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**LOGICAL APPROACH TOWARDS THE SURPRISE TEST AND
UNEXPECTED HANGING PARADOX: A CRITICAL ANALYSIS**

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Introduction: Humans are intelligent beings. That is, as he has intelligence also has animality in him. In the pursuit of animality he acts emotionally. Similarly for rationality he becomes judgmental. But that rational thinking can sometimes take the form of self-contradiction or Paradoxical. The word paradox is derived from two Greek words 'para' and 'doxa'.¹ Where the word 'Para' means 'Contrary to'. That is contrary to conventional wisdom. And the word 'Doxa' means 'Opinion'. That is, the literal meaning of the word Paradox is contrary to the conventional opinion. For example, I am now going to discuss such a topic which has been created in the context of a classroom examination. Suppose a teacher goes to his class on a Sunday and tells the students that I will give you a surprise test from this Monday to Friday. Many students were shocked but one of them said that, Sir, you cannot take our surprise test. Because a surprise test can never be taken by announcing. Mean? Whenever you announce that you will take a surprise test, it is not really a surprise anymore. Then the teacher said why? What's the problem? Then the student said that whenever you announce that you will take a surprise test then we start preparation for said purpose. And we are thinking that we will not be surprised by you and are alert every day that you will take our test and are always preparing with that in mind. As a result, it is no longer a surprise test for us, rather it is becoming a sure test. Because whenever you have class on Monday, we are thinking that you will take it on Monday, so we are preparing accordingly. So, it is no longer a surprise, and if we see that you are not taking the test on Monday, we assume that you will take the test on Tuesday. As a result, it is no longer a surprise test but is becoming a sure test. Thus, due to our alert until Friday, it is no longer a surprise test. As a result, a surprise test can never be taken by announcing or a surprise can never be given by announcing that a surprise will be given. As a result, it is not possible to take a surprise test.²

Similarly in the case of unexpected hangman paradox we observe that a convict sentenced to death is told that he will be hanged unexpectedly on a day between Monday and Friday next week. Then the said prisoner said that I cannot be hanged suddenly. Because it

¹ Ramaprasad Das and Subirranjan Bhattacharya, *Sansad Yuktibijnan Abhidhan*, (Kolkata: Sahitya Sangsad, 2009), 267.

² James Cargile, , "The Surprise Test Paradox," *Journal of Philosophy* 64, No. 18 (Sep. 21, 1967), 550.

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is never possible to hang suddenly by announcement. Because whenever it is announced that the execution will be between Monday and Friday next week, he knows that he can be hanged on any of those days. As a result, those days are not the days of sudden execution for him but the days of certain execution. But since the jail authorities did not mention any specific day or time, many may think that if he is hanged on any day of the week, it will happen suddenly.³ As a result, two opposing views are emerging. According to one side i.e., prison authorities, sudden hanging is possible. But according to the said prisoner, it is not possible to hang suddenly with prior announcement. As a result, the matter needs to be discussed critically.

Critical Exposition: Actually, in this case, two sides have been created, so two views have been created. One is the teacher's side and the other is the students' side. The reason for thinking that it is possible to take a surprise test on the part of the teacher or a surprise test is that in this case, the teacher can take a test at any time during the aforementioned week, by which everyone will be shocked, as no specific day is mentioned. But this is not surprising on the part of the students because they know that whenever the teacher says that he will organize a test sometime in the aforementioned week, they will all become aware and read about the subject. As a result, they will not be surprised or shocked no matter what time of the week the exam is. As a result, in this case, a glimpse of a logical paradox may appear due to the fact that at the same time it is possible to take a surprise test and it is not possible to take a surprise test. In this case, if we take the surprise test as possible event 'P' and surprise test is not possible if we take the event as ' $\sim P$ ', then at the same time an event is possible and impossible or $p \sim p$ event occurs, according to the principles of logic, self-contradiction is generated.⁴

But if we observe the above deeply, we will see that there is actually no paradox. There seem to be positive and negative events about the same event, but in reality, they are happening in different contexts. Because one is happening from the students and the other is happening from the teacher. In this case, the teacher is thinking that a surprise test is possible in the sense that he has thought to test the students by surprise. But he did not have it in his mind that whenever I announce that I am going to organize an exam for you suddenly - saying

³ Timothy Y. Chow, , "The Surprise Examination or Unexpected Hanging Paradox," *The American Mathematical Monthly* 105, No. 1 (Jan., 1998), 41.

⁴ Irving. M. Copi, Carl Cohen and Kenneth McMahan, *Introduction to Logic*, (England: Pearson, 2014.), 352.

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so means that it is no longer sudden. And therefore, it is not possible to take a sudden test. That's why it cannot be called a proper logical paradox.

But some may claim that in this case there is a minimum surprise. Because by surprise we usually mean that which is unexpected to us. Similarly, there is minimal surprise in the case of the surprise test paradox. Because even though they may think that they will be tested sometime between Monday to Friday. But if the test is on Monday, then there is minimal surprise because Monday is one of the possible days and every day from Tuesday to Friday is one of the possible days. As a result, as the exam is on Monday, it could have been any day between Tuesday and Friday. As a result, if the teacher takes the exam on Monday, they will be surprised because the exam could have been on Tuesday or Wednesday or Thursday or Friday instead of Monday. Again, if the exam is on Tuesday instead of Monday, it will also be surprising because the exam could have been on Wednesday or Thursday or Friday instead of Tuesday. Similarly, if the exam is held on Wednesday instead of Tuesday, it would be surprising because the exam could have been held on Thursday or Friday instead of Wednesday. Similarly, if the test is on Thursday, it is surprising because the test could have been on Friday instead of Thursday. But now the question is if the exam is on Friday. That is, if the exam is on the last day of the scheduled week, will it be a surprise? Because one can say that it is the last day of the surprise test. As a result, the exam will be held that day. On the one hand, it can be said that yes, it is a confirmation of the said test. But that is also a possible day because the exam may not be held like other days for some unknown reason. So even if it is the last day of the week, it cannot be called a completely sure day.

Similarly, in the case of the Unexpected Hanging Paradox, we observe that a prisoner on death row is told that you will be hanged unexpectedly between Monday and Friday of the following week. Then the said prisoner said that it is not possible to hang him suddenly. Then the said prisoner said that it is not possible to hang him suddenly. Because whenever it is announced that he will be hanged on any day between next Monday and Friday, he will be on the alert every day of the week for the reason that he can be hanged on any day. So, it is not a sudden day for him but a certain day. Rather, one may wonder why he was sentenced to death because he did not commit a crime worthy of the death penalty. But if the person sentenced to death is to be hanged on any day between Monday and Friday of the specified week, he can be hanged on any day at any time. He is not surprised here. Because if it is announced that he will be hanged on any day between Monday and Friday next week then he

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will be alert or ready to be hanged thinking that he will be hanged on Monday. But he would not be surprised if he were hanged on Monday because that day is a day of the week mentioned. Again, he will not be surprised if there is no hanging on Monday because there are still four days to go. Again, he would not be surprised if he were hanged on Tuesday because that day is a day of the week mentioned. He would not be surprised if there is no hanging again on Tuesday because there are still three days to go. Similarly, he should not be surprised if he is hanged on Wednesday or Thursday or Friday.

But as in the previous problem, one can say that every day mentioned has something to be surprised about, even if it is minimal. For, if he was hanged on the first day of the said week, i.e., Monday, then the incident is surprising because he could have been hanged on Tuesday or any other day instead of Monday. If he is hanged on Tuesday instead of Monday, it is also surprising because he could have been hanged on any other day instead of hanging on Tuesday. That is, he could be hanged next Wednesday or Thursday or Friday. And if he was hanged on Wednesday, it is also surprising because instead of hanging on Wednesday, he could have been hanged on Thursday or Friday. And if he was hanged on Thursday, it would be surprising because instead of being hanged on Thursday, he could have been hanged on Friday. But the question is if he is hanged on the last day of the scheduled week i.e., Friday, will it be a surprise? Because it is not accidental to him but a sure day of execution. But one could say that there is something to be surprised about. Because he could not be hanged on Friday like other days of the week. Perhaps for some unknown reason he could not have been hanged. The result can be said to be a surprising event to say the least.

Conclusion: But the question is how to accept the degrees of possibility? That is, how can we say that even on the last day of the mentioned week, i.e., Friday, there is a possibility that the exam will not be held even if it is a minimum possibility? Actually, if we observe the above, we can see that there is surprise, even if it is minimal. Because if there is a necessary event i.e., an event which will inevitably happen, there is no surprise. But surprise works in cases where probability works, i.e., the event may or may not happen. For example, $2+2=4$. Since the event is necessary, probability does not work there. But probability always works in cases which are contingent events i.e., events which may or may not happen. As a result, the subject of possibility has come in the aforementioned case. For example, in the case of surprise test paradox, the last day of the mentioned week i.e., Friday is also not out of possibility. Although there is often no chance of the exam not being held on that day, it cannot

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be said with complete certainty that the exam will be held on that day. Because that is also a possible day. That is to say, there is a possibility, even if it is minimal. Because on that day like other days, their exam could not be done for some unknown reason. Although the said Friday is not like other days. Because if we judge from the point of view of probability, we will see that the probability of examination on Monday of the specified week is $\frac{1}{5}$ and the probability of examination on Tuesday is $\frac{1}{4}$, the probability of examination on Wednesday is $\frac{1}{3}$ and the probability of examination on Thursday is $\frac{1}{2}$ but the probability of examination on the last day of the week i.e., Friday is $\frac{1}{1}$ i.e., 0.⁵ Hence it means that the said day is a sure day of examination or there is no possibility of examination. But why do we call that day a possible day? That is, why is it saying that the probability of the test is $\frac{1}{1}$ or 0? That is to say that all the events which are not inevitable or not necessarily have a minimal possibility. Hence it has to be said that every day of the week is a possible day of non-examination as well as a possible day of examination. So, on one of those days, they may or may not be tested by chance. And in the case of surprise tests, we notice that they are surprisingly tested on a day of the said week.

Similarly, in the case of unexpected hanging paradox, the last day of the mentioned week i.e., Friday is also not out of possibility. Although the possibility of not being hanged on that day is often unlikely, it cannot be said with complete certainty that it will be hanged on that day. Because that is also a possible day. That is to say, there is a possibility, even if it is minimal. Because on that day, like other days, he could not be hanged for some unknown reason. Although the said Friday is not like other days. Because if we judge from the point of view of probability, we will see that the probability of hanging on Monday of the said week is $\frac{1}{5}$ and the probability of hanging on Tuesday is $\frac{1}{4}$, the probability of hanging on Wednesday is $\frac{1}{3}$ and the probability of hanging on Thursday is $\frac{1}{2}$ even if the last day of the week i.e., Friday the probability of hanging is $\frac{1}{1}$ i.e., 0. Hence it is said that the said day is a certain day of hanging or not likely to be hanged. But why do we call that day a possible day? That is, why is it saying that the probability of hanging is $\frac{1}{1}$ or 0? That is to say that all the events which are not inevitable or not necessary, have a minimal possibility. Consequently, it must be said that every day of the week is as likely to be hanged as it is to be non-hanged. So, on one of those days, they may or may not be hanged by

⁵ Irving. M. Copi, Carl Cohen and Kenneth McMahon, *Introduction to Logic*, (England: Pearson, 2014), 588.

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chance. And in the case of an unexpected hanging paradox, we notice that one day of the week he is suddenly hanged.

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