

Minor 1

PYL757- Statistical and Quantum Optics

Time: 01 Hour

Total Marks: 20

Date: 29/08/2016

Note: All questions are compulsory. All symbols have their usual meaning unless otherwise stated.

1. What is meant by a stationary random process and explain its physical significance. (02 marks)
2. A bag contains 5 black and 4 blue balls. Two balls are drawn from the bag one by one without replacement. What is the probability of drawing a blue ball in the second draw if a black ball is already drawn in the first draw? (02 marks)
3. What do you understand by power spectral density? Derive the relation between spectral density and auto-correlation function of a random stationary process. Explain the term cross-spectral density. (05 marks)
4. Differentiate between temporal and spatial coherence of a source. Comment on the complex degree of temporal coherence for the light fields and on its importance. (05 marks)
5. Starting from the Binomial distribution, derive the probability density function for a Poissonian distribution. Show that the variance of a Poissonian distribution scales as the mean of the distribution. (06 marks)