

JAYA GROUP OF INSTITUTIONS – THIRUNINRAVUR.

4TH Semester – B.E. / B.Tech.

INTERNAL ASSESSMENT-II (Model Examination –II)

Sub. Title : **Communication Theory**
Sub. Code : **EC6402**
Duration : **180 Minutes**

Date : **7.03.2015**
Branch : **ECE**
Max. Marks: **100**

Part A - (10 x 2 = 20) Answer all questions

1. Define Random variable and process.
2. What is Central limit theorem?
3. The process $X(t)$ is defined by $X(t)=X$ where X is random variable uniformly distributed on $[-1,1]$. Find the correlation value.
4. Define correlation and Co-variance.
5. Find the mean value of $X(t)=A\cos(2\pi f_0 t + \theta)$ distributes on 0 to π radians.
6. What are the sources of noise?
7. What is narrow band noise in terms of envelope and phase?
8. What is White noise?
9. Define capture effect.
10. What are the different methods in FM threshold reduction?

Part B - (5 x 16 = 80) Answer the questions as per the choice.

11. (a) Explain in detail about

- i) Stationary process (6)
- ii) Gaussian process (4)
- iii) Ergodic process. (6)

Or

(b) i) Assume a stationary process passes through a differentiator.

- a) What are the mean and auto correlation function of the output? (4)
- b) What is the cross correlation between the input and output? (4)
- ii) $h(t)=1/\pi t$ and $H(f)=-j\text{sgn}(f)$ the output is Hilbert transform of the input. What are the mean and correlation function of the output and input? (8)

12. (a) What is PSD? Derive the expression for the same. (16)

Or

(b) For the stationary random process $X(t)=A\cos(2\pi f_0 t + \theta)$ distributes on 0 to 2π radians.

Calculate PSD and total power. (16)

13. (a) Explain in detail about transmission of a random process through LTI filter. (16)

Or

(b) Explain in detail about

i) Noise Figure

(8)

ii) Noise Temperature

(8)

14. (a) Prove Figure of merit of **DSB-SC** by using coherent detection is unity.

(16)

Or

(b).Find the Figure of merit of **AM** by using envelope detection.

(16)

15. (a) Calculate noise ratio in FM receiver.

(16)

Or

(b).What is threshold effect? How to improve threshold reduction by using Pre-emphasis and De-emphasis filters.

(16)