



DEPARTMENT OF ELECTRONICS &  
COMMUNICATION  
Digital Communication (Code: ECEM-101)



Date: 24/11/2017 Deadline: Monday (27/11/17) Morning *Homework 3 for M.Tech (CIT) ECE (I Sem)*

1. Solve problem 5.18 from problem set given on the chapter from simon haykins book
2. Solve problem 5.19
3. Problem number 5.20 from the Book of Simon Haykins
4. Problem number 5.25 from the Book of Simon Haykins (This is optional problem only for outstanding students. If you really solve this problem by yourself, without looking for any solution or hint, then you should go for pursuing research in Information and coding theory)
5. Take  $X$  and  $Y$  as discrete random variables as in assignment 2, Show that

$$H(X, Y) = H(X) + H(Y|X) \quad (1)$$

6. Using the result proved in above problem and also using the fact that  $I(X; Y) = H(Y) - H(Y|X)$  show that

$$I(X; Y) = H(X) + H(Y) - H(X, Y) \quad (2)$$

7. Problem number 5.31 from the Book of Simon Haykins
8. Problem number 5.33 from the Book of Simon Haykins
9. Solve 5.21 from book, and hence show that  $I(X, Y) \geq 0$ .
10. Problem number 7.3 from the Book of Simon Haykins