Program: BE Electronics and Telecommunication Engineering

Curriculum Scheme: Revised 2012

Examination: Third Year Semester V

Course Code: **ETC503** and Course Name: **RSA**

Time: 1 hour Max. Marks: 50

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Note to the students: - All the Questions are compulsory and carry equal marks.

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| Q1. | What is the value of an area under the conditional PDF? |
| Option A: | Greater than “0” but less than “1” |
| Option B: | Greater than “1” |
| Option C: | Equal to “1” |
| Option D: | Infinite |
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| Q2. | Which of the following is not possible in probability distribution? |
| Option A: | p(x)≥0 |
| Option B: | Σp(x) = 1 |
| Option C: | Σxp(x) = 2 |
| Option D: | p(x) = -0.5 |
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| Q3. | Let X be a random variable with probability distribution function f (x)=0.2 for |x|<1  = 0.1 for 1 < |x| < 4  = 0 otherwise  The probability P (0.5 < x < 5) is \_\_\_\_\_\_\_\_. |
| Option A: | 0.3 |
| Option B: | 0.5 |
| Option C: | 0.4 |
| Option D: | 0.8 |
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| Q4. | What is the area under a conditional cumulative density function? |
| Option A: | 0 |
| Option B: | Infinity |
| Option C: | 1 |
| Option D: | Changes with CDF |
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| Q5. | Mutually Exclusive events \_\_\_\_\_\_\_\_. |
| Option A: | Contain all sample points |
| Option B: | Contain all common sample points |
| Option C: | Does not contain any common sample point |
| Option D: | Does not contain any sample point |
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| Q6. | If a variable can certain integer values between two given points is called\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| Option A: | Continuous random variable |
| Option B: | Discrete random variable |
| Option C: | Irregular random variable |
| Option D: | Uncertain random variable |
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| Q7. | The Markov and Chebyshev inequalities allow us to bound probabilities involving X in terms of its first \_\_\_\_\_ moments only. |
| Option A: | Three |
| Option B: | Two |
| Option C: | Four |
| Option D: | Five |
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| Q8. | The distribution function of random variable is\_\_\_\_\_\_\_\_\_\_. |
| Option A: | P(X less than or equal to x) |
| Option B: | P(X greater than or equal to x) |
| Option C: | P(X less than x) |
| Option D: | P(X greater than x) |
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| Q9. | The expected values of a random variable is it's \_\_\_\_\_\_\_\_\_\_\_\_. |
| Option A: | Mean |
| Option B: | Standard Deviation |
| Option C: | Mean Deviation |
| Option D: | Variance |
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| Q10. | A fair cubical die is thrown twice and their scores summed up. If the sum of the scores of upper side faces by throwing two times a die is an event. Find the expected value of that event. |
| Option A: | 48 |
| Option B: | 76 |
| Option C: | 7 |
| Option D: | 132 |
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| Q11. | If X and Y are independent, then X and Y are uncorrelated, but not vice versa. If X and Y are jointly\_\_\_\_\_\_\_\_\_, then they are independent. |
| Option A: | Gaussian and correlated |
| Option B: | Gaussian and uncorrelated |
| Option C: | Poisson and correlated |
| Option D: | Poisson and uncorrelated |
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| Q12. | If the probability of hitting the target is 0.4, find mean and variance. |
| Option A: | 0.4, 0.24 |
| Option B: | 0.6, 0.24 |
| Option C: | 0.4, 0.16 |
| Option D: | 0.6, 0.16 |
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| Q13. | A Random Variable X can take only two values 2 and 4 i.e. P (2) = 0.45 and P (4) = 0.97. What is the expected value of X? |
| Option A: | 3.8 |
| Option B: | 2.9 |
| Option C: | 4.78 |
| Option D: | 5.32 |
|  |  |
| Q14. | The sampling error is defined as\_\_\_\_\_\_\_\_\_. |
| Option A: | between population and parameter |
| Option B: | difference between sample and parameter |
| Option C: | difference between population and sample |
| Option D: | difference between parameter and sample |
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| Q15. | \_\_\_\_\_\_\_\_\_\_states that the cdf of a sum of iid finite-mean, finite variance random variables approaches that of a Gaussian random variable. |
| Option A: | Strong law of large numbers |
| Option B: | The central limit theorem |
| Option C: | Weak law of large numbers |
| Option D: | Burke’s theorem |
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| Q16. | Autocorrelation is a \_\_\_\_\_\_\_\_\_ function. |
| Option A: | Real and even |
| Option B: | Real and odd |
| Option C: | Complex and even |
| Option D: | Complex and odd |
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| Q17. | The white Gaussian noise process results from taking the \_\_\_\_\_\_ of the Wiener process. |
| Option A: | Sum |
| Option B: | Integration |
| Option C: | Derivative |
| Option D: | Square root |
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| Q18. | A random process is defined by X(t) + A where A is continuous random variable uniformly distributed on (0,1). The auto correlation function and mean of the process is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . |
| Option A: | 1/2 & 1/3 |
| Option B: | 1/3 & 1/2 |
| Option C: | 1 & 1/2 |
| Option D: | 1/2 & 1 |
|  |  |
| Q19. | Power spectrum describes distribution of \_\_\_\_\_\_\_\_\_ under frequency domain. |
| Option A: | Mean |
| Option B: | Variance |
| Option C: | Gaussian |
| Option D: | Binomial |
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| Q20. | Which theorems states that when time-average estimates of a parameter of a random process converge to the expected value of the parameter. The decay rate of the covariance function determines the convergence rate of the sample mean. |
| Option A: | Jackson’s theorem |
| Option B: | Burke’s theorem |
| Option C: | Central limit theorem |
| Option D: | Ergodic theorem |
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| Q21. | The utilization factor for a system represents\_\_\_\_\_\_\_\_\_. |
| Option A: | The steady state average waiting time. |
| Option B: | The probability that no one in the system |
| Option C: | The probability that the service facility is being used |
| Option D: | The average number of customers in the queue |
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| Q22. | \_\_\_\_\_\_\_\_\_states that for networks of queueing systems with exponential service times and external Poisson input processes, the joint state pmf is of product form. |
| Option A: | Little’s formula |
| Option B: | Burke’s theorem |
| Option C: | Jackson’s theorem |
| Option D: | Central limit theorem |
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| Q23. | How does the state of the process is described in HMM? |
| Option A: | Literal |
| Option B: | Single random variable |
| Option C: | Single discrete random variable |
| Option D: | None of the mentioned |
|  |  |
| Q24. | In Markov analysis, we are concerned with the probability that the\_\_\_\_\_\_\_\_\_\_. |
| Option A: | State is part of a system |
| Option B: | System is in a particular state at a given time |
| Option C: | Time has reached a steady state |
| Option D: | Transition with occur |
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| Q25. | \_\_\_\_\_\_\_\_\_states that under very general conditions: The mean number in a system is equal to the product of the mean arrival rate and the mean time spent in the system. |
| Option A: | Little’s formula |
| Option B: | Jackson’s formula |
| Option C: | Burke’s theorem |
| Option D: | Ergodic theorem |