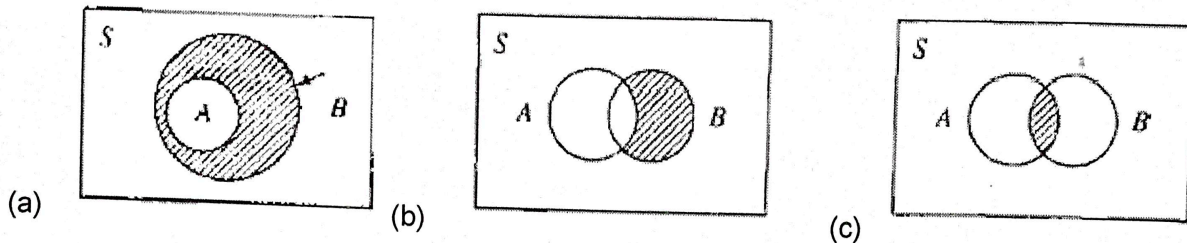## Department of Electronics and Communication Engineering
Digital Communication
Theory Assignment 1 (02/07/2019)
Date of Submission (16/07/2019)

Q1. What are the axioms of Probability? Justify with suitable proofs. [CO.502.1]

Q2. What is illustrated by following Venn diagrams? [CO.502.1]

(a) (b) (c)

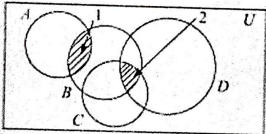Q3. Show that $P(A) = P(A \cap B) + P(A \cap \bar{B})$. [CO.502.1]

Q4. Two manufacturing plants produce similar parts. Plant 1 produces 1000 parts out of which 100 are defective. Plant 2 produces 2000 parts, 150 of which are defective. A part is selected at random and found to be defective. What is the probability that it came from Plant 1. [CO.502.1]

Q5. Find the Fourier transform of $e^{-at}u(t)$. [CO.502.1]

Q6. Find the Fourier transform of $g(t) = rect(\frac{t}{\tau})$. [CO.502.1]

Q7. Verify the relation $A + B - AB = A\bar{B} + \bar{A}B$. [CO.502.1]

Q8. Find out the set composed of shaded region. [CO.502.1]

Q9. A box contains 3 white, 4 red and 5 black balls. A ball is drawn at random. Find the probability that it is (a)red (b) not black and (c) black or white. [CO.502.1]

Q10. Two dice are thrown. What is the probability of getting a 5? [CO.502.1]

Q11. The density function of a continuous random variable is

$$f(x) = \begin{cases} \dfrac{x}{8} & 0 < x < 4 \\ 0 & otherwise \end{cases}$$

Compute $E(X)$. [CO.502.1]

Q12. A fair die is tossed 5 times. A toss is called a success if 1 or 6 appears. Find (a) the probability of 2 successes, (b)the mean and standard deviation for the number of successes. [CO.502.1]

Q13. If 4% of the total items made by a factory are defective, find the probability that less than 2 items are defective in a sample of 50 items. [CO.502.1]

Q14. Find the probability of 4 to 7 heads inclusive in 10 tosses of a fair coin. [CO.502.1]

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Prepared by : Dr. Amit Udawat (EC department)
Submission date: 16/07/2019

Dated: 02/07/2019

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Director
Shivajirao Kadam Institute of Technology & Management - Technical Campus,INDORE

Head
Electronics & Communication Deptt.
Acropolis Technical Campus
Tillore Khurd, Ralamandal, Indore (M.P.)