

Azim Premji University  
Undergraduate Programmes  
Sample Paper – Descriptive component\*

Time: 60 Minutes

1. ECONOMICS
2. HUMANITIES
3. BIOLOGY
4. PHYSICS
5. MATHEMATICS

Note: To be written after the completion of Multiple choice questions (Not part of this document). Candidates to attempt the section based on their first programme preference. These are indicative questions for practice. The entrance test may follow a different pattern in terms of level of difficulty and number of questions.

# 1.B.A. Economics –

Table 1

**Global Geographies of Extreme Poverty, 1987 and 2013**

	<i>Millions in extreme poverty</i>	<i>Poverty headcount (%)</i>	<i>Share of world's poor (%)</i>	<i>Ranking in # of world's poor</i>		<i>Millions in extreme poverty</i>	<i>Poverty headcount (%)</i>	<i>Share of world's poor (%)</i>	<i>Ranking in # of world's poor</i>
<b>A: 1987</b>									
<b>Low-income countries:</b>					<b>Middle-income countries:</b>				
Total	1,587	57.3	90.3		Total	115.2	11.9	6.5	
China	659.5	60.8	37.5	1	Brazil	25.1	17.8	1.4	9
India	391.1	47.9	22.2	2	Philippines	15.4	26.9	0.9	12
Indonesia	122.5	71.4	7.0	3	South Africa	8.9	25.8	0.5	17
Pakistan	61.1	62.2	3.5	4	Thailand	8.3	15.4	0.5	19
Nigeria	56.8	64.5	3.2	5	Mexico	7.8	9.7	0.4	20
Vietnam	42.3	68.5	2.4	6					
Myanmar	36.5	94.4	2.1	7					
Bangladesh	33.4	33.9	1.9	8					
Ethiopia	24.6	56.6	1.4	10					
Dem. Rep. of the Congo	19.6	62.3	1.1	11					
Tanzania	15.0	64.7	0.9	13					
Nepal	12.7	72.6	0.7	14					
Mozambique	11.7	89.5	0.7	15					
Uganda	10.7	68.2	0.6	16					
Sudan	8.4	45.7	0.5	18					
<b>B: 2013</b>									
<b>Low-income countries:</b>					<b>Middle-income countries:</b>				
Total	284.3	36.9	36.3		Total	478.1	9.6	61.1	
Dem. Rep. of the Congo	54.1	75.9	6.9	3	India	210.4	16.5	26.9	1
Ethiopia	27.8	29.3	3.6	4	Nigeria	85.2	49.6	10.9	2
Bangladesh	26.5	16.8	3.4	5	China	25.2	1.9	3.2	6
Tanzania	23.3	45.9	3.0	8	Indonesia	23.6	9.4	3.0	7
Madagascar	17.9	77.8	2.3	9	Pakistan	12.7	7.0	1.6	13
Mozambique	16.9	63.9	2.2	10	Philippines	10.7	10.8	1.4	15
Kenya	15.1	33.7	1.9	11	South Africa	9.3	17.5	1.2	16
Uganda	13.5	35.8	1.7	12	Zambia	8.9	58.8	1.1	17
Malawi	11.7	70.4	1.5	14	South Sudan	7.8	69.5	0.9	20
Mali	8.6	52.0	1.1	18					
Niger	8.5	46.3	1.1	19					

The table above shows the distribution of poverty across the world in 1987 and 2013 respectively. Please use the definitions given below in your answers.

**Poverty Line** defines the estimated minimum level of income needed to secure the necessities of life. The World Bank has defined the poverty line as having less than \$1.90 or 100 INR per day

**Poverty headcount** refers to the percentage of people in the country below the poverty line.

**African Countries:** Congo, Ethiopia, Tanzania, Madagascar, Mozambique, Kenya, Uganda, Malawi, Mali, Niger, Nigeria, South Africa, Zambia, South Sudan

**Asian Countries:** India, Indonesia, China, Pakistan, Philippines, Thailand, Philippines

**North America:** Mexico

**South America:** Brazil

Q1. Describe the basic changes in poverty in India, China and Indonesia in the period

Q2. Write a couple of paragraphs describing the main changes between 1987 and 2013 in terms of geography (continents) and extent of poverty. In particular describe the world's overall progress in poverty reduction and how the world's progress towards poverty has differed across regions and countries.

Q3. India, China, Nigeria and Indonesia were among the fastest growing (in terms of GDP) large countries in the world in the period 1987-2013. Given this fact and the data in table 1 write

- a) a paragraph explaining why growth is essential for poverty reduction
- b) a paragraph explaining why growth may not be sufficient for poverty reduction

In each of these paragraphs give supporting evidence from the table.

## 2.B.A. Humanities–

Descriptive component for the Humanities major will contain passages (from History /literature/ poem) wherein the candidate needs to read the passage and answer the question that follow the passage. (Approximate 500-750 words). The candidates can choose one of the passages and the question(s) that follow:

**Choose one passage and answer the questions that follow-**

### **Passage 1**

I must not be understood to decry English or its noble literature. The columns of the Harijan are sufficient evidence of my love of English. But the nobility of its literature cannot avail the Indian nation any more than the temperate climate or the scenery of English can avail her. India has to flourish in her own climate and scenery and her own literature, even though all the three may be inferior to the English climate, scenery and literature. We and our children must build on our own heritage. If we borrow another we impoverish our own. We can never grow on foreign victuals. I want the nation to have the treasures contained in that language, and for that matter the other languages of the world, through its own vernaculars. I do not need to learn Bengali in order to know the beauties of Rabindranath's matchless productions. I get them through good translations. Gujarati boys and girls do not need to learn Russian to appreciate Tolstoy's short stories. They learn them through good translations. It is the boast of Englishmen that the best of the world's literary output is in the hands of that nation in simple English inside of a week of its publication. Why need I learn English to get at the best of what Shakespeare and Milton thought and wrote?

From *Speeches and Writings of Mahatma Gandhi*, p.p. 318-20; 4-2-1916

All regional languages must be developed and promoted. But that did not mean that English should be discarded. To do that, will amount to closing a window on the world of science and technology— Foreign language served as windows on it and to suppose that translations could take their place was a mistake. It was no use getting into an intellectual prison after achieving political independence. English is ours by historic necessity".

Jawaharlal Nehru – Quoted by S K Kochar in *Language Problem*

**Question 1: Answer the following questions (Word Limit: 500 words)**

**The British imposed English education on India. But they also left in 1947 when India became independent. As citizens of a free nation, is it appropriate for us to continue our education in English today?**

## **Passage 2**

*Epithalamium* by Tom Leonard

Let me not to the marriage of true minds admit impediment  
Shakespeare says - and maybe it *is* something to do with minds.  
Or there again, something to do with everything else  
you can think of; going to the shops, sitting in a bus together,  
who you want to waken up beside in the morning,  
And who you want to go to bed with - for the rest of your life.  
Who you're going to have your most important rows with  
who you want to share your silences, who you want to share  
your money with, if you have any. Who you want to share  
your poverty with, if you don't. Who you *can* share your poverty with,  
and still get on when there's no fancy stuff to occupy your minds.  
It's maybe being thirty with somebody, being forty with somebody,  
being fifty, being sixty, getting used to ways of doing things  
with the same person, getting used to *not* doing things with them  
when you have to go your separate ways to raise the dough  
for a house. "The trouble with marriage," I used to say,  
"is you have to stop *living* with each other." All this up at  
the crack of dawn stuff, out to your separate jobs,  
who's first home at night, who makes the dinner, if anybody  
makes it. And all the account business, joint or separate. And the  
usual list as to who does what, ironing, hoovering, washing  
the clothes. Who does what. Who's got lousy habits. Who thinks  
their farts are funny. Who's the most incomprehensible, opaque,  
wrongheaded pain in the arse you could ever find, and you've  
found them living with you. But give it an hour. Or a day.  
And watch out for the wisecracks. There's Chekhov:  
"If you can't stand loneliness don't get married" and there's  
no shortage of busted-up couples out there who won't bust  
a gut with grief if you join them. You stick your own way. To  
hell with them. It's not a sentimental thing, it's a serious thing  
the most serious thing you'll ever do, if you're doing it properly  
as you are. Saying it to others, before others, this is who I want,  
this is where it ends and begins with me. And uniquely so.  
So here's to you, Stephen and Lucy, standing at that old portal:  
here's to a good road before you, and a long one,  
and the two of you walking together happily, down it.

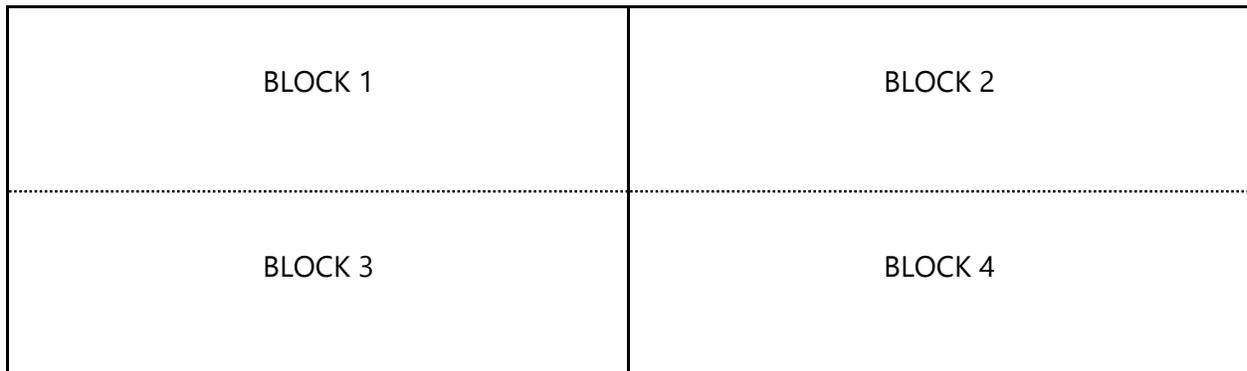
**Question 2 - If you like the poem, why do you like it? If you don't, why don't you? Consider the following aspects: theme, use of language, speaker's attitude and style. (Word Limit: 750 words)**

### 3. B.Sc. & B.Sc. B.Ed. Biology

1. How do you think studying **biology** can help solve **health issues** in your city/town/village? (Answer in 150-200 words)

2. According to you, what are some of the major issues that the **agriculture sector** is facing in India? (Answer in 150-200 words)

3. A garden in a city has a rectangular shape and is divided into four separate blocks as shown below.



At present, the garden contains trees from different species and the number of trees in each block is shown in the table below.

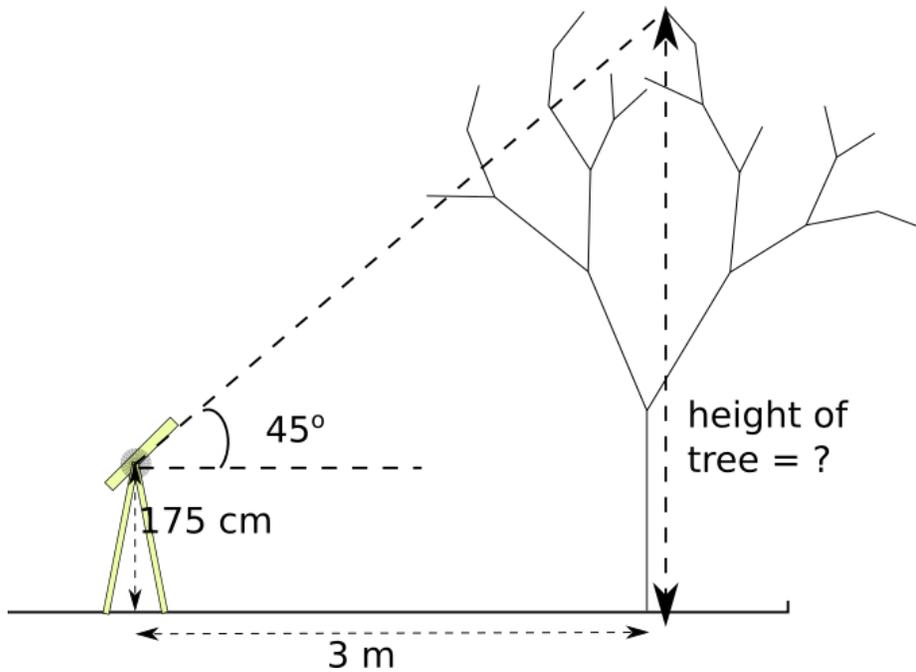
Species	Block 1	Block 2	Block 3	Block 4
Neem	5	6	4	8
Ashoka	4	7	9	7
Fig	3	6	7	8
Coconut	7	5	8	6

Use the present tree count to answer the following:

- Which block has the largest number of trees? Which block has the fewest number of trees?
- Arrange the 4 species in increasing order of number of trees found in the garden.
- What is the percentage of Ashoka trees in the garden?

## 4. B.Sc. & B.Sc. B.Ed. Physics

1. A botanist is measuring the height of a tree, using an instrument called a "clinoscope". This is just a small telescope with crosshairs, which can be mounted at a convenient height. The angle made by the telescope with the horizontal can be measured. The botanist finds that the angle of elevation from the top of the tree is 45 degrees, the instrument is mounted at a height of 175 cm, and the distance to the base of the tree is 3 m. What is the height of the tree?



2. On earth, you travel 1km south, then 1km east, then 1km north and reach your starting point. How can it happen? What are all the different possibilities for the starting point so that this can happen?

3. An electron, initially at rest, is placed in a uniform electric field of strength 10 newton/coulomb. What happens to the electron? Calculate the value of the acceleration of the electron, if any. What is the velocity of the electron after 10 second? Draw a simple picture showing the direction of motion of the electron. Assume that the mass of the electron is  $10^{-30}$  kilogram and its charge is  $10^{-19}$  coulomb. You may neglect the effect of gravity.
  
4. Draw the shape of a drop of water a) floating in space with no gravity or air b) moment after it gets released from a leaking tap (drop-by-drop) in gravity but without air c) a rain drop falling under gravity but in vacuum d) a real rain drop falling in gravity through air. Give brief explanations.

## 5.B.Sc. & B.Sc. B.Ed. Mathematics

### PART 1-Please attempt all three questions from this part

1. Let  $V_1$  be the volume of a cylinder of height  $h$  and whose base has radius  $2r$ . Let  $V_2$  be the volume of a cylinder with height  $3h$  and base  $r$ . Compute

$$\frac{V_1}{V_2}$$

2. Recall that a quadratic equation is an equation of the form  $ax^2 + bx + c = 0$ . Give an example of values of  $a$ ,  $b$ , and  $c$  such that the quadratic equation has no real roots.

3. Give a rough sketch of the graph of  $f(x) = x^3 + 1$ , where  $x$  is in  $(-\infty, \infty)$ . You should indicate the points where the curve crosses the  $x$ -axis, the maxima, minima, and stationary points.

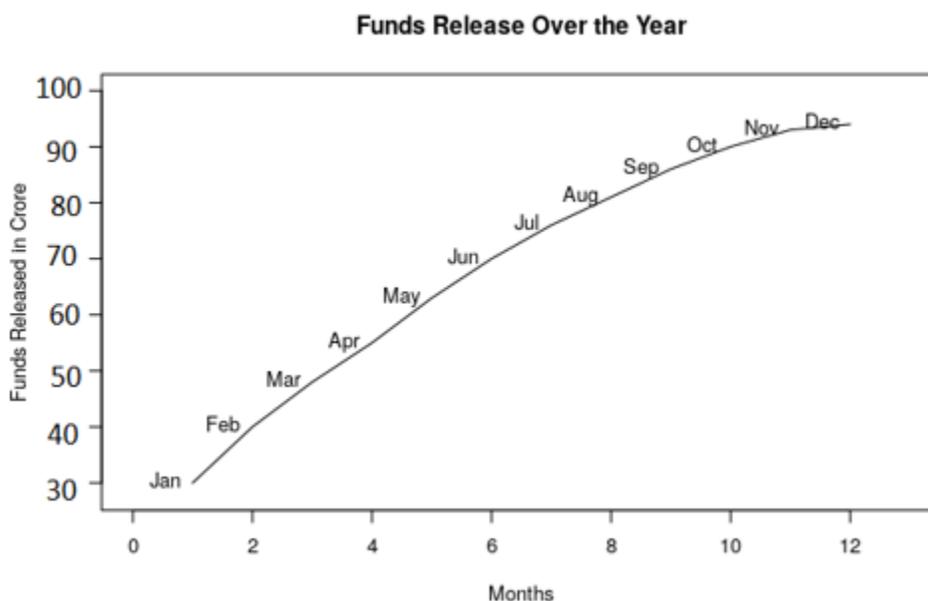
### PART 2

#### Please attempt two of the following three questions.

4. The graph below shows the total amount of funds (in Rs crore) released by an agency for a social welfare programme up to a given month, starting in January.

For example, in January, the agency released Rs 30 crore. The total amount released up to February was Rs 40 crore, the total amount released up to March was Rs 48 crore, the total amount released up to April was Rs 55 crore, and so on.

The agency claims that the amount of money released every month is increasing. Is the agency's claim true? Explain your answer.



5. What's wrong with the following proof by induction? Be precise in your answer.

Statement: Let  $x > 1$  be fixed. For every integer  $n \geq 0$ ,  $nx=0$ .

Base case: Clearly  $0.x = 0$ .

Inductive step: Suppose the result is true for  $0, 1, \dots, k$ . Then

$$(k + 1)x = kx + 1x = 0 + 0 = 0$$

6. Chennai has a population of about 71 lakhs. Estimate the total weight of garbage produced by all the households in Chennai per week.

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