**CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY,GANDIPET ,HYDERABAD**

**BE(AI&DS)-IV SEM**

**STOCHASTIC PROCESSES & QUEUEING THEORY-20MTC10**

**ASSIGNMENT –II**

**LAST DATE OF SUBMISSION -27-07-2023**

|  |  |  |  |
| --- | --- | --- | --- |
| **SLNO** | **QUESTIONS** | **CO** | **BT** |
| **1** | A random Process X(t) has auto correlation R(τ)= a|τ|  Determine the spectral density function | **CO3** | **L5** |
| **2** | If the random process X(t) = 10 Cos ( 9t+ β) , here ‘β’ is uniform random variable in the interval ( 0, 2π) , show that Correlation ergodic | **CO3** | **L5** |
| **3** | A RP X(t) has PSD given by S(w) = |w| < 6 Compute ACF | **CO3** | **L5** |
| **4** | A RP X(t) has ACF R(τ)={  { A( 1+ (  Determine Power Spectrum | **CO3** | **L5** |
| **5** | A RP X(t) has WSS whose PSD is S(w) = Determine ACF and Average Power | **CO3** | **L5** |
| **6** | If the random process X(t) = Cos ( 9t+ β) , here ‘β’ is uniform random variable in the interval ( 0, 2π) , Examine X(t) mean ergodic | **CO3** | **L5** |
| **7** | White noise with S(ω) = is passed through a low pass RC filter , whose transfer function is H(W) = , Determine the Output Spectrum Average power , joint PSD (Y,X), Joint PSD ( X,Y), CCF(X,Y), CCF(Y,X) | **CO4** | **L5** |
| **8** | The input voltage to an RL circuit is stationary random process X(t) with Zero mean and Determine output spectral density and ACF whose filter is | **CO4** | **L6** |
| 9 | A white Gaussian noise process of zero mean and PSD is applied a high pass filter H(w)= Determine the (i) ACF of input (ii) PSD output, (iii) ACF output | **CO4** | **L5** |
| 10 | A stationary process X(t) having autocorrelation function is applied to network with filter H(w)= Determine PSD input, PSD output, ACF output | **CO4** | **L5** |
| 11 | Arrivals at a telephone both are considered to be Poisson at an average time of 8 min between our arrival and the next. The length of the phone call is distributed exponentially, with a mean of 4 min.  Determine  (a) Expected fraction of the day that the phone will be in use. (b) Expected number of units in the queue Expected waiting time in the queue. (c) Expected number of units in the system. (e) Expected waiting time in the system (f) Expected number of units in queue that from time to time. (g) What is the probability that an arrival will have to wait in queue for service? | **CO5** | **L6** |
| 12 | Consider a box office ticket window being manned by a single server. Customer arrives to purchase ticket according to Poisson input process with a mean rate of 30/hr. the time required to serve a customer has an ED with a mean of 90 seconds determine:  (a)Mean queue length. (b) Mean waiting time in the system | **CO5** | **L5** |
| 13 | A T.V repairman repair the sets in the order in which they arrive and expects that the time required to repair a set has an ED with mean 30mins. The sets arrive in a Poisson fashion at an average rate of 10/8 hrs a day.  (a) What is the expected idle time / day for the repairman  b) How many TV sets will be there awaiting for the repair | **CO5** | **L5** |
| 14 | In a bank there is only on window. A solitary employee performs all the service required and the window remains continuously open from 7am to 1pm. It has discovered that an average number of clients is 54 during the day and the average service time is 5mins / person.  Determine a) Average number of clients in the system b) Average waiting time | **CO5** | **L6** |
| 15 | At public telephone booth in a post – office arrivals are considered to be Poisson fashion with an average inter arrival time of 12mins. The length of the phone call is ED with a mean of 4mins. Determine   1. The probability that the fresh arrival will not have to wait for the phone. 2. What is the average length of the queue that forms from time to time | **CO5** | **L5** |

**LAST DATE OF SUBMISSION 27-07-2023 WITHOUT FAIL**