# TE EXTC RSA 2021-22 Test 2 Examination

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Email *

vishwakarmavivek-extc@atharvacoe.ac.in

Name *

Vivek Vishwakarma

Roll No. *

36

Division *

- ○ TE ET-1
- ◉ TE ET-2

Email Address *

vishwakarmavivek-extc@atharvacoe.ac.in

Mobile Number *

8655689594

## Answer the following questions

✓ The random variables X and Y have variances 0.2 and 0.5 respectively. Let Z= 5X-2Y. The variance of Z is? *

- 3
- 4
- 7 ✓
- 5

✓ Which of the following is equal to Var(2X −3Y ), where X and Y are random variableson S? *

- 2Var(X) − 6Cov(X, Y ) + 3Var(Y )
- 4Var(X) − 12Cov(X, Y ) + 9Var(Y ) ✓
- 4Var(X) + 12Cov(X, Y ) + 9Var(Y )
- 2Var(X) + 6Cov(X, Y ) + 3Var(Y )

✓ Why is the central limit theorem so important in the study of the sampling distributions? *

- It allows us to disregard the size of the sample when the sample size is large enough.
- It allows us to disregard when the population is not normal.
- It allows us to estimate the sampling distribution of the population when the sample size is large enough. ✓
- Insufficient Data

✓ If the original samples from which samples were drawn is not normally distributed the sampling distribution of the mean will be _____for large sample sizes? *

- same as distribution of original data
- unidentifiable
- normal
- approximately normal ✓

✓ Consider a large population with mean of 160 and standard deviation of 25 a random sample of sample size 64 is taken from this population, what is the standard deviation of the sample mean? *

- 2.5
- 3.75
- 3.125 ✓
- 5.625

✓ Stochastic processes are *

- Random in nature
- Functions of time
- none of the above
- Random in nature and functions of time ✓

✓ The minimum and maximum values of the correlation coefficient are *

- (●) -1 and 1 respectively ✓
- ( ) 0 and 1 respectively
- ( ) -0.5 and 0.5 respectively
- ( ) -0.25 and -0.25 respectively

✓ Define SSS *

- (●) its finite dimensional distributions are invariant under translation of time parameter ✓
- ( ) its infinite dimensional distributions are variant under translation of time parameter
- ( ) its finite dimensional distributions are variant under translation of time parameter
- ( ) its infinite dimensional distributions are invariant under translation of time parameter

✓ Define WSS *

- ( ) if mean is not constant and the auto correlation depends only on the time difference.
- (●) if mean is a constant and the auto correlation depends only on the time difference. ✓
- ( ) if mean is a constant and the auto correlation does not depends only on the time difference.
- ( ) if mean is a not constant and the auto correlation does not depends only on the time difference.

✓ A random process with time averages equal to ensemble averages is called as *

- ○ gaussian process
- ◉ ergodic process ✓
- ○ rayleigh process
- ○ erlang process

✓ Define Markov chain *

- ○ If X(t) is a Markov process which does not posses Markov property which takes only discrete values whether t is continuous or discrete is called Markov chain.
- ○ none of the above.
- ◉ If X(t) is a Markov process which posses Markov property which takes only discrete values whether t is continuous or discrete is called Markov chain. ✓
- ○ If X(t) is not a Markov process which posses Markov property which takes only discrete values whether t is continuous or discrete is called Markov chain.

✓ Regression between variables gives the relationship between them *

- ○ false
- ○ Indeterminate
- ○ true in an interval
- ◉ true ✓

✓ Regression between X and Y is the same as that between Y and X *

- ○ true in an interval
- ○ true
- ◉ false ✓
- ○ indeterminate

✓ X and Y are independent random variables with variance 2 and 3.Find the variance of 3X+4Y *

- ◉ 66 ✓
- ○ 72
- ○ 64
- ○ 68

✓ The regression lines of X on Y and Y on X are $5x - y = 22$, $64x - 45y = 24$ respectively. Find the means of X and Y *

- ○ 12,16
- ○ 3,4
- ○ 24,32
- ◉ 6,8 ✓

✓ The random process at a particular time instant is a *

- ○ Deterministic Variable
- ○ Indeterministic variable
- ◉ Random Variable ✓
- ○ none of the above

✓ the difference of two independent Poisson Processes *

- ◉ is not a poisson process ✓
- ○ is a poisson process
- ○ is a gaussian process
- ○ is not a gaussian process

✓ The poisson process is an independent increment process with Markov property. *

- ◉ true ✓
- ○ false
- ○ true in an interval
- ○ indeterministic

✓ A random process is called Deterministic if _____ *

- (●) all the future values can be predicted from the past observations ✓
- ( ) Never is a random process deterministic
- ( ) all the future values cannot be predicted from the past observations
- ( ) Random process is always deterministic.

✓ define irreducible Markov chain *

- (●) If Pij ($nn$) ≥ $00$ for some n and for all i &j,then every state can be reached from other state.When this condition is satisfied,the Markov is said to be irreducible ✓
- ( ) If Pij ($nn$) ≥ 11 for some n and for all i &j,then every state can be reached from other state.When this condition is satisfied,the Markov is said to be irreducible
- ( ) If Pij ($nn$) < $00$ for some n and for all i &j,then every state can be reached from other state.When this condition is satisfied,the Markov is said to be irreducible
- ( ) If Pij ($nn$) < 11 for some n and for all i &j,then every state can be reached from other state.When this condition is satisfied,the Markov is said to be irreducible