# University of Mumbai
# Examination 2020 under cluster 4 (PCE)

Program: BE Electronics and Telecommunication Engineering
Curriculum Scheme: Rev 2012
Examination: Third Year Semester V
Course Code: ETC 503 and Course Name: Random Signal Analysis

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. | The probability of certain event is |
| Option A: | 0 |
| Option B: | 1 |
| Option C: | 0.47 |
| Option D: | 0.65 |
| | |
| Q2. | Which of the following is usually the most difficult cost to determine |
| Option A: | service cost |
| Option B: | facility cost |
| Option C: | calling cost |
| Option D: | waiting cost |
| | |
| Q3. | The first order Markov chain is generally used when |
| Option A: | stable transition probabilities |
| Option B: | random change in transition probabilities |
| Option C: | sufficient data |
| Option D: | no sufficient data |
| | |
| Q4. | Random process is also called as |
| Option A: | Deterministic system |
| Option B: | Linear system |
| Option C: | Nondeterministic system |
| Option D: | Stochastic process |
| | |
| Q5. | If future values of sample function is cannot be predicted from its past values such process is called as |
| Option A: | Deterministic process |
| Option B: | Nondeterministic process |
| Option C: | Linear process |
| Option D: | Nonlinear process |
| | |
| Q6. | convergent means |
| Option A: | tending to move toward one point or to approach each other |
| Option B: | tending to move toward different point or move away from each other |
| Option C: | it is not defined |
| Option D: | addition |
| | |
| Q7. | Strong law of large numbers is defined as |
| Option A: | $P[\lim n\to\infty(\lvert X-\mu\rvert>\epsilon)=0]$ |
| Option B: | $P[\lim n\to\infty(\lvert X-\mu\rvert>\epsilon)= 1]$ |

| | |
|---|---|
| Option C: | P[lim n→∞(\|X−μ\|>ϵ)= 2] |
| Option D: | P[lim n→∞(\|X−μ\|>ϵ)=3] |
| | |
| Q8. | Chebychevs inequality is defined by |
| Option A: | P(\|x-μ\|>=k σ) <= 1/(k^3). |
| Option B: | P(\|x-μ\|>=k σ) <= 1/(k^4). |
| Option C: | P(\|x-μ\|>=k σ) <= 1/(k^2). |
| Option D: | P(\|x-μ\|>=k σ) <= 1/(k^5). |
| | |
| Q9. | The value of CDF for any function should approcach |
| Option A: | 1 |
| Option B: | 0 |
| Option C: | -1 |
| Option D: | ∞ |
| | |
| Q10. | A variable which can assume finite or countably infinite number of values is known as: |
| Option A: | Continuous |
| Option B: | Discrete |
| Option C: | Qualitative |
| Option D: | None of the them |
| | |
| Q11. | Mean of random process is given by |
| Option A: | X(t ) |
| Option B: | X2(t) |
| Option C: | E[X(t)] |
| Option D: | -X(t) |
| | |
| Q12. | If P(x) = 0.4 and x = 5, then E(x) = ? |
| Option A: | 1 |
| Option B: | 0.5 |
| Option C: | 4 |
| Option D: | 2 |
| | |
| Q13. | The probability of a continuous random variable "X" taking any particular value, k is always: |
| Option A: | Negative |
| Option B: | Zero |
| Option C: | One |
| Option D: | Two |
| | |
| Q14. | Occasionally, a state is entered which will not allow going to another state in the future. This is called |
| Option A: | stable mobility |
| Option B: | market saturation |
| Option C: | a terminal state |
| Option D: | an equilibrium state |
| | |

| | |
|---|---|
| Q15. | $Rxx(\tau) = \tau^{3}+ \tau^{4}$ |
| Option A: | Is not a valid autocorrelation function |
| Option B: | Is a valid autocorrelation function |
| Option C: | Is cross correlation function |
| Option D: | Is not a covariance function |
| | |
| Q16. | The sampling distribution of the mean becomes approximately normally distributed only when which of the following conditions is met? |
| Option A: | The population is normally distributed. |
| Option B: | The sample size is large. |
| Option C: | A single random sample is drawn from the population. |
| Option D: | The standard deviation of the population is large. |
| | |
| Q17. | The conditional PMF of X given Y is |
| Option A: | PX\|Y(xi\|yj) = PY(yj)/PXY(xi,yj) |
| Option B: | PX\|Y(xi\|yj) = PXY(xi,yj)/PY(yj) |
| Option C: | PX\|Y(xi\|yj) = PXY(xi,yj)/PY(xi) |
| Option D: | PX\|Y(xi\|yj) = PXY(xi,yj)/PYX(yj,xi) |
| | |
| Q18. | Mean of a constant 'a' is ___________ |
| Option A: | 0 |
| Option B: | a |
| Option C: | a/2 |
| Option D: | 1 |
| | |
| Q19. | Which of the following distributions is Continuous |
| Option A: | Binomial Distribution |
| Option B: | Poisson Distribution |
| Option C: | Geometric Distribution |
| Option D: | Exponential Distribution |
| | |
| Q20. | Which algorithm is used for solving temporal probabilistic reasoning |
| Option A: | Hidden markov model |
| Option B: | Hill-climbing search |
| Option C: | Depth-first search |
| Option D: | Breadth-first search |
| | |
| Q21. | A random process is given by $X(t) = A\cos(\omega 0t+\theta)$ where $\theta=(0, \pi)$. Average power of random process is |
| Option A: | $A^{2} /2$ |
| Option B: | $A^{2}$ |
| Option C: | 0.5 |
| Option D: | 0.6 |
| | |
| Q22. | Which theorem states that the larger the sample size, the closer the sample mean will be to the mean of the population? |
| Option A: | Law of large numbers |
| Option B: | Chebychevs Inequality |

| | |
|---|---|
| Option C: | Convergence |
| Option D: | Central limit theorem |
| | |
| Q23. | In a joint distribution of x and y, the marginal PDF for X is given as |
| Option A: | fx(X)= ∫ f(x,y) dy |
| Option B: | fx(X)= ∫ f(x,y) dx |
| Option C: | fx(X)= ∫ f(y) dy |
| Option D: | fx(X)= ∫ f(x) dx |
| | |
| Q24. | The distribution function F(x) is equal to: |
| Option A: | $P(X = x)$ |
| Option B: | $P( X \leq x)$ |
| Option C: | $P( X \geq x)$ |
| Option D: | All of the above |
| | |
| Q25. | A continuous random variable X has pdf defined by $f(x)=A+Bx$ ,$0\leq x\leq 1$.If the mean of the distribution is 1/3 .Find A and B. |
| Option A: | A=1 B=3 |
| Option B: | A=4 B=9 |
| Option C: | A=8 B=5 |
| Option D: | A=2 B= -2 |

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| **Question** | **Correct Option (Enter either 'A' or 'B' or 'C' or 'D')** |
|---|---|
| Q1. | B |
| Q2. | A |
| Q3. | A |
| Q4 | D |
| Q5 | B |
| Q6 | C |
| Q7 | A |
| Q8. | C |
| Q9. | A |
| Q10. | B |
| Q11. | C |
| Q12. | D |
| Q13. | B |
| Q14. | D |
| Q15. | A |
| Q16. | B |
| Q17. | B |
| Q18. | B |
| Q19. | D |
| Q20. | A |
| Q21. | A |
| Q22. | D |
| Q23. | A |
| Q24. | B |
| Q25. | D |