Azim Premji University

Applicant's Name:	
Roll Number:	**Application Number:** A P U 2 0 U G
Date:	**Test Centre:**

<u>**PART II**</u>   <u>**DESCRIPTIVE COMPONENT**</u>

As part of the selection process, we would like to learn more about your interest in pursuing the programme of your choice. Answer the questions relevant to the programme that you have indicated as your first preference in the application form.

- Please write the descriptive component for the major which you have selected as your first preference.
- The Descriptive component (approximately 500 - 750 words) must be written only in English.
- Use the space provided in this booklet to answer the questions. Additional sheets will not be provided.
- Rough sheets will be provided to you separately.
- You have 60 minutes to complete this section.
- This booklet will be collected at 1.30 p.m.

Mention your first programme preference -   ------------------------------------

Read the passage below and answer the questions that appear after it.

The urban farmers battling Bangalore's concrete jungle

Ramagondanahalli is an urban village being swallowed by the city. It lies on Varthur Lake, one of the biggest in Bangalore, which is known as the Silicon Valley of India. There are copper-tinted dirt roads, small-scale vegetable farms all around Varthur lake.

The once-rural farming community is now part of eastern Bangalore, near the city's mighty IT campuses. This rapid urbanisation has placed urban farmers like Hanumanthappa, who is 45, into a difficult relationship with the city. They are confronted with a choice: continue farming under adverse conditions, or sell their land.
Ramagondanahalli is an example of what's happening throughout Bangalore. The city's concrete-covered area has expanded by 92.5% since 1970, with more farmland being sold off to developers as the city embraces its tech boom. The new urban landscape is testing farmers as they think about how to move forward.
A stream from Varthur Lake irrigates Hanumanthappa's plot. The second biggest lake in Bangalore lies just beyond his farm. He has always used lake water, but now it is extremely polluted. Hanumanthappa knows he's not supposed to use water straight from the lake. But without enough money to drill a borewell, he feels he has no other choice.

Varthur Lake is polluted with both industrial waste and untreated residential sewage from the apartments that line its perimeter. There is no hiding the pollution, since there is froth at the lake's surface, especially when it rains. Upstream, Bellandur Lake periodically catches fire because of the mixture of chemical pollutants it contains.

According to the state government's Department of Agriculture, as Bangalore was witnessing its IT boom and expanding growth, the area covered by vegetable crops in the district decreased from 0.1 million hectares in 2000 to a mere 0.04 million hectares by 2015. As a result, vegetable production went down 72%, from 0.29 million tonnes to 0.08 million tonnes during the same period.

(Adapted from: https://www.bbc.com/news/world-asia-india-39968365 - some words have been modified for easier reading)

Answer the following questions from this paragraph:

a. As a scientist in-charge, what biotic and abiotic factors would you measure to determine whether Varthur lake's water quality has deteriorated? (100 word limit)

b. What are the consequences of Hanumanthappa using Varthur lake's water for growing crops? (100 word limit)

c. If the concrete-covered area of Bangalore was 80 km^2 in 1970, what is the current concrete-covered area of Bangalore? Show your work.
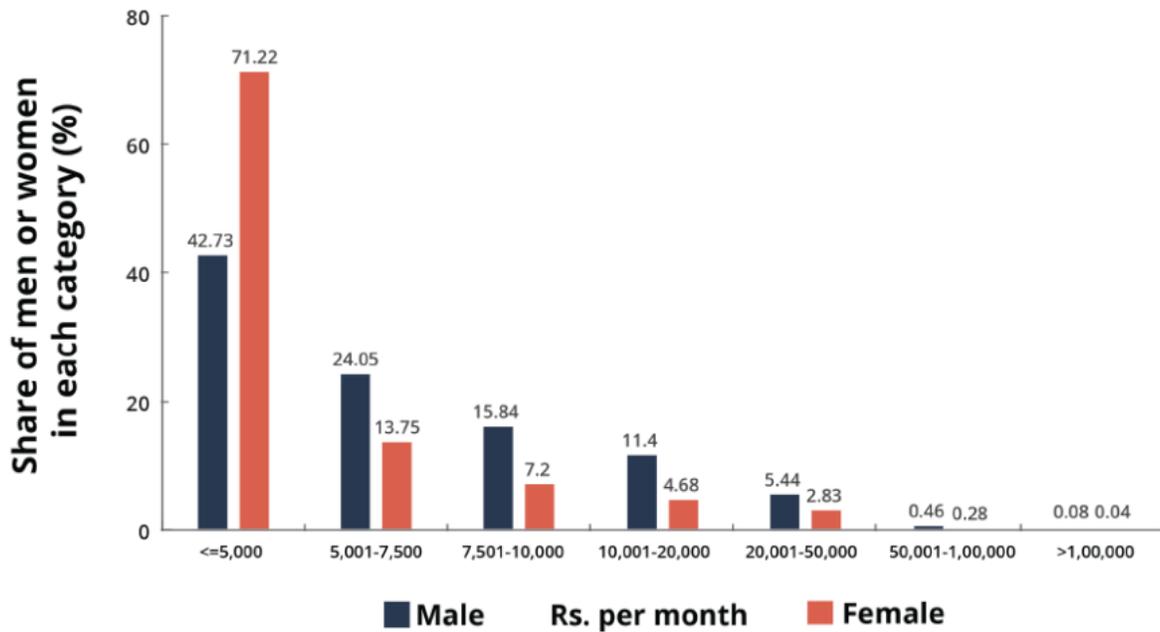
State of Working India 2018, Azim Premji University

The figure above is from the State of working India report in 2018. It depicts the share of men and women in different income brackets

1. "The majority of the population earns less than Rs. 7,500 a month." Is this statement True or False? Explain your answer.

2. If the Indian population was 1,000,000,000 people. How many women would be earning more than 10,000 Rs. Explain your answer.

3. Provide 3 reasons that you think the share of men in the higher income brackets is higher.

Read the passage below and answer the two questions that appear after it.

"Religions have helped greatly in the development of humanity. They have laid down values and standards and have pointed out principles for the guidance of human life. But with all the good they have done, they have also tried to imprison truth in set forms and dogmas, and encouraged ceremonials and practices which soon lose all their original meaning and become mere routine. While impressing upon man the awe and mystery of the unknown that surrounds him on all sides, they have discouraged him from trying to understand not only the unknown but what might come in the way of social effort. Instead of encouraging curiosity and thought, they have preached a philosophy of submission to nature, to established churches, to the prevailing Social order, and to everything that is. The belief in a supernatural agency which ordains everything has led to a certain irresponsibility on the social plane, and emotion and sentimentality have taken the place of reasoned thought and inquiry. Religion, though it has undoubtedly brought comfort to innumerable human beings and stabilized society by its values, has checked the tendency to change and progress inherent in human society." [Jawaharlal Nehru, *Discovery of India*]

a) On what grounds does the author critique religion?

b) Do you think religion can play a positive role in bringing people together in present day India? Give reasons for your answer.

(Minimum word requirement: 300 words for each answer, i.e. 600 words in all.)

Q4: B.Sc. & B.Sc. B.Ed. Mathematics

Answer any two questions from Part 1 and any two questions from Part 2. If you answer more than two questions from any part, only the first two will be considered. Please explain all your steps.

PART 1

1. A pair of six-sided dice are rolled together. What is the probability that the sum of the numbers rolled is 6?

2. Consider the two statements below and answer the questions that follow:

Statement A: All crocodiles are happy

Statement B: All happy animals like music

Draw a Venn diagram to represent these statements. Is it true that some animals that like music are crocodiles? Is it possible that every animal that likes music is a crocodile?

3. Draw a rough graph of speed versus time of a bus in the city of Bangalore. The bus starts from the bus stand and in a minute its speed is 60 km/hr. For the next ten minutes, it loses speed at 5 km/hr every minute, and then it continues at the same speed for the next ten minutes.

PART 2

1. Every neighbourhood in the city Bangalore has a garbage collection point which attracts a lot of stray dogs. Small localities have about ten dogs at the garbage centre whereas big localities have about twenty dogs at the garbage centre. Estimate the number of stray dogs in Bangalore. State any assumptions that you make.

2. The figure shows two circles with the same radius x arranged such that each one passes through the centre of the other. Find the perimeter of the shape outlined in bold.
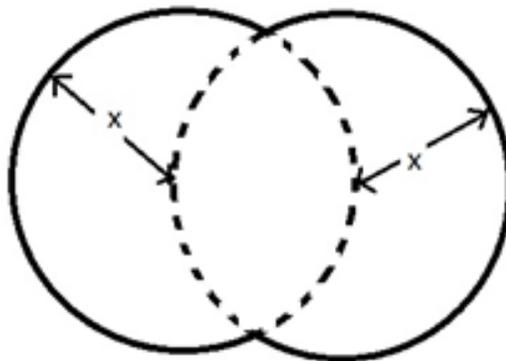
3. The Long Period Average (LPA) rainfall received by a place is calculated as the average rainfall received by it between 1951 and 2000, measured in centimetres.

The graph below shows the rainfall received by different states in 2018 versus the deviation from the LPA.
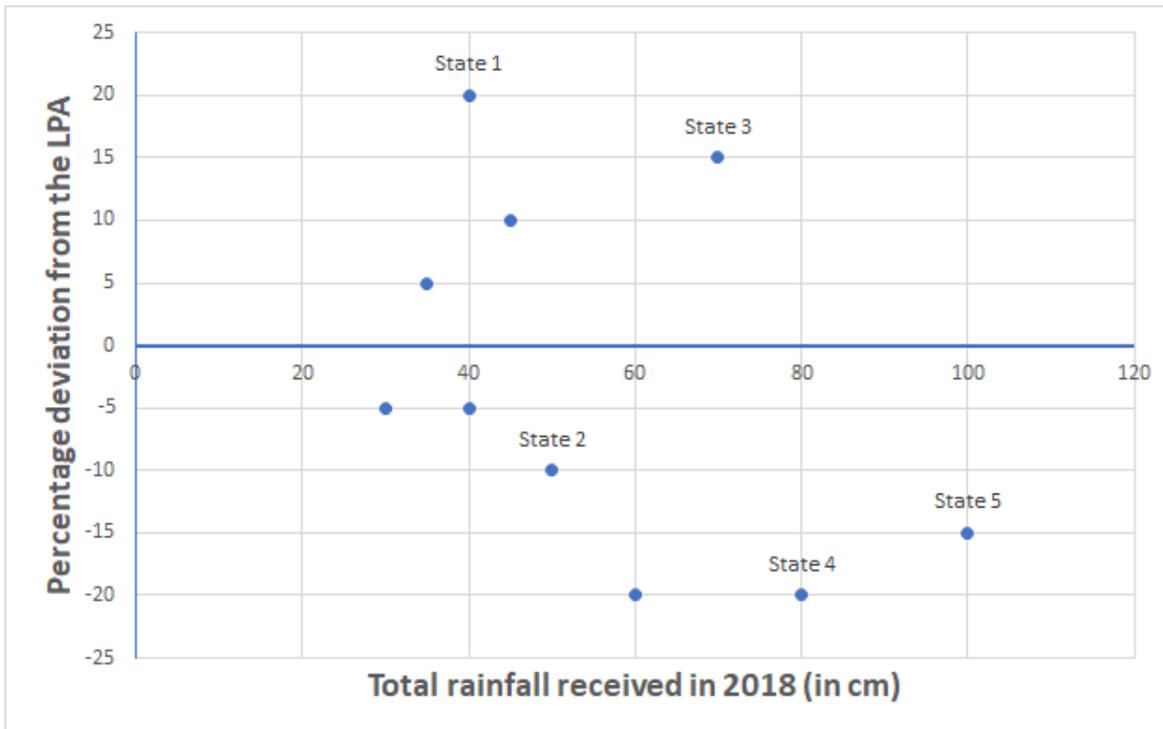
i) What is the LPA of State 5?

ii) Among State 2 and State 3, which has a higher LPA?

iii) What is the average deviation from LPA among States 1-5?

Q5: B.Sc. & B. Sc B. Ed Physics

Instruction: Attempt **any two** of the following three questions.

1. Imagine a ball that bounces without any energy loss, so that its velocity right after it hits the ground is the negative of its velocity right before it hits the ground. This ball is dropped down from height H. Let the time taken by the ball to reach the ground be T seconds.

    a) How high will it bounce back?

    b) Plot the position-time graph of the ball in the interval 0 to 2T seconds.

    c) Plot the velocity-time graph of the ball in the interval 0 to 2T seconds.

    d) Plot the acceleration-time graph of the ball in the interval 0 to 2T seconds.

2. A regular hexagon is drawn to fit inside a circle of radius 7cm.

    a) What is the perimeter of the hexagon and what is its area?

    b) Estimate the ratio of perimeter to area for the circle and for the hexagon with proper units.

    c) Comment on which ratio is more and why.

3.

    a) I have a long spring of spring constant k. With age, the spring becomes 'loose' and its spring constant drops to k/2. Can you think of a scheme to get a spring of constant k with this loose spring itself?

    b) Take three equal resistors of resistance R and place them on the three sides BC, CD, DA of a square ABCD with connecting adjacent resistors at the vertices C and D. Take another such arrangement of resistors and attach it parallel to the middle resistor with the new square's open ends joining C and D. Imagine repeating this pattern till infinity. What is the equivalent resistance of the final circuit (i.e., between the original open ends A,B)?