

Question Booklet

Candidate's name: _____ <div style="display: flex; justify-content: space-around; width: 100%;"> (First) (Middle) (Surname) </div>
Roll No. : <input style="width: 150px; height: 20px;" type="text"/>

	Section Title	Question Type	No. of Questions	Question Nos.	Total Time *
Part I	English Language	Multiple choice	18	1-18	2 Hours (10.00 a.m. -12.00 p.m.)
Part II	Quantitative Reasoning	Multiple choice	18	19-36	

Please read the following instructions carefully:

1) At the test venue, the instructions given by the Test Administrator and Invigilators must be followed. Violation of instructions will result in disqualification and the candidate will be asked to leave the Examination Hall. Any candidate found guilty of using unfair means of any nature in the Examination Hall shall be liable to be disqualified.

2) Candidates are not allowed to carry any papers, notes, books, log table, calculators or calculating devices, scanning devices, communication devices like cellular phone/pager/docupen, etc. to the Examination Hall.

3) Please use **ONLY** blue/black ball point pen to fill details and to darken the circles on the OMR sheet. **USE OF PENCIL IS PROHIBITED.**

4) Before beginning to answer the paper, write your Roll number in the space provided in the Question Booklet. On the OMR Answer Sheet, please fill in the details and sign at the appropriate place.

5) For each correct answer, candidate will be given 2 marks and zero mark on no attempt. There is a negative marking for each wrong attempt (only for Quantitative Reasoning section). 1 mark will be deducted for each incorrect response.

6) Each objective type question is followed by four responses. Please mark the correct response by darkening the relevant CIRCLE with a BLUE/BLACK ball point pen on the OMR Answer Sheet. Darken **ONLY ONE** circle for each answer so that the letter inside the circle is not visible.

The CORRECT and the WRONG methods of darkening a circle are given below.

Correct Method



Wrong Method



7) Please **DO NOT** make any stray marks anywhere on the OMR Answer Sheet. **DO NOT** fold or wrinkle the OMR Answer Sheet. Rough work **MUST NOT** be done on the Answer Sheet. Use space provided in the Question Booklet for rough work.

8) After completing the test, please hand over the Question Booklet to the Test Invigilator. **DO NOT** carry the Question Booklet or any part thereof outside the Examination Hall.

Part I – English Language

Direction for Questions 1-9:

Read the following passage and answer the questions that follow:

Jane Goodall's dedicated research efforts lead to the establishment of a new approach to the study of wildlife biology. When she began her work, animals and humans were seen as completely different forms of life. Through her work, she demonstrated that the difference between animals and humans was of degree and not of kind. Her study of chimpanzees helped scientists to see the rich interconnectedness of humans with animals, and gave them new ideas about how they could study non-human life forms. Goodall describes the human as the fifth great ape, along with the four well recognized great ape species, i.e. the gorilla, the chimpanzee, the bonobo and the orangutan.

In the 1970s, Goodall established a permanent research station in Gombe, Tanzania. Addressing a rapt audience at Melbourne University last year, she reminisced: "I could spend hours each day out in the forest on my own. It was a very spiritual experience for me to be out in the forest. You realize how every little species has a role to play, and each one plays its part in the tapestry of life." But though she loved her work, Goodall would not remain a scientist for too long. She recalled the event in 1986 that made her change her mind: "I left the field of scientific research because of a big conference in 1986 when we brought all the chimpanzee researchers together. We realized during a session on conservation that right across Africa forests were disappearing. Also, it was the beginning of large-scale commercial hunting of wild animals for food. Chimpanzees were caught in wild snares set by hunters for antelopes or pigs. There was also the spread of disease as humans encroached further into their forest habitats: building houses, growing crops and breeding cattle. We also had a session on the condition of captive animals in medical research labs. Afterwards, I had nightmares for weeks, having viewed secretly filmed videos of our closest relatives in 5ft x 5ft cages. I went to that conference as a scientist and I left as an activist."

Goodall was one of the early proponents of the idea that humans were well on the way to destroying the earth. She explains why she feels this is such a precarious time for the planet: "In so many parts of the world habitats are being increasingly destroyed; wetlands have drained. We're sprinkling poisonous chemicals onto our agricultural products. We're destroying our environment with modern cultures and poisonous products. Agricultural and industrial and household waste is being washed down from the land into the rivers and out into the ocean. One of the great lungs of the world is the great rainforest that

absorbs carbon dioxide from the atmosphere and breathes out oxygen. When compared to a century ago, all around the world these forests are disappearing at an alarming rate. The other great lungs of the world — the oceans — which also absorb carbon dioxide, have become polluted; all the plastic that we throw out ends up in the ocean." While she struck a gloomy note, Goodall ended her lecture on a positive note. "Young people give me hope," she said, but added that the clock was ticking. "We don't have much time and we need to get together —all together—around the world. And fight to keep this planet."

1) Goodall says her experience in the Gombe forest helped her to understand:

- A) How human beings can live in natural surroundings
- B) How the forest is our natural habitat
- C) How the forest makes us more religious
- D) How interconnected all forms of life are

2) In 1986, Goodall and other scientists connected the plight of chimpanzees to human actions in the following ways (choose the most complete and accurate answer):

- A) Humans were polluting the seas and causing diseases.
- B) Humans were encroaching on animal living spaces, destroying forests, observing and filming chimpanzees in the wild, throwing plastic into the sea and causing diseases.
- C) Humans were encroaching on animal living spaces, causing diseases, destroying forests and hunting chimpanzees for their meat.
- D) Humans were encroaching on animal living spaces, causing diseases by polluting the seas, observing and filming chimpanzees in the wild, and hunting chimpanzees for their meat.

3) Which incident changed the way in which Goodall thought about scientific research?

- A) Watching animals out in the wild
- B) Watching a film about animals in the wild
- C) Watching a film about the spread of the meat trade
- D) Watching a film about animals in research conditions

4) According to the passage, which of the following statements would Goodall believe to be true?

- A) Animals and humans belong in completely different categories of living beings.
- B) Animals and humans are basically similar, differing from each other only in degree rather than in kind.
- C) Human beings are kind to animals because they are born with a certain degree of sympathy in them.
- D) The degree to which humans can relate to animals depends on the kind of upbringing they have had.

5) Based on this essay we can conclude that:

- A) All scientists must become activists for life on earth to be preserved.
- B) Urgent and united human efforts are necessary for life on earth to be preserved.
- C) Human beings who want to preserve life on earth must unite and fight against humans who do not want to preserve life on earth.
- D) If humans stop putting poisonous chemicals in agricultural products, life on earth will be preserved.

6) In the sentence "You realize how every little species has a role to play, and each one plays its part in the tapestry of life", the word "tapestry" is closest in meaning to:

- A) richly woven fabric
- B) complex social structure
- C) secret communication system
- D) natural medicinal properties

7) In the sentence "Goodall was one of the early proponents of the idea that humans were already well on the way to destroying the earth", the word "proponent" is the closest antonym (opposite) of:

- A) Supporter
- B) Enemy
- C) Critic
- D) Promoter

8) In the sentence "I went to that conference as a scientist and I left as an activist", the word "activist" is closest in meaning to:

- A) A person dedicated to working towards a cause
- B) A person who acts in plays and films
- C) A person who takes cautious and well-planned action
- D) A person who takes part in a lot of physical activities

9) How would you write the following sentence in the past tense:

"The other great lungs of the world — the oceans — which also absorb carbon dioxide, have become polluted."

- A) The other great lungs of the world — the oceans — which had also absorbed carbon dioxide, will become polluted.
- B) The other great lungs of the world — the oceans — which also absorbed carbon dioxide, are becoming polluted.
- C) The other great lungs of the world — the oceans — which also absorbed carbon dioxide, were to become polluted.
- D) The other great lungs of the world — the oceans — which also absorbed carbon dioxide, became polluted.

Direction for Questions 10-18:

Read the following passage and answer the questions that follow:

This year's Nobel Prize in Physiology or Medicine has been awarded to 71-year-old Yoshinori Ohsumi of the Tokyo Institute of Technology. In the 1990s, Dr. Ohsumi unravelled the underlying molecular mechanism of autophagy. During starvation a person is able to survive for a considerable stretch of time. Despite the obvious stress, the body is able to cope because of an internal process of "self-cannibalisation". As a part of this process, inessential and damaged cellular components are broken down by the body and then reassembled into the proteins and nutrients needed to sustain essential functions. The process is called autophagy, which literally means "self-devouring" in ancient Greek. The word comes from the two words "auto" meaning self, and "phagein" meaning to eat. It is a process that has been conserved by evolution and is intrinsic to all organisms, from unicellular yeast to multicellular mammalian systems like humans.

Autophagy is an essential part of the body's self-renewal process. Every day 200 to 300 grams of proteins need to be replaced in the human body. On average, however, our intake is only about 70 grams of proteins, which is insufficient to make new proteins. Because of autophagy, we are able to rely on some of our own proteins to survive. Thus, autophagy maintains normal functioning or "homeostasis", the tendency of a biological system to actively maintain the fairly stable internal equilibrium conditions necessary for survival despite changing external conditions.

Until late into the 20th century, there were many unanswered questions about autophagy: How is it initiated? How important is it for cellular and organism survival? Does the process have any role in human

diseases? In the late 1980s, Ohsumi embarked on the study of autophagy using baker's yeast as the model system. "As the fundamental unit of life, the question of how dynamic the cell is has always captivated me," said Ohsumi. "This strong motivation led me to use yeast, the humble single-cell organism, to address some of the important basic questions of life", he continued. "My work with yeast stemmed from a personal desire to undertake work that was unique and didn't follow the intellectual trends of the day. Yeast is an excellent tool for genetic analysis, so we therefore immediately began the process of identifying the genes essential for autophagy to occur."

Ohsumi said that as a young scholar, when he was trying to isolate the nuclei in yeast cells, he had seen a layer of clearly concentrated organelles, or specialized structures, in the top layer of the centrifuge tube that was discarded after experiments. He noticed that these organelles were actually vacuoles or tiny closed membrane sacs that could keep material separated from the rest of the cell. He had wondered even then whether they played an important role in the cells. Returning to Japan in 1988, Ohsumi started his own laboratory and began his 28-year journey with autophagy research. "I started out with a love of the microscope. Vacuoles are the only organelles visible under the light microscope, and I often observed them. I had a strong interest in the degradative function of the vacuole in the cell. So I devised a method to capture this process using a light microscope, a very common piece of lab equipment. Then, Misuzu Baba joined my lab and conducted electron microscopy of the process in yeast. He too confirmed that what we could see under the light microscope was actually exactly the same process as one that had been observed decades earlier in mammalian cells but was never understood," Ohsumi said.

10) From which two Greek words does the word "autophagy" come?

- A) From the words for "autopsy and eat"
- B) From the words for "automatic" and "phases"
- C) From the words for "self" and "eat"
- D) From the words for "self" and "heat"

11) Autophagy is a process by which the body:

- A) Parts itself to consume the cells of other organisms so as to survive
- B) Consumes decaying parts of itself to be able to survive
- C) Survives by preying on dead cells it finds in its external environment
- D) Ensures the continuous disruption of its own balance

12) Ohsumi's successful journey in autophagy research was partly the result of:

- A) His interest in humble cells
- B) His interest in seeing things through telescopes
- C) His interest in seeing things through microscopes
- D) His interest in sophisticated lab equipment

13) According to the passage, which of the following statements is true?

- A) Autophagy is something nobody had heard of till 2016
- B) Autophagy began to be fully understood in 1975
- C) Autophagy remains a mystery to scientists to this day
- D) Autophagy began to be understood better after 1990

14) From this passage, we can conclude that

- A) The baking process that uses yeast also provides nutrition for the human body
- B) The process of fermentation in yeast is similar to the process of fermentation in human beings
- C) Some of the same processes can be seen in the human body as well as in the yeast cell
- D) The yeast cell and the human cell are identical in structure

15) Which of the following words or phrases conveys the same meaning as the word "unravalled" in the sentence: "In the 1990s, Dr. Ohsumi unravalled the underlying molecular mechanism of autophagy"?

- A) Twisted
- B) Disturbed
- C) Disentangled
- D) Knotted

16) Which of the following words or phrases conveys the same meaning as the word "isolate" in the sentence: "Ohsumi said that as a young scholar, when he was trying to isolate the nuclei in yeast cells, he had seen a layer of clearly concentrated organelles, or specialized structures, in the top layer of the centrifuge tube that was discarded after experiments"?

- A) Combine
- B) Discover
- C) Segregate
- D) Create

17) Which of the following words or phrases conveys the opposite meaning of the word “equilibrium” in the sentence: “Thus, autophagy maintains normal functioning or “homeostasis”, the tendency of a biological system to actively maintain the fairly stable internal equilibrium conditions necessary for survival despite changing external conditions”?

- A) Imbalance
- B) Calmness
- C) Coolness
- D) Balance

18) How would the following sentence be written in the past tense? “Despite the obvious stress, the body is able to cope because of an internal process of “self-cannibalisation” through which it makes use of its own inessential and damaged cellular components.”

- A) Despite the obvious stress, the body would be able to cope because of an internal process of “self-cannibalisation” through which it makes use of its own inessential and damaged cellular components.
- B) Despite the obvious stress, the body was able to cope because of an internal process of “self-cannibalisation” through which it made use of its own inessential and damaged cellular components.
- C) Despite the obvious stress, the body will be able to cope because of an internal process of “self-cannibalisation” through which it would make use of its own inessential and damaged cellular components.
- D) Despite the obvious stress, the body should have been able to cope because of an internal process of “self-cannibalisation” through which it will make use of its own inessential and damaged cellular components.

Part II – Quantitative Reasoning

19) Given below is the data regarding exam marks and number of hours studied for a student.

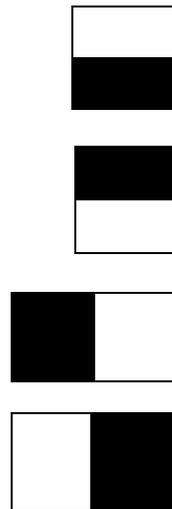
Number of hours studied	1	2	3	4	6	8
Exam marks	60	70	90	70	60	55

Which of the following is true?

- A) Marks increase when student studies more
- B) Marks decrease when student studies more
- C) Initially marks increase when student studies more and then decreases
- D) Initially marks decrease when student studies more and then reduces

20) A game board has 3 X 3 squares with alternate black and white squares (as in a chessboard). A domino is a block with one black and one white square sharing a side – see figure for examples. Two dominoes are said to be different if they differ by at least one square.

How many different dominoes are there in the 3 X 3 board?



- A) 9
- B) 12
- C) 18
- D) 6

21) A stone dropped from a height keeps on increasing in speed. Every second its speed increases by 10 metres per second. How much distance will the stone fall between 1.5 and 2.5 seconds, after being dropped with zero speed? Use the idea of average speed.

- A) 5 m
- B) 10 m
- C) 20 m
- D) 40 m

22) A city has 100 roads. Each road has 50 cars. The cars on each road form a queue. Assume that a car occupies 6 metres and there is no gap between the cars. How long is the sum of all the queues?

- A) 60000
- B) 300
- C) 30000
- D) 3000

23) To show that a statement is false, it is enough to give one case where it is not true.

This is called a counterexample.

Read the following.

Statement - All human beings are Indian.

This statement is false because we have a counterexample:

Chinese are human beings but they are not Indians.

Now answer the question below:

Statement – All ministers are men.

Choose the correct counterexample which shows that the statement is false.

- A) Siddaramiah is a minister
- B) Tendulkar is not a minister
- C) Sushma Swaraj is a woman
- D) All women are human beings

24) Answer the following question based on the table below:

x=number of years in company	y=salary
1	6.3
2	9.6
3	12.9
4	16.2

What is the correct relationship between x and y?

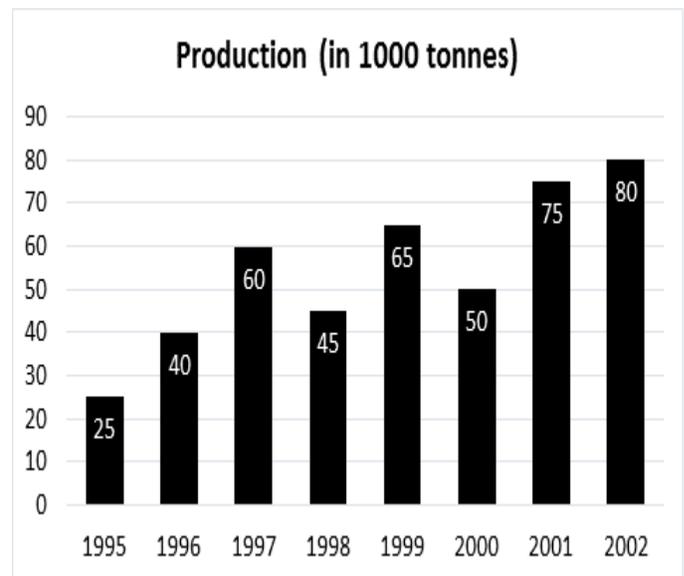
- A) $y = x+3.3$
- B) $y = 3.3x+3$
- C) $y = 3x+3.3$
- D) There is no relationship between y and x

25) Bunglor city has had heavy rains this year. The heaviest rain of 180 cm was in the eastern part of the city but the northern part got just one-third this amount. The southern and western parts got double the rainfall of the north part. Which list is the order of increasing rainfall?

- A) South, north, west
- B) South, east, north
- C) North, west, east
- D) East, west, North

26) The production of fertilizer (in thousands of tonnes) by a company is shown from 1995 to 2002.

Answer the following questions based on the graph below.



What was the percentage decrease in the production of fertilizers from 1997 to 1998?

- A) 33%
- B) 25%
- C) 30%
- D) 27.5%

27) A box has a large number of chocolates. 200 are taken out, given a red wrapper, and put back. They get mixed with the others. When 300 chocolates are pulled out later, you find that there are 20 chocolates with a red wrapper. Based on this can you guess how many chocolates are there in the box, approximately?

- A) 6000
- B) 3000
- C) 12000
- D) 1000

28) A natural number A is multiple of 5 but is less than 63. What is the highest possible value of A?

- A) 62
- B) 5
- C) 60
- D) 61

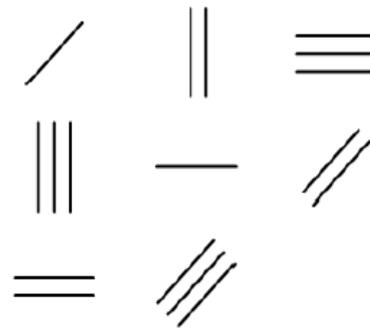
29) The following chart gives the ratio of the amounts of imports by a country to the amount of exports from that country over the period from 1995 to 2001. Answer the following questions based on the following graph.



If the imports of the country in 1996 was Rs. 272 crores, the exports from the country in 1996 was:

- A) Rs 120 Crores
- B) Rs 220 Crores
- C) Rs 320 Crores
- D) Rs 420 Crores

30) Choose one of 4 choices that would complete the following patterns:



- A.
- B.
- C.
- D.

- A) A
- B) B
- C) C
- D) D

31) A wall which is 3 metres by 3 metres takes up paint costing 900 rupees to cover. What is the cost of painting the outside wall of a circular building of diameter 10 metres, which is 10 metres high?

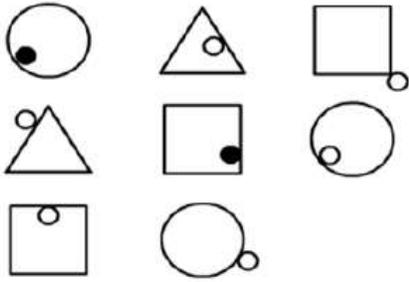
Choose the nearest number to your answer:

- A) Rs. 50 000
- B) Rs. 1 lakh
- C) Rs. 2 lakhs
- D) Rs. 3 lakhs

32) A ball is dropped from a height of 1 metre. After each bounce, the height becomes half of the previous height. What is the total distance travelled when it hits the floor for the third time?

- A) 1.5 m
- B) 2m
- C) 2.5 m
- D) 3m

33) Choose one of 4 choices that would complete the following patterns:



- A. B. C. D.

- A) A
B) B
C) C
D) D

34) A chemist measures the masses of CO and CO₂, and finds the ratio 12:19. What is the ratio of the mass of the carbonate group, CO₃, to the mass of CO?

- A) 6:13
B) 13:6
C) 19:26
D) 26:19

35) A factory making thin biscuits, each 1mm thick, first packs 20 biscuits in a cardboard box and then a dozen of such packs in a bigger red box. Assume that each biscuit has dimensions 5 cm by 10 cm. Approximately how big would the red box be?

(Assume that the cardboard is very thin).

- A) 1200 cubic cm
B) 1000 cubic cm
C) 120 cubic cm
D) 100 cubic cm

36) A hair colouring product requires henna and indigo in the ratio a:b. Which of these ratios is the same as a:b?

- A) a+1: b+1
B) a-1: b-1
C) a+a: b+b
D) a+b: b+a

Space for Rough Work:

Space for Rough Work: