# Modeling and Simulation of Discrete Event Systems
## Solution- Assignment 2

Q1. The type of probability distribution function that follows the following will be

$p(x) = q^{x-1}p \quad x=1,2,3\ldots\ldots\ldots$

$= 0 \quad \text{otherwise}$

(a) **Geometric distribution**
(b) Poisson distribution
(c) Lognormal distribution
(d) Bernoulli distribution

Q2. In case of Geometric distribution, if p is the associated probability of each success and q is associated probability of each failure, mean is equal to
(a) $1/p^2$
(b) **$1/p$**
(c) $1/q$
(d) p

Q3. Weibull distribution reduces to exponential distribution when location parameter, scale parameter and shape parameter values are set to respective values of
(a) **0,1,1**
(b) 1,0,1
(c) 0,1,0
(d) 1,1,1

Q4. The type of probability distribution function that follows the following will be

$P(x) = n_{C_x}\, p^x q^{n-x} \quad x= 0,1,2\ldots\ldots\ldots$

$= 0 \quad \text{otherwise}$

(a) Bernoulli distribution
(b) **Binomial distribution**
(c) Normal distribution
(d) Triangular distribution

Q5. The given probability distribution function below is:

$p(x) = e^{-\alpha}\, \alpha^x / x! \quad x=0,1,2\ldots\ldots\ldots$

$= 0 \quad \text{otherwise}$

(a) Triangular distribution
(b) **Poisson distribution**
(c) Geometric distribution
(d) Negative binomial distribution

Q6. The type of distribution in which mean and variance are equal is
(a) **Poisson distribution**
(b) Normal distribution
(c) Triangular distribution
(d) Bernoulli distribution

Q7. In case of Geometric distribution, if p is the associated probability of each success and q is associated probability of each failure, Variance is equal to
(a) $q^2/p^2$
(b) $q^2/p$
(c) **$q/p^2$**
(d) $p^2/q$

Q8. Weibull distribution reduces to which distribution when location parameter, scale parameter and shape parameter values are set to 0, 1 and 1 respectively.

(a) **Exponential**
(b) Poisson
(c) Binomial
(d) Geometric

Q9. In a triangular distribution with parameters (a, b, c), the mode is

(a) (a+2b+c)/4
(b) (a+4b+c)/6
(c) (a+b+c)/3
(d) **b**

Q10. If a random variable Y has a N($\mu$,$\sigma^2$), then it can be said that X=$e^Y$ has

$$p(x,y) = \begin{cases} \frac{x+y}{30} & for\ x = 0, 1, 2\ and \\ & y = 0, 1, 2, 3 \\ 0 & otherwise \end{cases}$$

(a) an exponential distribution with parameter 1/ $\mu$
(b) an exponential distribution with parameter $e^{\mu}$
(c) **a lognormal distribution with parameter** $\mu$ and $\sigma^2$
(d) a lognormal distribution with parameter 1/$\mu$ and 1/$\sigma^2$

Q11. It is indicated that 82% of single women aged 25 years old will be married in their lifetime. Using the binomial distribution, the probability that two or three women in a sample of twenty will never be married will be

(a) 0.173
(b) 0.228
(c) **0.401**
(d) 0.782

Q12. Ram is part of the squad for playing football tournament this season. The probability that Ram gets into the game is 0.40. The probability that the first game Ram enters is the fourth game of the season will be

(a) 0.0384
(b) **0.0864**
(c) 0.0576
(d) 0.1440

Q13. A computer repairperson is "beeped" each time there is a call for service. The number of beeps per hour follows Poisson distribution with mean of 2 per hour. The probability that there are two or more beeps in 1-hour period will be

(a) **0.594**
(b) 0.148
(c) 0.385
(d) 0.823

Q14. A group is currently winning 55% of their games. There are 5 games in the next two weeks. Probability that they will win more games than they lose will be

(a) **0.593**
(b) 0.256

(c) 0.387
(d) 0.407

Q15. Records indicate that 1.8 % of the entering students at a university drop out of school by midterm examination. The probability that three or fewer students will drop out of a random group of 200 entering students (assuming poisson distribution) will be
(a) 0.173
(b) 0.228
(c) **0.515**
(d) 0.782