



Register Number:

Date and Session:

ST JOSEPH'S UNIVERSITY, BENGALURU-27
UG (MATHEMATICS OPEN ELECTIVE)- IV SEMESTER
SEMESTER EXAMINATION: APRIL 2024
(Examination conducted in May/June 2024)
MTOE 10: HOW TO MAKE THE RIGHT DECISIONS
(For current batch students only)

Duration: 2 Hours

Max Marks: 60

-
1. The paper contains **FOUR** printed pages and **THREE** parts.
 2. Dictionary is allowed.
-

PART A

Answer any **SIX** of the following.

[6 × 2 = 12]

1. Discuss decision-making under conditions of risk, providing an example to illustrate the concept.
2. Differentiate between parametric and nonparametric decision-making approaches.
3. A farmer wants to decide which of the three crops he should plant on his 100-acre farm. The profit from each is dependent on the rainfall during the growing season. The farmer has categorized the amount of rainfall as high, medium, and low. His estimated profit for each is shown in the table.

Rainfall Estimated conditional profit(Rs)

Rainfall level	Crop A	Crop B	Crop C
High	800	350	500
Medium	450	450	500
Low	200	500	400

If the farmer wishes to plant only one crop, decide which should be his best crop using Maximin criterion.

4. Explain Bayes' Criterion and its significance in decision theory, particularly in the context of making decisions under uncertainty?
5. What is the significance of admissibility criteria in evaluating solutions or actions in a professional setting, and how does adherence to these criteria contribute to maintaining a positive and productive work environment?
6. Define pure strategy and provide an example illustrating its application in a strategic decision-making context.
7. What is the equilibrium solution for game theory?
8. Let's say there are two coworkers, Alice and Bob, who work together on a project. Alice feels that Bob has been taking credit for her work and undermining her efforts in front of their boss. Instead of addressing the issue directly, Alice decides to retaliate in a vindictive manner. She intentionally excludes Bob from important meetings, spreads rumors about him among other colleagues, and even sabotages some of his work. How might Alice's actions affect the overall work environment and team dynamics, and what steps could be taken to resolve the situation more constructively?

PART B

Answer any **THREE** of the following.

[3 × 6 = 18]

Scenario 1

As the final quarter of the nineteenth century approaches, you, Thomas Edison, foresee coming era of greater and greater use of machines, particularly those that use electricity. As a result, you are planning on going into business developing those machines. Not only are you talented, but you have always been able to keep your eye on the ball-when you were young, you saved the life of a railway station official's child and asked for lessons in telegraphy as a reward. Despite the fact that you have little or no formal schooling, you have already developed several improvements to the telegraph, and this has given you a modest amount of seed money. As a result, you are nearly at the point where you can start your own company developing inventions. You already have several inventions in mind, but for your business to become prosperous, you want to make sure that everything is well organized. The two inventions that you believe have top priority are a stock quotations printer because there is an immediate demand for it, although the market is small, and an electric light because the market for it is so phenomenal.

Scenario 2

Ever since that unforgettable Christmas when your parents gave you a microscope, you've dreamed of being a biologist. You could have gone into industry or taught biology at a high school after you received your B.Sc., but you had your sights set on getting a doctorate. You had to take out a bunch of student loans and undoubtedly a major factor in the recent rise in fuel prices is all the midnight oil you've had to burn. However, it all seems to have paid off at least at this stage. You've just gotten word that you've passed your comprehensive exams, and it's time to select a thesis advisor. The department hotshot (Two years ago he produced a thesis that has the largest number of citations of any publication produced by a member of the department. There's a chance that he's doing research that will put him on the shortlist for a Nobel Prize). Your favorite professor (You instantly connected with this guy, you know you can work with him, and he's willing to let you choose whatever topic you would like for your dissertation). You've heard horror stories about promising students who have been derailed by selecting the wrong advisor, so this is a make-or-break decision.

9. In **scenario 1**, justify the decision to prioritize the development of the stock quotations printer.
10. In **scenario 1**, justify the decision to prioritize the development of electric light.
11. In **scenario 1**, explain the decision to initially distribute efforts across both projects and subsequently focus on the project showing the most progress, with appropriate justification.
12. In **scenario 2**, justify why would you choose the department hotshot as your thesis advisor?
13. In **scenario 2**, justify why would you choose your favorite professor as your thesis advisor?

PART C

Answer any **FIVE** of the following

[5 × 6 = 30]

Scenario 3

You've been a competitive basketball player all your life- in fact, you went to college on a basketball scholarship. Few make the transition to the NBA, and you were forced to acknowledge that a career in the pros was simply not in the cards. Nonetheless, you've held your own with the youngsters at the gym- and you are in your forties. However, you find yourself getting side lined with injuries now, that you never suffered when you were younger, and a hip injury is just healing. You have no intention of giving up athletics, which has played such an important role in your life, but you have to face the facts: Father Time is catching up with you.

Scenario 4

You were the first (and so far, the only) person to conquer the world, and maybe that's why they are starting to call you Alexander the Great. After the assassination of your father, Philip of Macedon, you were surrounded by domestic enemies and threatened by rebellion on the foreign front. Nonetheless, your skill as a warrior enabled you to defeat the other Greek states, and you have just emerged triumphant in a monumental battle with your ancient foe, Persia. There are still new worlds to conquer, but equally important is the necessity of not having to reconquer the opponents you have already vanquished. If are to achieve your dream of an empire, you need to devise a strategy for dealing with conquered territories that will not only maximize their benefit to you but will minimize the discontent that inevitably springs from being conquered. After some thought, you have constructed three alternative actions.

14. In **scenario 3**, justify the decision to play with the same intensity as always.
15. In **scenario 3**, justify the decision to not give the proverbial 110 percent and settle for 100 percent. Or 90 percent? Or maybe 80 percent?
16. In **scenario 3**, justify the decision to switch to another less physically demanding sport, such as golf?
17. In **scenario 4**, justify the decision to leave a garrison behind in each conquered territory that will be responsible for governing it.
18. In **scenario 4**, justify the decision to establish a privileged class from the conquered population that will have the responsibility of governing in your absence.
19. In **scenario 4**, justify the decision to leave a small entourage behind, which you will encourage to adopt local customs and mix with the local establishment to try to instill a feeling of belonging in the conquered territory?
20. On Thursday evening, detectives from India's National Investigation Agency arrived in an SUV at a red and white building on the outskirts of Ranchi in India's eastern state of Jharkhand. There they picked up Father Stan Swamy, an ailing 83-year-old activist and Jesuit priest. They seized his mobile phone and asked him to pack a bag. They then drove him to the airport and boarded a flight to Mumbai, where Father Swamy was remanded to judicial custody until 23 October. He is now the oldest person to be accused of terrorism in India. The National Investigation Agency (NIA), which deals with anti-terror crimes, arrested him in connection with a 2018 incident of caste-based violence and alleged links with Maoists. The rebels, who are active in several eastern and central states, claim that they are fighting for communist rule and greater rights for tribal people and the rural poor. In a video recorded days before his arrest, Father Swamy said detectives had questioned him for 15 hours over five days in July. They had produced "some extracts" allegedly taken from his computer that pointed to his links with Maoists, he said. He denied them, saying they were "fabrications" that were "stealthily" put into his computer. His advanced age, health complications, and the raging pandemic would make it difficult for him to travel to Mumbai, he told the detectives.

He hoped “human sense would prevail,” he said. Despite his deteriorating health, Father Swamy never missed an opportunity to speak up for tribespeople. He has survived a bout of cancer and three surgeries. His hands shake uncontrollably - doctors have not been able to make a diagnosis yet - and food is always served to him. A few years ago, he participated in a march to protest against a spate of lynchings, trying to hold a placard with his shaking hands. “Such is his spirit and commitment,” said Siraj Dutta, a local activist. Jean Dreze, a Belgian-born Indian development economist who has known Father Swamy for over a decade, described him as a “gentle and honest man, always on time, secular and committed to his causes”.

“He might have helped people with association or sympathy with Maoists, which is not uncommon in a place like Jharkhand. That doesn’t make him a Maoist. His arrest is part of a larger effort to undermine opposition”, Dr Dreze said. “He is now being treated like the people he has been trying to defend all his life.” Much of Father Swamy’s activism, his friends say, was seeded during his time at the University of Manila. He told friends how he was inspired by the people’s movement to overthrow the corrupt and brutal regime of President Ferdinand Marcos.

As a postgraduate student in Brussels, he met the radical Brazilian educator, Paulo Freire, an advocate of teaching critical thought in schools. And even after returning to India, he kept in touch with people’s movements in Latin America and read voraciously.

The son of a farmer father and homemaker mother from the southern state of Tamil Nadu, he led a school for training leaders of marginalized communities in Bangalore for more than a decade. “For Stan, people were more important than anything else. He leaped across the wall of church institutions to be with the people,” Xavier Dias, a friend and activist, told me.

He was also stoical about loss. Two months ago, his nephew died of Covid-19 in Chennai. A few days later, his nonagenarian sister passed, of “sorrow, possibly”, according to Father Swamy. “This is my personal loss, but when so many people are dying of the disease, we have to think about their losses too,” he told Mr Dias. At a dinner at Mr Dias’s home, weeks before the NIA came for him, the two discussed the future and fears about an impending arrest.

“My bags are packed and I am ready to go,” Father Swamy told his host.

With this information, what options will you bring to the decision table(stating your Payoff in each case), if you are,

- a) a student
- b) a teacher

*******END*******