of size n with mean $\bar{x}$ and variance S^2 is taken from the population having mean μ and variance σ^2.	Understand	CO 5	CLO 21	AHSB12.021
6	Define student t-distribution for difference of	Consider a population with mean μ and variance σ^2. If we choose two small samples from	Understand	CO 5	CLO 21	AHSB12.021

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	means?	the population of size n_1 and n_2 with the mean $\bar{x}_1$ and $\bar{x}_2$, variances ${S_1}^2$ and ${S_2}^2$				
7	Define F-distribution?	To test whether there is any significance difference between two sample variances ${S_1}^2$ and ${S_2}^2$	Understand	CO 5	CLO 22	AHSB12.022
8	Define Chi-square distribution?	To test whether there is any significance difference between observed and expected frequencies	Understand	CO 5	CLO 23	AHSB12.023
9	What is Chi-square distribution for goodness of fit?	Whether there is significance difference between observed and expected frequencies to use Chi-square test	Understand	CO 5	CLO 23	AHSB12.023
10	What is Chi-square distribution for goodness of fit?	Whether there is significance difference between observed and expected frequencies to use Chi-square test	Understand	CO 5	CLO 23	AHSB12.023
11	What is degree of freedom for Student's t-distribution for difference of means?	The degree of freedom for Student's t-distribution for difference of means is $n_1 + n_2 - 2$	Remember	CO 5	CLO 21	AHSB12.021
12	What is degree of freedom for Student's F-distribution?	The degree of freedom for Student's F-distribution is $(n_1 - 1, n_2 - 1)$	Remember	CO 5	CLO 22	AHSB12.022
13	What is degree of freedom for Chi-square distribution?	The degree of freedom for Chi-square distribution is n-1	Remember	CO 5	CLO 23	AHSB12.023
14	What is the significance for small samples	The study of test of significance is the deviation between the observed sample statistic and the hypothetical parameter value is significant and the deviations between two sample statistics are significant.	Remember	CO 5	CLO 21	AHSB12.021
15	What is degree of freedom for Chi-square distribution of Attributes?	The degree of freedom for Chi-square distribution of Attributes is $(row - 1, column - 1)$	Remember	CO 5	CLO 23	AHSB12.023

Signature of the Faculty **HOD, ME**