IME625: Stochastic Processes

2021-22 Sem-II

Homework-1

Consider students in IME625 can be classified as sincere as well as smart (with respect to the course), sincere but unsmart, insincere but smart, and insincere as well as unsmart. Let B_1, B_2, B_3, B_4 denote these types. I want to award 3/2/1/0 marks to a $B_1/B_2/B_3/B_4$ student in the class participation component. I don't know who is of which type. So, I have decided to employ the following mechanism: I ask three questions to each student during the classes. If a student answers 3/2/1/0 questions correctly, I consider him/her of $B_1/B_2/B_3/B_4$ type.

With the above mechanism, a student was awarded 2 marks. What is the probability that the mark assignment is correct? What is the probability that the error in the mark assignment is within ± 1 of the true marks? Use the following data for answering.

Past experiences suggest that 40% students are of type B_1, 30% are of type B_2, 20% are of type B_3, and the remaining 10% are of type B_4. Let A denote the event that a student correctly answers a question asked during class. Again, past experiences tell that $P(A|B_1) = 0.9$, $P(A|B_2) = 0.6$, $P(A|B_3) = 0.5$, and $P(A|B_4) = 0.2$.