Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, January 2021

Course: Statistical Modelling for Computer Sciences **Semester: I**
Program: M. Tech. CSE **Time 03 hrs.**
Course Code: CSEG7003 **Max. Marks: 100**

SECTION A (All Questions Are Compulsory)

1. **Each Question will carry 5 Marks**
2. **Instruction: Complete the statement/ Select the correct answer(s)**

S. No.	Question	CO
Q 1	Let S={1,2,3,4,5,6} A={1,3,5} B={2,4,6} C={2,3,5} then answer the following in the form of **True or False** i. A and B are mutually exclusive ii. A and C are collectively exhaustive iii. A and B are collectively exhaustive iv. B and C are collectively exhaustive	**CO1**
Q 2	i. All of the following increase the width of a confidence interval except: a) Increased confidence level b) Increased variability c) Increased sample size d) Decreased sample size ii. Degree of freedom indicates _____ iii. Level of significance indicates_____ iv. Type I error in hypothesis testing occurs when _____	**CO2**
Q 3	i. Coefficient of variation of _____distribution is 1. ii. If λ is equal to 8 then standard deviation of exponential probability distribution is_____ iii. Value of mean in standard normal distribution is _____ iv. Normal distribution is symmetric around_____	**CO3**
Q 4	i. Expectation remains same in _____ process ii. In Poisson process, inter arrival time distribution is according to _____ distribution. iii. Formula of Autocorrelation function $R(t_1, t_2)$=_____ iv. Superposition of two independent process having parameter λ_1 and λ_2 will result into a Poisson process with parameter_____	**CO4**
Q 5	i. Normal distribution has _____shape curve. ii. In binomial distribution n=6 and p=0.9, then the value of P(X=8) is _____ iii. Name the discrete distribution possess Markov property: _____ iv. Name the continuous distribution possess Markov property: _____	**CO1**

Q 6	i. Name of the test which is used for judging the significance of more than two sample means at the same time is _____ ii. Chi square is parametric test. **True/False** iii. If a random sample from exponential distribution is as follows: 14.84, .19, 11.75, 1.18, 2.44, .53 then value of λ is _____ iv. If population distribution is uniformly distributed over an interval (-a, a) then mean is _____.	**CO3**
SECTION B (All Questions Are Compulsory) **1. Each Question will carry 10 Marks** **2. Instruction: Write short / brief notes**		
Q 7	A lot of transistor contains .6% defectives. Each transistor is subjected to a test that correctly identifies a defective, also misidentifies defective about 2 in every 100 good transistor. Given that a randomly chosen transistor is good by the tester, compute the probability that it is actually good.	**CO1**
Q 8	Explain least square method of parameter estimation.	**CO2**
Q 9	**i.** Prove the linearity property of expectation. **ii.** If X & Y are independent random variables then prove that Var[X+Y] = Var[X] + Var[Y]	**CO3**
Q 10	Using suitable example, explain open and close queuing network. **Or** Explain the classification of Stochastic process.	**CO4**
Q 11	A sample of 400 male students is found to have a mean height 67.47 inches. Can it reasonably regarded as a sample from a large population with mean height 67.39 inches and standard deviation 1.30 inches? Test at 5% level of significance with $\|z\|>1.96$	**CO2**
SECTION-C (All Questions Are Compulsory) **1. Each Question will carry 20 Marks** **2. Instruction: Write long answer**		
Q 12	i. Prove that uni-programmed computer system with m I/O devices and a CPU can be represented by finite irreducible Markov chain. ii. Explain the three generalization of Bernoulli process. **(14+6) marks** **OR** i. Explain birth death process for discrete parameter homogeneous Markov chain. ii. Using generating function transformation, calculate the expectation and variance of random variable whose distribution is according to geometric distribution. **(10+10) marks**	**CO4**