

Application Number: _____

Name: _____

Section 1: Logical and Analytical Reasoning

1. The Bangalore Metropolitan Authorities are considering passing a regulation to ban playing cricket/hockey and other sports on city streets, citing safety concerns. However, data tells another story. Each year, many more people are injured while jogging than are injured while playing street sports. So, in fact, street sports is safer than jogging.
Which of the following indicates a flaw in the reasoning of the argument in the last sentence:
 - a. It assumes that no one who plays on the street also jogs.
 - b. It fails to distinguish between rash street players who attempt dangerous things from more careful ones who are cautious.
 - c. It fails to consider the number of people who play on the streets compared with the number of people who jog.
 - d. Ignores the possibility that other activities cause more injuries than either street plays or jogging.
 - e. Fails to address the issue and instead attacks the motif of the people involved in decision making.
2. A recent study revealed that most of the university graduates in city X could not write a simple business letter. The universities in city X have failed to prepare students for the business world.
Which of the following if true, would provide additional evidence in support of the claim above?
 - a. A majority of students attending universities in city X are business degree majors.
 - b. The majority of graduates living in city X received their degree from universities located in city.
 - c. The universities in the neighbouring city have recently improved its business program by adding courses in business writing.
 - d. Most city X graduates move outside the city X area after they graduate.
 - e. Most city X university students live in on-campus accommodation.
3. The tourism department in country X began a campaign in country Y two years ago. Since that time, the number of visitors to country X from country Y has increased by 10%. Clearly, the campaign is responsible for this increase.
Which of the following if true would most weaken the argument above.
 - a. The campaign by country X was criticised heavily by country Y media for lack of imagination.
 - b. Two years ago, travel to country X became significantly cheaper for residents in country Y.
 - c. Increase political turmoil in country X will lead to decrease in visitors in country Y next year.
 - d. Number of visitors from country Y to country Z increase by more than 8% over the past two years.
 - e. Over the past two years, the campaign by country X cost more money than residents of country Y spent travelling to country X.
4. For the past year, a section of the local media has been making fun of a particular brand of curd – the Chord Curd. This is obviously affecting Chord Curd whose sales have declined in the past 12 months by 25% whereas the sales of other cheese have increased.
Which of the following, if true, would cast the most doubt on the conclusion above?
 - a. The local media who is making fun of the Chord Curd actually owns Chord Curd.
 - b. The number of consumer complaints about the Chord Curd has not increased in the past year.
 - c. The average price of all curd has increased by 10% in the past year.
 - d. The number of stores who sell Chord Curd has remained steady for the past year.
 - e. A year ago, the Food Safety Authority rated the Chord Curd as “unsafe” for children.

5. The increase in taxes on cigarettes will not limit the use of addictive tobacco products. Many cigarette smokers will shift their spending to cigars and chewing tobacco when the law takes effect.
- Which of the following if true, would most strongly weaken the argument above?
- Cigars and chewing tobacco can satisfy the nicotine cravings of most cigarette smokers.
 - The taste, smell and texture of cigars and chewing tobacco are sufficiently different from those of cigarettes to deter smokers from using them.
 - Many health advocates use tobacco products.
 - The government might also impose significant taxes on cigars and chewing tobacco
 - Cigars and chewing tobacco are often more expensive than cigarettes were before the tax increase.
6. Photography is no longer an art form. Nowadays everyone has access to mobile cameras that only need to be pointed at the subject in order to generate a perfect image.
- The writer of the argument apparently assumes that
- the selection of the subject is not an important artistic factor in photography
 - digital cameras will continue to improve in quality
 - digital cameras can never go wrong
 - photography with all other types of camera is an art form
 - art is not perfect
7. Select the option that is most appropriate to complete the last sentence below.
- In a survey of undergraduates (UGs), two fifth admitted to having cheated on an exam at least once during their education. However, the survey may underestimate the proportion of UGs who have cheated in exams because
- some UGs who have never cheated might have claimed on the survey to have cheated.
 - some UGs who claimed on the survey to have cheated at least once may have cheated on multiple occasions other than exams.
 - some UGs who claimed on the survey to have cheated at least once may have been answering honestly.
 - some UGs who have cheated at least once in exams might have claimed on the survey to never have cheated.
 - some students who are not UGs have probably cheated at least once during their education
8. Namita has twenty years of copy-editing experience behind her; therefore, if you are looking for an efficient copy editor to copy edit your article, you need look no further.
- The speaker assumes that
- Twenty years of practice ensures copy editing efficiency
 - The type of typing editing for the new system is identical to what Namita has been doing
 - Namita's job profile is the best that the new employer is going to get
 - Namita is an outstandingly fast and accurate copy editor
 - Namita will fit well into the new office
9. Read the quote by an interview participant: "Many administrative set ups are given by the government. There is a standard structure that follows the government policies or systems, and structure, so structural point of view, you can do very little. 80% of variability is gone because it's a government institute so certain procedure has to be followed even if it is time consuming."
- Which of the following topics relate least to the quote above:
- Government control
 - Standardization
 - Efficiency
 - Politics
 - Administration

10. While universities, public research organizations, and corporations play individual roles in the system of national innovation, universities are generally expected to pursue research in basic areas in which companies are ill-equipped to address. The role of universities is to open up academic frontiers and produce research results with long-lasting and large spill over effects over a wide range of disciplines. Stronger university incentive to engage in university-industry collaboration (UIC) may affect research, giving it a more practical focus and possibly leading to the neglect of basic research, which is the natural domain of university research. Some research suggests that although the number of patent applications by universities increased in the US following the enactment of the Bayh–Dole Act in 1980, the quality of the patents declined, because excessive focus on commercializing research results led to a neglect of basic research, which should be a university focus on.

Motohashi, Kazuyuki, and Shingo Muramatsu. "Examining the university industry collaboration policy in Japan: Patent analysis." *Technology in Society* 34, no. 2 (2012): 149-162.

Which of the following statement can NOT be said based on the paragraph above:

- a. One of the possible effects of UIC is neglect of basic research.
 - b. Companies are ill-equipped to pursue research in basic areas.
 - c. Universities should not engage in UIC since universities are only meant for produce research results with long-lasting effect.
 - d. Number of patent applications by universities increased in the US following the enactment of the Bayh–Dole Act in 1980.
 - e. Increase in patents does not guarantee an increase in the quality of patent.
11. Technology has a proprietary aspect and a public good aspect. The proprietary aspect makes it profitable for firms to invest in its advance. The public aspect enables the community as a whole to benefit from technological advance. In order for technical advance to proceed rapidly and for the gains to be widely shared, there must be an appropriate balance between the proprietary and public aspects. Recent policy discussions have emphasized the proprietary aspects of technology, calling for a tightening and broadening of intellectual property rights. Universities have been encouraged to be more proprietary. We may be in danger of leaning too far **in this direction**.

Nelson, Richard R. "What is private and what is public about technology?." *Science, Technology, & Human Values* 14, no. 3 (1989): 229-241.

What does the writer imply by "in this direction" at the end:

- a. Balancing public and private good aspects of technology.
 - b. Privatising the use of technology through proprietorship.
 - c. Policies focussing on public aspects of technology.
 - d. Controlling the use of technology by the government.
 - e. Making technology more open.
12. Consider the following excerpt from an interview

I: Do you think your neighbours are the same as you, or different?

R: I think they are different. I think because I'm Indian. [It's a] different culture. So there's always a difference there, when you have a different culture. I think. Like food, they usually eat bread, I eat rice. Sometimes [I eat] baked or cooked bread but usually rice. So, there's a difference there.

In the above excerpt, a woman living in a multi-ethnic neighbourhood is describing how her next-door neighbours differ from her. For her, the fact that her neighbours usually eat bread while she usually eats rice signals and confirms that they have a different 'culture'. What is interesting about her assessment is that it is based largely on observation. We often socially identify and categorize others based on observations. We get to know strangers in the street only through reading and interpreting their appearance, whereas we know much more about our closest friends because they tell us things about themselves.

Van Eijk, Gwen. "'They eat potatoes, I eat rice': symbolic boundary making and space in neighbour relations." *Sociological Research Online* 16, no. 4 (2011): 22-33.

Which of the following most closely relates to the topic discussed above:

- a. Eating habit of people from different settings
- b. The popularity of rice and potato as a staple food
- c. The significance of observation in deciding our social boundaries
- d. What makes a good neighbour
- e. How can we get to know people in the streets.

13. Broadly speaking, a two-sided market is one in which 1) two sets of agents interact through an intermediary or platform, and 2) the decisions of each set of agents affects the outcomes of the other set of agents, typically through an externality. In the case of a video game system, the intermediary is the console producer—Sony in the scenario above—while the two sets of agents are consumers and video game developers. Neither consumers nor game developers will be interested in the PlayStation if the other party is not. Similarly, a successful payment card requires both consumer usage and merchant acceptance, where both consumers and merchants value each other's participation.

Rysman, Marc. "The economics of two-sided markets." *Journal of economic perspectives* 23, no. 3 (2009): 125-43.

What does the author imply by the phrase "two-sided market"

- a. Consumers and suppliers are on different sides of an intermediate agent or platform
 - b. Consumers and suppliers are in different geographic locations.
 - c. There are two products involved.
 - d. The products are sold at two different price points.
 - e. There are two types of consumers.
14. In 2011 Australia welcomed 332,700 international students, yet little is known about how their complex identities influence the social networks they make in order to negotiate everyday life in their overseas host nation. Emerging studies are showing that international students in Australia create identities and social networks that are tied to the host nation while studying. As transient migrants, international students may have neither a singular national home-based identity, nor social networks exclusively connected to the home nation. Many transient migrants have multiple identities, and identity, rather than place-of-birth-based social networks, dominate their sojourn in Australia.

Gomes, Catherine, Marsha Berry, Basil Alzougool, and Shanton Chang. "Home away from home: International students and their identity-based social networks in Australia." *Journal of International Students* 4, no. 1 (2014): 2-15.

Based on the above paragraph, we can infer that

- a. Australia has the highest number of international students but not much is known about them.
- b. International students can be considered as transient migrants.
- c. International students in Australia fail to create a home-based identity similar to that of Australian students.
- d. International travellers can also have multiple identities.
- e. Social networks are important for the success of international students.

Read the paragraph below and answer the two questions.

It is hard to understand why there is so little good empirical work beyond anecdotes or case studies. The latter are often published without reflection on choice, representation, or generalizability. **Empirical work** can be laborious, and secondary data analysis is often more time-consuming and less enjoyable than interviewing. Most American case studies appear to have been done by researchers on industries, firms, and establishments in their own back yard. While understandable given resource constraints, such '**proximity**' research may constitute a form of provincial boosterism, conscious or not – most case studies of southern California, Silicon Valley, and New York are suspect in this regard. The policy impact of these studies, especially for regions elsewhere and at the national and international level, will be limited if this is the case.

Markusen, Ann. "Fuzzy concepts, scanty evidence, policy distance: the case for rigour and policy relevance in critical regional studies." *Regional studies* 37, no. 6-7 (2003): 701-717.

15. What does the author mean by the term 'proximity' research in the above para:
- a. Research carried out in America
 - b. Research that has interviews and is enjoyable.
 - c. Research that includes firms and industries as case studies.
 - d. Research that is carried out in settings that are located close to the researcher.
 - e. None of the above.

16. What does the author mean by 'empirical work' in the above para:
- Work that is laborious
 - Work that involves primary data collection
 - Work that are based on American case studies
 - Work that is based on proximity-based research
 - Work that includes case studies of Silicon Valley

Passage

Colonial British ships were built of Burma teak, their sailors wearing clothes of cotton grown in India, drinking Kenyan coffee sweetened with sugar planted in the Caribbean.

17. Which one of the following is the most important implication of the above sentence?
- Colonial Britain had a huge ship building industry.
 - Kenya and Caribbean were British colony.
 - Cotton was grown in colonial India.
 - British colonialism was global in nature.
 - British ships are made of Burma teak.

Passage

Redesign of agricultural systems is essential to deliver optimum outcomes as ecological and economic conditions change. The combination of agricultural processes in which production is maintained or increased, while environmental outcomes are enhanced, is currently known as sustainable intensification (SI). SI aims to avoid the cultivation of more land, and thus avoid the loss of unfarmed habitats, but also aims to increase overall system performance without net environmental cost. For example, large changes are now beginning to occur to maximize biodiversity by means of integrated pest management, pasture and forage management, the incorporation of trees into agriculture, and irrigation management, and with small and patch systems. SI is central to the Sustainable Development Goals of the United Nations and to wider efforts to improve global food and nutritional security.

18. The above passage is an abstract of a peer-reviewed article. Which of the following is the most suitable title for the article?
- Intensification for redesigned and sustainable agricultural systems
 - Sustainable Development Goals of the United Nations and Global Food Security
 - Integrated Pest Management for Sustainable Development Goals of the United Nations
 - Sustainable Intensification is the only future of Global Agriculture
 - Sustainable Intensification and climate adaptation: ecology, environment and social change

Passage

Since the 1980s, experts have been claiming that the skill demands of today's jobs have outstripped the skills workers possess. Moss and Tilly counter that worker deficiencies lie less in job-specific skills than in such attributes as motivation, interpersonal skills, and appropriate work demeanour. However, Handel suggests that these perceived deficiencies are merely an age effect, arguing that workers pass through a phase of early adulthood characterized by weak attachment to their jobs. As they mature, workers grow out of casual work attitudes and adjust to the workplace norms of jobs that they are more interested in retaining. Significantly, complaints regarding younger workers have persisted for over two decades, but similar complaints regarding older workers have not grown as the earlier cohorts aged.

19. The passage suggests that Moss and Tilly are most likely to disagree with the "experts" (line 1) about which of the following?
- Whether the skills demanded by jobs in the labor market have changed since the 1980s
 - Whether employers think that job-specific skills are as important as such attributes as motivation and appropriate work demeanour
 - Whether workers in today's labor market generally live up to the standards and expectations of employers
 - Whether adequate numbers of workers in the labor market possess the particular skills demanded by various different jobs
 - Whether most workers are motivated to acquire new skills that are demanded by the labor market

20. The last sentence serves primarily to
- suggest that worker deficiencies are likely to become more pronounced in the future
 - introduce facts that Handel may have failed to take into account
 - cite evidence supporting Handel's argument about workers
 - show that the worker deficiencies cited by Handel are more than an age effect
 - distinguish certain skills more commonly possessed by young workers from skills more commonly found among mature workers

Passage

For the most part, it is the poor who suffer most from a deteriorated environment – particularly from various forms of urban and industrial pollution. Despite their direct exposure to the effects of environmental deterioration, the poor have generally not become interested or involved in the environmental movement. In part, this is an instance of the phenomenon that Denton Morrison has called "*the participation paradox*": the people who stand to gain the most from a social reform movement are often least likely to participate in it.

21. Which of the following is *the most crucial and logical inference* that can be made from the above passage?
- Environmental pollution only affects the middle class; hence, they are interested in protecting it.
 - The fact the poor are less likely to participate in environmental movement can be explained by the 'participation paradox'.
 - Poor people are interested in environmental movement as they do not suffer the wrath of environmental pollution.
 - Poor are not interested in participating in environmental movement as they pollute the most.
 - Denton Morrison thinks poor people should participate in environmental movement as they tend to suffer the most from urban and industrial pollution.

Fill in the blank with suitable word (s) from the options.

22. The history of backward countries in the nineteenth and twentieth centuries is the history of trying to _____ with the more advanced world by _____ it.
- catch up – imitating
 - catch on – imbibing
 - catch out – inhibiting
 - catch – imploding
 - catch hold – imploring
23. The paper was _____ so that it could be easily removed from the bound notebook.
- voracious
 - infectious
 - fickle
 - perforated
 - fluent
24. Sam reached the _____ of his career in his early thirties when he became president and CEO of a software company.
- success
 - victory
 - vale
 - zeal
 - zenith
25. At a time when the Cold War is history and the world is _____ with nuclear weapons, a land grab of a large neighbouring country was considered _____.
- Infested – inconceivable
 - expanding – reasonable
 - contaminated – plausible
 - surmounted – invincible
 - exploding – possible

26. It is not that the poor are ____; they often work harder, with longer hours, than those who are far ____.
- a. lazy – better off
 - b. dishonest – worse off
 - c. unruly – disciplined
 - d. professional – unprofessional
 - e. inferior – cleverer

In each of the following questions find out the alternative which will replace the question mark.

27. Man: Woman :: Horse: ?
- a. Mare
 - b. Doe
 - c. Ewe
 - d. Stallion
 - e. Falcon
28. Warm : hot :: ? : hilarious
- a. humid
 - b. raucous
 - c. summer
 - d. amusing
 - e. laughable
29. grove : forest :: ? : lake
- a. pond
 - b. ocean
 - c. tree
 - d. boat
 - e. water
30. follow : chase :: nudge : _____
- a. thrust
 - b. pursue
 - c. catch
 - d. precede
 - e. succeed
31. _____ : deciduous :: pine : coniferous
- a. tree
 - b. oak
 - c. forest
 - d. cone
 - e. Teak

In the questions below there are statements followed by conclusions. You have to decide which of the given conclusions logically follows from the statements. Please disregard commonly known facts and use only the information given here.

32. Statements:
No AKs are FPs.
All FPs are Sukhois.
Only a few Sukhois are RPGs.
- Conclusions:
I. A few AKs are Sukhois.
II. A few RPGs being FPs is a possibility.
- a. Only conclusion I follows
 - b. None of these
 - c. Only conclusion II follows
 - d. Neither conclusion I nor conclusion II follows
 - e. Both conclusion I and conclusion II follow

33. Statements:
No cubes are pongs.
All pongs are roads.
Only a few roads are bridges.
- Conclusions:
I. No roads are cubes.
II. No pongs are bridges.
- a. Only conclusion II follows
 - b. Both conclusion I and conclusion II follow
 - c. Neither conclusion I nor conclusion II follows
 - d. Only conclusion I follows
 - e. None of these
34. Statements:
Some engines are brakes.
All horns are mirrors.
All brakes are horns.
- Conclusions:
I. Some engines are horns.
II. All horns are brakes
- a. Only I follows
 - b. Only I and II follow
 - c. All follow
 - d. Only II follows
 - e. None of these
35. Statements:
Every ohm is volt
No volts are amps.
All amps are farads.
- Conclusions:
I. Some volts are farads.
II. No amps are ohms.
- a. Only conclusion I follows
 - b. None of the above
 - c. Neither conclusion I nor conclusion II follows
 - d. Both conclusion I and conclusion II follow.
 - e. Only conclusion II follows
36. Statements:
All police are judges.
No judge is inspector.
Only rollos are inspectors.
- Conclusions:
I: Some police are inspectors.
II: Some rollos are police.
- a. Only conclusion I follows
 - b. Only conclusion II follows
 - c. Either conclusion I or II follows
 - d. Both conclusions I and III follow
 - e. Neither conclusion I nor II follow

37. Statements:
 All bells are lenovos.
 Only a few dells are lenovos.
 Only few samsungs are bells.
- Conclusions:
 I: All samsungs are lenovos.
 II: Only a few bells being a dell is a possibility.
- Only conclusion I follows
 - Only conclusion II follows
 - Either conclusion I or II follows
 - Both conclusions I and III follow
 - Neither conclusion I nor II follows
38. Statements
 Only a few roads are treks.
 No trek is hill.
 All hills are hikes.
- Conclusions:
 I: Some hikes are not treks.
 II: All roads being treks is not a possibility.
- Only conclusion I follows
 - Only conclusion II follows
 - Either conclusion I or II follows
 - Both conclusions I and II follow
 - Neither conclusion I nor II follows
39. Statements:
 Only JJs are LLs.
 Some JJs are KKs.
 Each KK is RR.
- Conclusions:
 I. Few JJ are RR
 II. Some LL can be KKs.
- Only conclusion II follows
 - None of the above
 - Neither conclusion I nor conclusion II follows
 - Both conclusion I and conclusion II follow.
 - Only conclusion I follows
40. Statements:
 Some Yahoo are Google.
 Only a few Hotmails are Yahoos.
 All Googles are Bings.
- Conclusions:
 I: All Yahoos are Hotmail.
 II: Some Bings are Hotmail.
- Only conclusion I follows
 - Both conclusions II and III follow
 - Either conclusion I or II follows
 - Both conclusions I and III follow
 - Neither conclusion I nor II follows

Section 2: Quantitative Reasoning and Data Interpretation

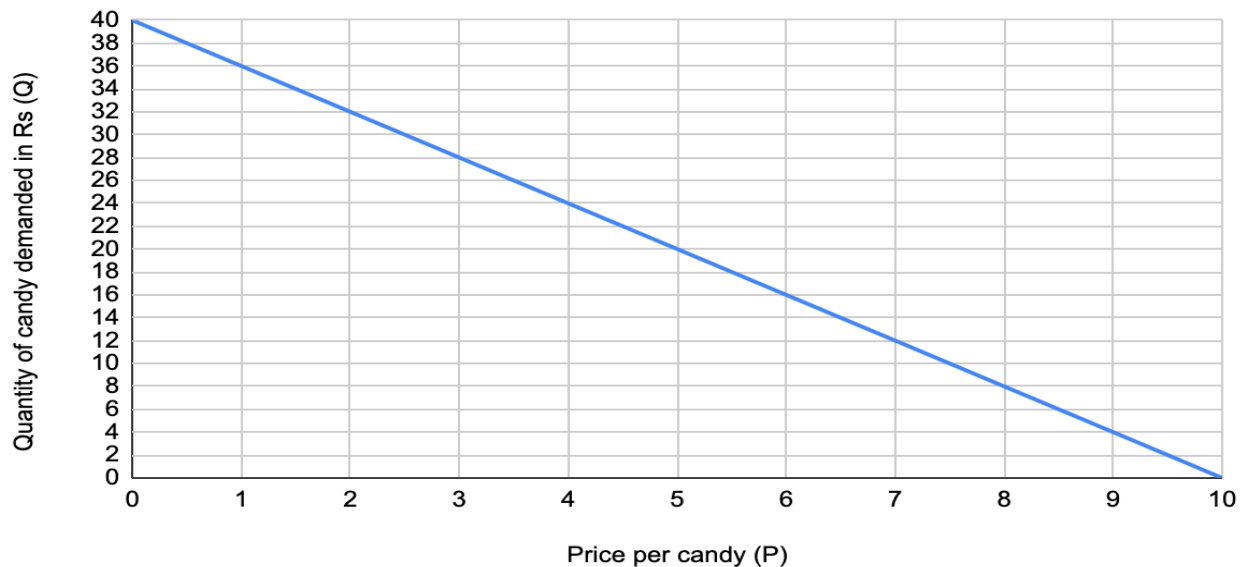
Consider the following table showing the distribution of final grade and weekly hours of self-study for each individual student. Answer the questions that follow based on the table.

	Weekly Hours Self-Study					
Final Grade (out of 10)	2	3	4	5	6	Total no. of students
6	6					6
7	4	3	1			8
8	1	7	3			11
9		2	5	1	1	9
10				4	2	6
Total no. of students	11	12	9	5	3	

41. What is the proportion of students who spent 4 hours a week doing self-study AND received a final grade of 7?
- 9/40
 - 8/40
 - 1/40
 - 17/40
 - 3/40
42. What is the proportion of students who spent LESS than 4 hours a week doing self-study?
- 32/40
 - 23/40
 - 0
 - 9/40
 - 1/20
43. Out of the students who spent 6 hours a week doing self study, what proportion received a grade of 8 and below?
- 1
 - 0
 - 3/40
 - 1/3
 - 11/40
44. Out of the students who received a grade of 10, what proportion spent AT LEAST 5 hours a week in self-study?
- 6/40
 - 4/40
 - 2/3
 - 1/6
 - 1

Consider the following plot of a linear demand function (of quantity of candy demanded vs price of a single piece of candy):

Quantity of candy demanded (Q) vs. Price per candy (P)



45. Which of the following equations represents the line in the plot, for positive numbers $a > 0$, $b > 0$?
- $Q = a + bP$
 - $Q = -a - bP$
 - $Q = abP$
 - $Q = a - bP$
 - $Q = -a + bP$
46. Suppose a seller sells 10 pieces of candy in one packet. What is the price of 1 pack of candies at which the demand for the pack of candy is 0?
- Rs 400
 - Rs 380
 - Rs 100
 - Rs 40
 - Rs 10
47. What is the change in quantity demanded for a unit increase in the price of a single piece of candy?
- 36
 - 2
 - 8
 - 4
 - 40

Consider the following set of numbers

Y	Z
10	2
2	1
4	0
8	2
4	1
6	2
5	0

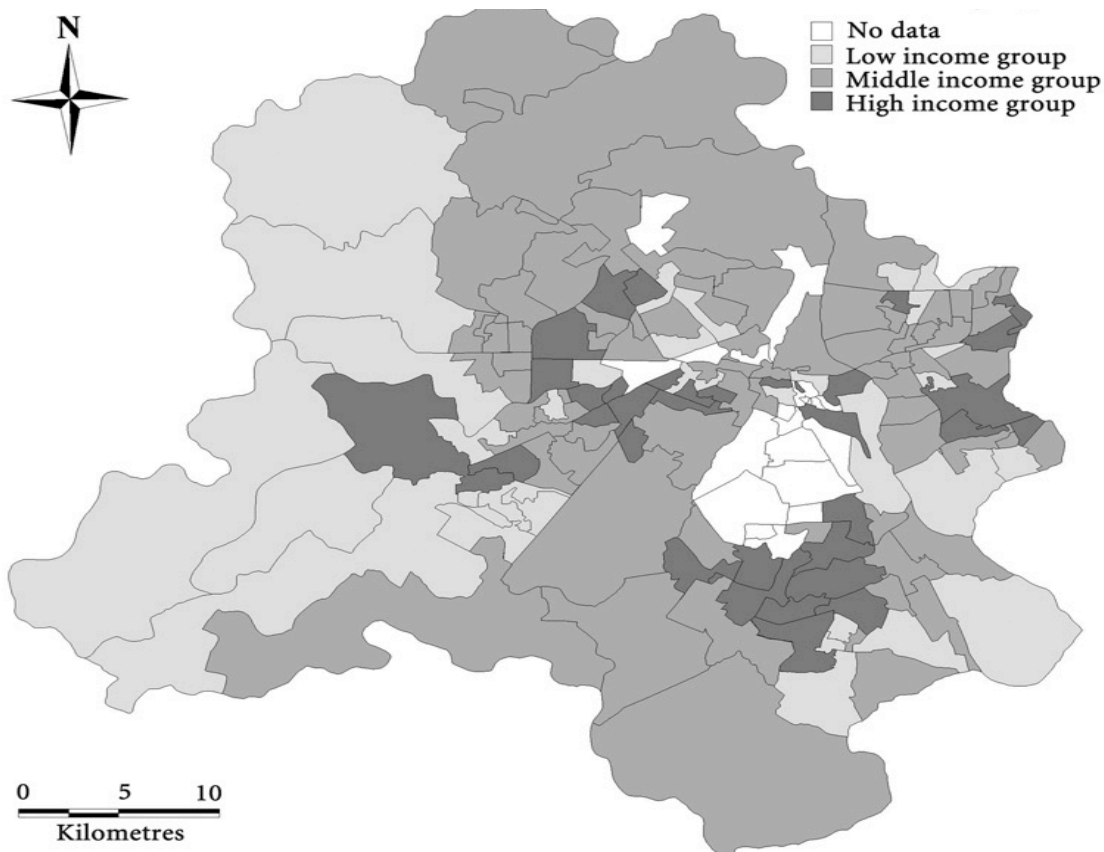
48. What is the median of Y?
- 8
 - 6.5
 - 5
 - 5.57
 - 4
49. What is the mode of Z?
- 0
 - 1.14
 - 1
 - 2
 - 1.33
50. What is the mean of $Y \times Z$ (i.e. row-wise multiplication of Y and Z)?
- 5.57
 - 9
 - 6.75
 - 7.17
 - 7.71
51. Represent the following situation mathematically. Surya and Chandra started with 20 apples together. Both of them then lost 2 apples each, and the product of the number of apples they now have is 60. Which of the following quadratic equations can help us identify how many apples each of them started with.
- $x^2 - 20x + 96 = 0$
 - $x^2 + 20x - 100 = 0$
 - $x - 80 = 0$
 - $x^2 - 2x + 80 = 0$
 - None of the above
52. A university produces a certain number of graduates every year. The cost of training each student amounts to 75 rupees plus the total graduates trained each year. During a particular year, the total cost of training all the graduates amounted to 650 rupees. Which of the following equations represent the situation mathematically, and can help us identify the number of students trained that year?
- $x^2 - 75x + 650 = 0$
 - $x^2 + 55x - 650 = 0$
 - $x^2 + 55x - 750 = 0$
 - $x^2 + 75x - 650 = 0$
 - None of the above
53. Calculate the possible solutions for x in the following quadratic equation: $3x^2 - 4x + 1 = 0$
Which of the following pair of numbers corresponds to the correct answer?
- 1, -1/3
 - 1/3, 1
 - 1, 1
 - 1/4, 1
 - None of the above
54. Solve the following set of simultaneous equations: $x + 4y = 10$; $5x + 4y = 22$. The values of x and y are ____ and ____ respectively.
- (7/4, 3)
 - (2, 4/7)
 - (3, 7/4)
 - (10, 22)
 - (4/7, 7/4)

55. Solve the following set of simultaneous equations: $2x - 4y = 10$; $-4x + 5y = -26$. The values of x and y are ___ and ___ respectively.
- (2, 9)
 - (9, 2)
 - (12/13, 6/13)
 - (5, 6/13)
 - (6, 12/13)

There is a coloured figure presented on the final page of this question booklet. The figure is entitled 'Final energy consumption per capita by state'. Please study the coloured figure carefully to answer the following four questions.

56. In the state with the lowest per capita energy use, consumption of which of the following energy sources dominates?
- Traditional biomass
 - Coal
 - Oil
 - Natural gas
 - Other
57. In the state with the highest per capita energy use, consumption of which of the following energy sources dominates?
- Traditional biomass
 - Coal and oil
 - Natural gas
 - Electricity
 - Other
58. Which of the following statements can we infer, based solely on the data presented in the figure above?
- As states grow in population, their energy consumption increases
 - States with higher GDP have higher per capita energy consumption.
 - In order to increase per capita energy consumption without adding to emissions, we need to increase the share of renewables in the energy mix.
 - States with higher per capita energy consumption have been heavily reliant on electricity and oil.
 - All of the above
59. In the figure above, the states are ordered by:
- per capita energy consumption
 - total energy consumption
 - both
 - size of GDP
 - none of the above.
60. Janaki collected data on how long she spent on her phone compared to how much battery life was remaining (in hours) throughout the day. She plotted the data in a graph which showed the variable, 'time spent on phone (in hours)' on the x-axis, and the variable, 'battery life remaining (in hours)' on the y axis. She found that the equation $y = -0.8x + 10$ best represented the data. Which of the following statements is the best interpretation of this trend line?
- For each additional 1 hour of time spent on the phone, the battery life increases by 0.8 hours
 - For each additional 0.8 hours of time spent on the phone, the battery life decreases by 1 hour
 - When unused, the phone has 9 hours of battery life remaining
 - For each additional 1 hour of time spent on the phone, the battery life decreases by 0.8 hours
 - None of the above

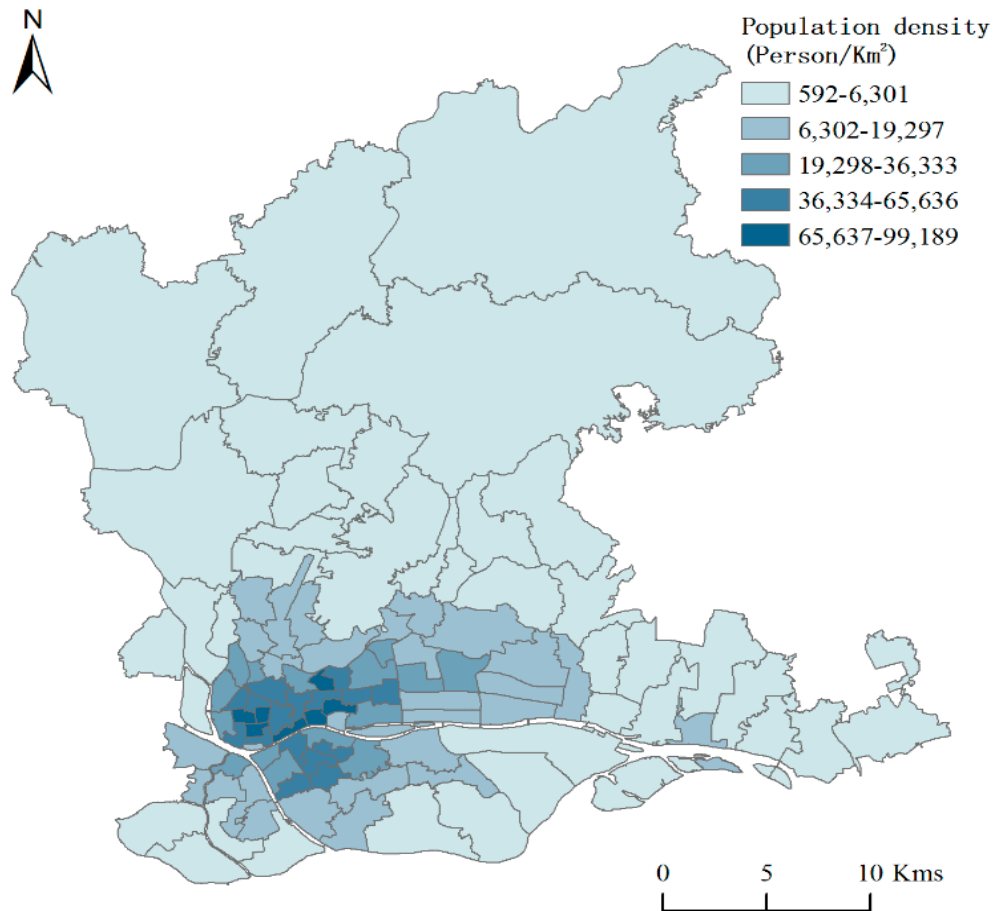
Income by electoral ward, for a city in India



Baud, I. S. A., Sridharan, N., & Pfeffer, K. (2008). Mapping urban poverty for local governance.... *Urban Studies*, 45(7), 1385-1412.

61. Which of the following can be reliably inferred from the map (income by electoral ward)?
 - a. The oldest parts of the city are in the West
 - b. There are forest areas in the wards with 'no data'
 - c. Agriculture is a big part of the city's economy
 - d. There's an airport near the city centre
 - e. None of the above
62. Assume the map above (income by electoral ward) is made based on median incomes, which of the following can be reliably inferred?
 - a. The highest population densities are in the high-income areas
 - b. Low-income households only live outside the areas labelled 'high income group'
 - c. There are no high-income households in the north
 - d. A large proportion of high-income households live within a 15km radius from the city centre
 - e. None of the above
63. Assume that the map was made again, this time based on the mean income in each ward. Which of the following is most likely to be true about the new map?
 - a. There will be no 'low-income' wards
 - b. Wards that have a large proportion of people living in poverty will tend to be classified higher than in the previous map
 - c. Wards that have a large proportion of people living in poverty will tend to be classified lower than in the previous map
 - d. All wards will be classified as 'middle-income'
 - e. The clustering of high-income wards will be broken up

Population Densities by ward in a city in China

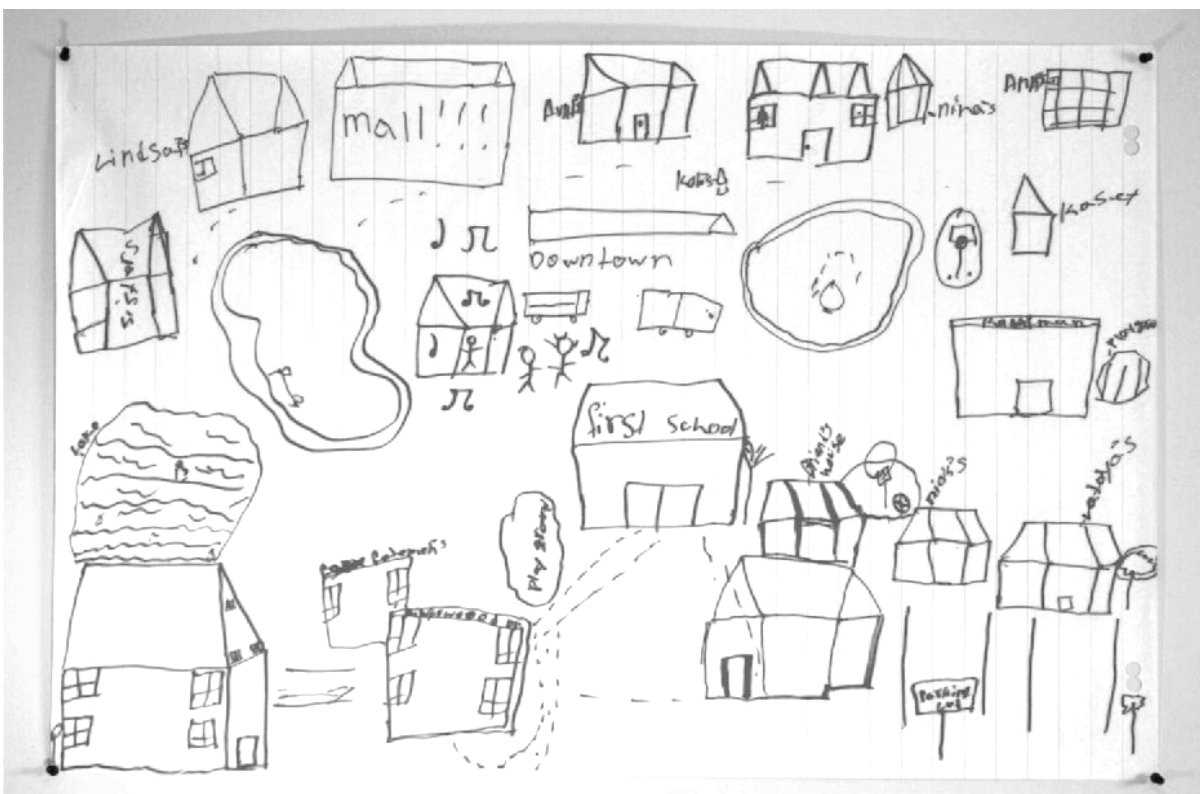


Zhao, G., & Yang, M. (2020). Urban Population Distribution Mapping with Multisource Geospatial Data Based on Zonal Strategy. *ISPRS International Journal of Geo-Information*, 9(11), 654.

64. What is the approximate total population of all wards shown on the map (Population Densities by ward)?
- 1 million
 - 15 million
 - 100 million
 - Depends on where people live
 - Depends on income levels
65. Which of the following is closest to the scale of the map (Population Densities by ward)?
- 1:10
 - 1:592
 - 1:10,000
 - 1:300,000
 - Depends on the total area
66. Where are we likely to find the most hospital beds in the areas shown on the map (Population Densities by ward)?
- Northwest
 - Northeast
 - Southwest
 - Southeast
 - Not enough information

67. If we had to represent an area of $10\text{km} \times 10\text{km}$ (100km^2) in the city, by drawing a square on the printed map (on the same size of paper that you have been given), what would be the approximate area of the drawn square?
- 100 cm^2
 - 1 km^2
 - 10 cm^2
 - 10 km^2
 - Not enough information
68. Which of the following can we infer from the map (Population Densities by ward)?
- There are industries near the city centre
 - The northern areas are agricultural
 - This is a coastal city – with the sea on the West
 - This is a coastal city – with the sea on the East
 - None of the above

Map drawn by a young person, Keisha, to represent her social spaces



Campbell, G., Glover, T. D., & Laryea, E. (2016). Recreation, settlement, and the welcoming community: Mapping community with African-Canadian youth newcomers. *Leisure Sciences*, 38(3), 215-231.

69. Which of the following is true about this map?
- The map is not a valid source of data
 - This kind of map is not useful for urban planning
 - With one such map we can plan a small neighbourhood
 - (a), (b) and (c)
 - None of the above
70. Which of the following can you infer from this map?
- Music might play an important role in the life of people of Keisha's age in her community
 - The mall might play an important role in the life of people of Keisha's age in her community
 - Recreational spaces might play an important role in the life of people of Keisha's age in her community
 - All of the above
 - None of the above

Section 3: Reading Comprehension

What is a prototype? The term prototype is typically used in the context of industrial production, design, and engineering; a prototype is built to model or test demand (from investors or users) for an idea or a product. But can we speak of prototyping a city, a region, a nation, or new ways of being? What would these complex prototypes look like, and what would they do? This book tells the story of how prototyping at vast scales came to be viewed as a promising way to intervene in entrenched structures of inequality, exploitation, and injustice—and how this promise became a demand for individual self-upgrade and economic development. As an ethnographer, I spent ten years (2008–2018) following the people who came together around the idea that cities, regions, economies, and even nations and life itself can be prototyped. They argued that if the production of technology was made available to everyone, concrete alternatives to corporatized, exploitative, and politicized technology could be tested. They envisioned that if people became makers of technology, they would own the things they made and could decide for themselves what their technologies—and by extension their social, economic, and political lives—would be like. The prototypes of intervention they made came to be widely known as the “maker movement.”

This promise of making—that every individual can prototype and thus intervene at scale—was fundamentally exhilarating. It felt empowering to many, like a moral form of hacking; an ethical, democratized technological resistance that was experimenting with how technology can be otherwise.

This book unpacks in ethnographic and historical detail how this happened; how “making” became saturated with an *affect of intervention*—a feeling of agency and control, a sense that alternatives to dominant structures at various spatial and temporal scales were possible. This affect of intervention created seemingly shared visions for the future— even when those visions were incompatible and contradictory. Making was taken up simultaneously to articulate a return to “made in America”— as former US president Barack Obama had envisioned it in 2013—and to overcome “made in China” and its associations of China with backwardness, low quality, and fakery. It was taken up by people, institutions, and corporations that we would typically think of as holding sharply opposing views; feminist technology researchers and designers, venture capitalists, educators, major tech corporations from Intel to Tencent, designers, technology activists, major governments with opposing political views, critical scholars of science and technology. The uptake of making was driven simultaneously by desires to relive modernist ideals of technological progress *and* by projects aimed at relocating future making and decolonizing technology and design. It was articulated both in terms of a nostalgic longing for older, “better” times *and* as a toolkit to imagine alternative futures. It became a site to re-articulate the importance of craftsmanship and its associations with individual self-transformation and autonomy. At the same time, it became a resource to envision an alternative designer, engineer, and computing subjectivity that challenged ideals of the autonomous self. The interesting question is not which version is true, but how it was possible for making to be understood through such contradictory terms.

Lindtner, Silvia M. *Prototype Nation*. Princeton University Press, 2020. Pg 1-2.

71. In this passage the idea of prototyping is:
- Exclusively describing the hardware product design process
 - Something that happens only in America or China
 - An idea owned and defined by a range of communities and institutions at different scales
 - Individuals emancipating themselves from the pressures social institutions
 - Available to only those who have the necessary skills to use technologies appropriately
72. As described in this passage, the “maker movement”:
- Is a social movement that encourages greater integration of technology in our daily lives
 - Extended notions of agency from the making of technology to other parts of people’s lived reality
 - Is all about manufacturing technology: the use of machining technology to build sophisticated equipment for personal and professional reasons
 - Is dominated by a small elite who have access to machine shops and 3D printers
 - Is a key contributor to China’s growing economy
73. Prototyping and Making was
- Adopted by a range of contrasting groups as part of their imagination of what the future could look like
 - A product of state-driven industrial policy
 - A happy accident that emerged with the creation of 3D printers
 - A form of fake news concocted to give people the sense that they had control over their lives
 - Borrowed from ancient cultures, which had a long tradition of invention and creativity

74. In this passage, the author describes herself as an ethnographer. We can infer that ethnography
- Is the study of prototyping of cities, regions, economies, and even nations and life
 - Is a research method which tries to understand the world from the standpoint of its social relations
 - Is simply a form of journalism which is longer and more elaborate
 - Must take decades to accomplish
 - Can be done from a distance; it does not require living amongst people and observing them
75. Craftsmanship is essential to the maker movement because
- Because companies can hire skilled craftspeople to build towards the national project
 - It re-locates the power of creating technologies to individuals and hence can have a democratizing effect
 - It is essential to creating newer, innovative products which can capture greater market share and increase profits
 - Skilled craftsmen can usually charge a premium for their services
 - It allows for self-sufficiency; skilled craftspeople do not need to rely on anyone else for their technologies

Over in the philosophy of sport, the value of game playing is usually spelled out in terms of skills, excellences, and achievements. But notice that this also cashes out the value of games in some very familiar currency. For example, Tom Hurka argues that games are valuable because they enable difficult achievements. But difficult achievements are, obviously, not confined to games. Curing cancer and inventing a better mousetrap would also be difficult achievements, and they would give us something useful besides. This leads Hurka to conclude that playing games is generally less valuable than engaging in more useful non- game activities. Science and philosophy are valuable in the same way as games in offering difficult achievements, but they are also valuable in other ways. They give us truth and understanding, or at least some useful tools, as well as difficulty. Games can offer us only difficulty (Hurka 2006). Games might truly come into their own, says Hurka, once we've solved all our practical problems and entered some sort of techno-futurist Utopia. But in the meantime, we're probably better off doing something more useful with our lives. Notice that Hurka's conclusion arises precisely because he thinks games are valuable in virtue of something rather commonplace— difficulty— rather than in virtue of something unique. Thus, the value of games is easily superseded by the value of other, equally difficult but more practical activities.

All these approaches miss much of what's special about games. Games, I will argue, are a distinctive art form. They offer us access to a unique artistic horizon and a distinctive set of social goods. They are special as an art because they engage with human practicality— with our ability to decide and to do. And they are special as a practical activity precisely because they are an art. In ordinary life, we have to struggle to deal with whatever the world throws at us, with whatever means we happen to have lying around. In ordinary life, the form of our struggle is usually forced on us by an indifferent and arbitrary world. In games, on the other hand, the form of our practical engagement is intentionally and creatively configured by the game's designers. In ordinary life, we have to desperately fit ourselves to the practical demands of the world. In games, we can engineer the world of the game, and the agency we will occupy, to fit us and our desires. Struggles in games can be carefully shaped in order to be interesting, fun, or even beautiful for the struggler.

This is enabled, in significant part, by the peculiar nature of our in-game ends. Games ends are extremely different from the sorts of ends we stand behind in ordinary life. Our values, in ordinary life, are largely recalcitrant. Much of what we value seems universal and immovable. We value life, freedom, and happiness. Even with our personal values, there's typically little short- term flex. I care about art, creativity, and philosophy. Changing my core values would take, at the very least, significant time and effort. My core values are thick and recalcitrant. But game activity is different. We can change our in- game ends easily and fluidly. We can adopt new ends, which will guide our actions for the duration of the game, and then drop them in an instant. When we play games, we take on temporary agencies— temporary sets of abilities and constraints, along with temporary ends. We have a significant capacity for agential fluidity, and games make full use of that capacity.

Nguyen, C. Thi. Games: agency as art. Oxford University Press, USA, 2020. Pg 3-4.

76. From this passage we can infer that
- The designers of games are trying to make games as addictive as possible
 - The designers of games are looking to maximize profits
 - The designers of games are philosophically sophisticated
 - The designers of games know major details about their target demographic which helps them in their work
 - The designers of games put in much time and effort to configure an experience for the game player
77. According to the author, games are interesting
- Because game players can often have very different and changing priorities in-game
 - Because game players are constantly struggling against the game
 - Because competition forces game players to take extreme risks to win
 - Because game players often break the rules and are quite unpredictable
 - Because game players' personal values are reflected in how they play the game
78. The author of this piece cites Tom Hurka. The author
- Largely agrees with Hurka's arguments and cites them as support for his own
 - Mildly disagrees with Hurka, but acknowledges some of his points
 - Strongly disagrees with Hurka
 - Knows Hurka personally and has engaged with his arguments frequently
 - Mildly agrees with Hurka's points on difficulty, but disagrees on the framing of the argument
79. According to the author games should be considered an art form because
- Game designers put in a lot of effort into the visual design of games
 - They engage with the complexity of human decision making and give us forms of agency which we do not always have in real life
 - Some games have made it to museums and art exhibits
 - Games sometimes change our core values
 - They present a form of difficulty or challenge which must be overcome by the game player
80. When the author invokes the "philosophy of sport" at the beginning of the passage
- He is using it to draw a contrast to his own "philosophy of games"
 - He is equating sports and games and asserting that they accomplish the same ends
 - He is arguing that sports require more skill than games; the achievements are more meaningful
 - He is trying to encourage more people who are fans of sports to also play games
 - He is arguing that people who are good at sports are also good at games

Indian insurance companies are among the worst performers in the world when it comes to covering climate-linked losses, with the lowest rate of insurance penetration across Asia, according to a recent analysis of the global climate insurance sector. Indian insurance companies have, in fact, failed to pay close to three-fourths of the claimed amount for Cyclone Amphan, the devastating cyclone that flattened the Sundarbans in West Bengal during May 2021. This is despite them releasing record amount of insurance claims for any natural disaster. "Record insurance payment despite not paying about three-fourths of the claimed amount underlines the enormity of damages," a senior official of the West Bengal disaster management department told this reporter March 30, 2022. A spate of recently published climate reports by the Intergovernmental Panel for Climate Change (IPCC) have pointed out that India is one of the most climate-vulnerable countries globally. These have added that India is likely to incur further economic losses due to extreme weather events.

A recent report prepared by environmental platform Climate Trends has pointed out that Indian insurance companies were "among the worst performers ... scoring below 10 per cent for the quality of their disclosures." Their disclosures were assessed against the recommendations made by the Task Force on Climate Related Financial Disclosures (TCFD). The report is based on an Ernst & Young review of climate disclosures from global insurance industries across the world. The TCFD was formed in 2017 by the G20 Financial Stability Board to create a consistent set of recommendations on how companies can analyse and disclose climate-related impacts for their businesses, which have now become the gold standard of climate disclosure by companies. "Insurance companies from Colombia, India, Kazakhstan, New Zealand, Russia, Saudi Arabia and the United Arab Emirates were among the worst performers, scoring below 10 per cent for the quality of their disclosures," the report read. It added: "Insurance companies from Australia, Canada,

Germany, Japan and the United States were the leading performers in terms of quality of disclosures, scoring between 50 per cent and 60 per cent.”

“Climate risks are evolving rapidly and getting increasingly complex ... insurers will not have the luxury of working in silos,” Praveen Gupta, former managing director and chief executive officer of Raheja QBE General Insurance Co Ltd, said. “Indian insurers have been laggards when it comes to incorporating climate risk assessment in their investment and underwriting decision-making process ... Insurance Regulatory and Development Authority of India (IRDAI) needs to bring in sensible regulations to mandate climate risk modelling by insurers and repricing of premiums,” an insider in the climate insurance sector, not wanting to be named, said. The latest report prepared by IRDAI shows that 14,575 insurance claims were made on Amphan damages, amounting to a gross value of Rs 1,767 crore during 2020-21. Of these, 11,512 claims were settled till June 30, 2021, amounting to Rs 471 crore, the highest for any extreme weather event in India during 2020-21 and also one of the highest-ever in country. The Telangana flood with a Rs 330 crore claim — of which Rs 151 crore was realised — and Cyclone Nisarga, which had hit Maharashtra in June 2021, with a claim value of Rs 290 crore — Rs 93 crore of which were realised — were next in the list after Amphan. “In 2020-21, the maximum numbers of insurance claims out of the total in India were due to damages caused by Cyclone Amphan, which caused immense impact in eastern India including West Bengal,” Aarti Khosla, director of non-profit Climate Trends, said. She added: “This was despite India having the lowest rate of insurance penetration across Asia.” “The Amphan data shows that while about 80 per cent of the claims were settled, only about 26 per cent of total claimed money was paid, indicating major claims have remained unsettled,” an insurance expert said. The insurance payment trend seems to be similar for other weather events in the country as well.

“Flood risk in India is quite pronounced but insurance companies bore less than 10 per cent of the actual losses during the Kerala floods in 2018,” Saon Roy, a visiting professor in Indian Council for Research on International Economic Research, said. As a matter of fact, during 2020-21, about 70 per cent of total claims worth Rs 2,559 crore made under various catastrophes in India remained unpaid. According to a recently published UN report — prepared by the IPCC’s Working Group 2 — India was found to be one of the most vulnerable countries in the world to climate-induced flooding, heat stress and droughts. “Research predicts that climate change could reduce India’s gross domestic product (GDP) by around 2.6 per cent by 2100, even if the global temperature increase is held below 2 degrees Celsius,” warned the Climate Trends report. A 2021 Germanwatch report on global climate risk showed that during 2001-19, India was globally second in terms of loss in GDP — expressed in percentage — due to climate change. “IPCC’s latest report calls for a pronounced focus on stepping up climate risk insurance, given the risks are set to breach all thresholds. CEEW research has found that more than 80 per cent of Indians live in districts vulnerable to climate risk,” Abinash Mohanty, programme lead, Council on Energy, Environment and Water (CEEW), a non-profit, said.

From *Down to Earth* article “**Indian insurers listed among worst performers in climate sector globally**”
By Jayanta Basu, Published: Thursday 31 March 2022

81. Indian insurance companies are among the worst performers in the world when it comes to covering climate-linked losses because:
- Indian insurance companies have the lowest rate of insurance penetration across Asia.
 - Indian insurance companies release record amount of claims for any natural disaster.
 - India is one of the most climate-vulnerable countries globally and India is likely to incur further economic losses due to extreme weather events.
 - Indian insurance companies have typically paid a small percentage of the total amount claimed.
 - All of the above
82. Please choose the correct statement:
- Total damages due to cyclone Amphan amounted to a gross value of Rs 1,767 crore during 2020-21.
 - The Amphan data shows that about only 26 per cent of the claims were settled.
 - About Rs. 1790 crores worth of insurance claims made under various catastrophes in India remained unpaid.
 - All of the above are correct statements.
 - Only ‘a’ and ‘b’ are correct statements.

83. Choose the false statement:

- a. Insurance companies bore less than 10 per cent of the actual losses during the Kerala floods in 2018.
- b. During 2001-19, India was globally second in terms of loss in GDP — expressed in percentage — due to climate change.
- c. A 2021 Germanwatch report on global climate risk showed that climate change could reduce India's gross domestic product (GDP) by around 2.6 per cent by 2100, even if the global temperature increase is held below 2 degrees Celsius
- d. Cyclone Nisarga, which had hit Maharashtra in June 2021, had insurance claim value of Rs 290 crore.
- e. None of the above

84. Indian insurers have not been proactive when it comes to incorporating climate risk assessment in their investment and underwriting decision-making process because:

- a. IRDAI has not mandated climate risk modelling by insurers and repricing of premiums.
- b. 80 per cent of Indians live in districts vulnerable to climate risk.
- c. Climate risks are evolving rapidly and getting increasingly complex and hence modelling them is difficult.
- d. Task Force on Climate Related Financial Disclosures (TCFD) has not mandated risk modelling by insurers and repricing of premiums.
- e. None of the above

85. The enormity of damages caused by cyclone Amphan were reflected in the fact that:

- a. Record insurance payouts were made despite only one-fourth of the claimed amount being paid out.
- b. The Amphan data shows that about 80 per cent of the claims were settled.
- c. 14,575 insurance claims were made on Amphan damages.
- d. None of the above.
- e. All of the above.

As long as there has been marine life, there has been marine snow — a ceaseless drizzle of death and waste sinking from the surface into the depths of the sea. The snow begins as motes, which aggregate into dense, flocculent flakes that gradually sink and drift past the mouths (and mouth-like apparatuses) of scavengers farther down. But even marine snow that is devoured will most likely be snowfall once more; a squid's guts are just a rest stop on this long passage to the deep.

Although the term may suggest wintry whites, marine snow is mostly brownish or grayish, comprising mostly dead things. For eons, the debris has contained the same things — flecks from plant and animal carcasses, feces, mucus, dust, microbes, viruses — and transported the ocean's carbon to be stored on the seafloor. Increasingly, however, marine snowfall is being infiltrated by microplastics: fibers and fragments of polyamide, polyethylene and polyethylene terephthalate. And this fauxfall appears to be altering our planet's ancient cooling process.

Every year, tens of millions of tons of plastic enter Earth's oceans. Scientists initially assumed that the material was destined to float in garbage patches and gyres, but surface surveys have accounted for only about one percent of the ocean's estimated plastic. A recent model found that 99.8 percent of plastic that entered the ocean since 1950 had sunk below the first few hundred feet of the ocean. Scientists have found 10,000 times more microplastics on the seafloor than in contaminated surface waters.

Marine snow, one of the primary pathways connecting the surface and the deep, appears to be helping the plastics sink. And scientists have only begun to untangle how these materials interfere with deep-sea food webs and the ocean's natural carbon cycles.

"It's not just that marine snow transports plastics or aggregates with plastic," Luisa Galgani, a researcher at Florida Atlantic University, said. "It's that they can help each other get to the deep ocean."

The sunlit surface of the sea blooms with phytoplankton, zooplankton, algae, bacteria and other minuscule life, all feeding on sunbeams or one another. As these microbes metabolize, some produce polysaccharides that can form a sticky gel that attracts the lifeless bodies of tiny organisms, small shreds of larger carcasses, shells from foraminifera and pteropods, sand and microplastics, which stick together to form larger flakes. "They are the glue that keeps together all the components of marine snow," Dr. Galgani said.

Marine snowflakes fall at different rates. Smaller ones have a more languid descent — "as slow as a meter a day," said Anela Choy, a biological oceanographer at Scripps Institution of Oceanography at the University of California, San Diego. Bigger particles, such as dense fecal pellets, can sink quicker. "It just skyrockets to the bottom of the ocean," said Tracy Mincer, a researcher at Florida Atlantic University.

Plastic in the ocean is constantly being degraded; even something as big and buoyant as a milk jug will eventually shed and splinter into microplastics. These plastics develop biofilms of distinct microbial communities — the "plastisphere," said Linda Amaral-Zettler, a scientist at the Royal Netherlands Institute for Sea Research, who coined the term. "We sort of think about plastic as being inert," Dr. Amaral-Zettler said. "Once it enters the environment, it's rapidly colonized by microbes."

Microplastics can host so many microbial hitchhikers that they counteract the natural buoyancy of the plastic, causing their raft to sink. But if the biofilms then degrade on the way down, the plastic could float back up, potentially leading to a yo-yoing purgatory of microplastics in the water column. Marine snow is anything but stable; as flakes free-fall into the abyss, they are constantly congealing and falling apart, rent by waves or predators.

"It's not as simple as: Everything's falling all the time," said Adam Porter, a marine ecologist at the University of Exeter in England. "It's a black box in the middle of the ocean, because we can't stay down there long enough to work out what's going on."

(extracted from In the Ocean, It's Snowing Microplastics, New York Times)

86. In this passage, the term marine snow is used only for:
- snowfalls in oceanic areas
 - biological material that sinks down from the ocean's surface
 - microplastics that sink down from the ocean's surface
 - a new phenomena that involves the plastisphere
 - b and c
87. The yo-yoing of microplastics is caused centrally by
- wave motion in the ocean
 - combination of buoyancy of the plastic and weight of microbial biofilms
 - production of polysaccharides by microbes
 - b and c
 - a, b and c
88. Contrary to initial assumptions, scientists now believe that
- much more plastic enters the oceans than thought initially
 - there are many kinds of plastics entering the oceans
 - plastics mostly float on the surface as gyres and garbage patches
 - most plastic in the ocean eventually sinks well below the surface
 - all of the above
89. The rate of sinking of plastic pieces is affected by
- Their size
 - The extent of their colonization by biological organisms
 - the rate of degradation into smaller pieces
 - a and b
 - a, b, and c

Although many experts believe robots will enhance human capability, one problem is that regulation lags technology. With covid-19, says Dr Johnson, some clinicians worried that even the spread of telemedicine might affect their indemnity insurance, let alone robots. And although a long road remains ahead for the development of autonomous delivery vans and lorries, Dr Christensen finds it “ludicrous” that a test vehicle driving across a state border in America may thereafter have to comply with a completely different set of regulations from those which pertained in the place whence it came. It seems an awful lot of meetings lie ahead for roboticists and regulators to determine how machines and people will work together.

(Extracted from Covid has reset relations between people and robots, The Economist)

90. The widespread use of robots will necessarily require
- Better indemnity insurance
 - Better autonomous delivery vans and lorries
 - More meetings between roboticists and regulators
 - Regulations to keep pace with technology
 - All of the above

Scientists have investigated how the average human brain evolved from cradle to grave, focusing on three types of brain tissue: grey matter (made up of neuron cell bodies), white matter (the filaments connecting neurons) and tissue conveying cerebrospinal fluid (the brain's plumbing system). The scientists paid particular attention to the cerebral cortex, the outermost layer of the brain, responsible for higher-order brain functions. They observed grey matter in the cortex peaking in volume at 5.9 years, 2 to 3 years later than previously thought.

The results turned up some surprises too. Autism, for example, is generally thought to present differently in male and female patients, but there is little sign of that difference in their brain tissue. In contrast, attention deficit hyperactivity disorder (adhd)—which presents similarly by sex—displays the largest average difference in brain structure between male and female patients of any diagnosis they analysed. Over the course of a lifetime, the brains of male adhd patients appear to be skewed towards below-average volumes of grey matter, white matter and cerebrospinal fluid. The brains of female adhd patients, on the other hand, were ever-so-slightly skewed towards higher volumes of the same tissues.

(Extracted from The first reference charts for the human brain have been completed, The Economist)

91. In the brains of middle-aged patients with developmental disorders, one would expect to find
- three types of brain tissue
 - differences between male and female brains
 - Restructured brain tissue relative to normal brains
 - a and c
 - a, b, and c
92. A woman with attention deficit hyperactivity disorder (adhd) would
- have a different brain structure from men
 - have greater volumes of cerebrospinal fluid compared to men
 - have same volumes of grey matter compared to normal women
 - a and b
 - a, b, and c

In soldering metals, an intermediate material is heated until it melts and bonds with the two surfaces that are to be joined. The material of these edges has a higher melting point and remains solid (otherwise it would count as welding). For tissue, the intermediate material is not a metal alloy, but a paste of biocompatible material, such as albumin, a protein that is an important constituent of blood. When heated, the paste develops chemical bonds with living tissue on both sides. As healing progresses, the two sides reconnect and the paste is removed by the body's natural cleaning procedures.

But soldering tissue has turned out to be difficult in practice, which means it is not commonly done. Heating the soldering paste is done by shining a laser onto it, from which the paste absorbs energy. But controlling the heating precisely is tricky. The paste needs to reach about 80°C to work. If the temperature is too low, the soldering material will not fully melt and the bond will be weak. But if it is too high, it risks burning the

surrounding tissue. Existing attempts at wound-soldering rely on thermal imaging to measure temperature. But that only measures the temperature at the surface of the solder, rather than throughout the material.

(Extracted from Never mind stitches—it is possible to solder wounds closed, The Economist)

- 93.** Soldering tissue
- a. is similar to soldering metals
 - b. is based on the formation of chemical bonds
 - c. requires precise temperature control
 - d. a and c
 - e. a, b, and c

Most scientists now feel they can say with confidence that some animals process information and express emotions in ways that are accompanied by conscious mental experience. They agree that animals, from rats and mice to parrots and humpback whales, have complex mental capacities; that a few species have attributes once thought to be unique to people, such as the ability to give objects names and use tools; and that a handful of animals—primates, corvids (the crow family) and cetaceans (whales and dolphins)—have something close to what in humans is seen as culture, in that they develop distinctive ways of doing things which are passed down by imitation and example. No animals have all the attributes of human minds; but almost all the attributes of human minds are found in some animal or other.

[Extracted from Animals think, therefore.... The Economist]

- 94.** The above passage suggests that an animal
- a. has almost all attributes of human minds
 - b. does not have the attributes of human minds
 - c. has some attribute or the other of human minds
 - d. a and c
 - e. a, b, and c

Although genetic predisposition is an important risk factor, experts have also known for some time that what pregnant women eat and breathe can impact their unborn babies. The last decade has seen further scientific proof of the link between a mother's diet and lifestyle during pregnancy and the well-being of her child later in life. Recent results from a Flemish birth cohort study looking at mothers and their children, which was financed by the Flemish Government and coordinated by a leading European independent research and technology organisation VITO, showed an association between exposure to traffic-related air pollutants before birth (mainly nitrogen dioxide and the particle PM10) and the development of asthma symptoms or wheezing in three-year old toddlers.

[Extracted from How our environment can induce allergies even before we're born. The Conversation]

- 95.** This passage suggests that a baby's health is affected by
- a. mother's diet during pregnancy
 - b. the environment to which the mother is exposed during pregnancy
 - c. the mother's lifestyle during pregnancy
 - d. genetic predisposition
 - e. all of the above

Scientists have revealed how to solve the climate crisis, but will we listen?

Simon Lewis (*The Guardian*)

Amid the triple crisis of the war in Ukraine, the still-raging pandemic and escalating inflation, climate scientists have just pulled off a truly impressive achievement. They have stood firm and persuaded the world's governments to agree to a common guide to solving the climate emergency. Despite the despair of mounting global problems, the release of the latest report from the Intergovernmental Panel on Climate Change shows some grounds for hope. After the recent reports on the causes and effects of climate change, this one covers solutions – with a summary signed off by the world's governments. The summary is blunt and clear, and in many places acknowledges realities that scientists and campaigners have known for years but governments often avoided directly admitting.

First, it is clearly acknowledged that North America and Europe have made the greatest contribution to the crisis we are living through, by producing by far the most carbon dioxide emissions since the industrial revolution. The report shows that today the average North American emits 16 tonnes of carbon dioxide each year from fossil fuel use, compared with just 2 tonnes for the average African. Consumption by the top 10% of households comprises over a third of global greenhouse gases, compared with 15% of these gases for the bottom 50% of households. Every government now agrees that the climate crisis is driven by how the world's wealthy – which includes much of the UK's population – currently live, consume and invest. This is a major leap forward compared with previous reports. The last IPCC summary on solutions in 2014 labelled population growth as “one of the most important drivers of increases in CO₂ emissions from fossil fuel combustion”. Such dangerous misunderstandings are now gone. Seven years on, these old “blame the poor” arguments increasingly seem like a relic of a previous age.

The new report is also admirably clear on how far governments are from meeting their commitments signed under the Paris agreement in 2015 and reaffirmed in Glasgow late last year. For all the UK government's talk of “keeping 1.5 alive” in Glasgow, current climate pledges will not limit global heating to 1.5C above pre-industrial levels, or keep it “well below” 2C, the dual Paris targets. Our course is terrifyingly simple to see we are on track for catastrophic 3C heating. Extreme heatwaves, floods and droughts will destroy lives and livelihoods. If that feels depressing, there is cause for hope.

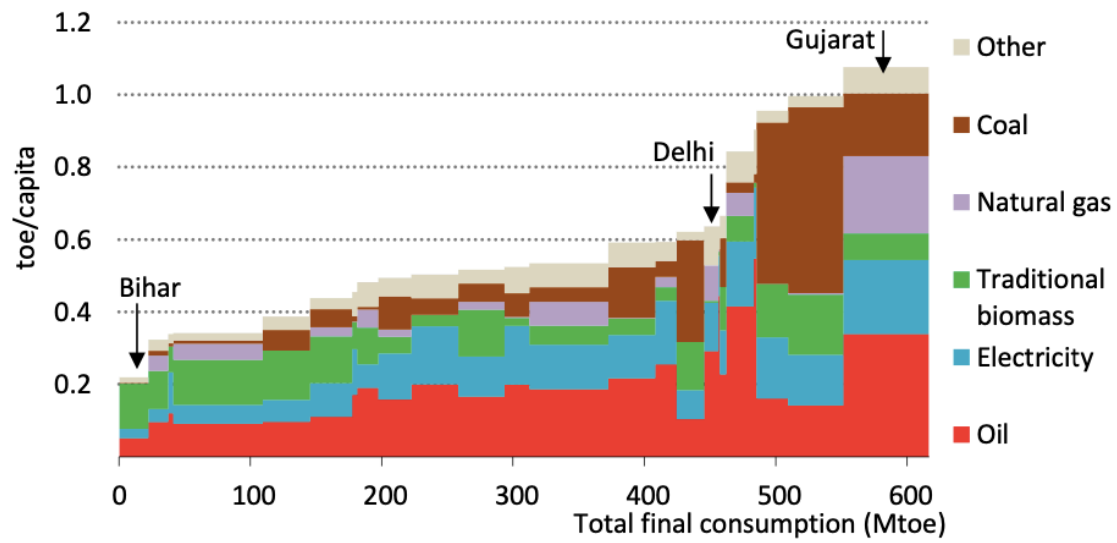
Governments own this report. The most heartening section is on alternatives to fossil fuels. The overarching solution is to electrify everything we can, and power everything using clean renewables and storage. Between 2010 and 2019, the report says that the cost of solar energy plummeted by 85%, wind energy by 55% and lithium-ion batteries by 85%. But the emissions problem is deeper than just failures to invest in low carbon alternatives. The world already has enough existing and planned high-carbon infrastructure to blast past 1.5C. Retiring big emitters, such as coal-fired power stations, is needed. Plus, planned new oil fields and airports that lock in high emissions need cancelling. This report is essentially a manifesto for ending the fossil fuel age. But there are elements in it that will be used by the fossil fuel industry to delay climate action. Central to this is the discussion of removing carbon dioxide from the atmosphere. There are those who argue that later this century we will be able to suck carbon out of the air, so why bother cutting emissions as sharply as possible today? The answer, in the report, is that carbon removal “currently faces technological, economic, institutional, ecological-environmental and sociocultural barriers”. The report rightly makes clear how unrealistic very high carbon removal pathways are, in stronger terms than ever before.

For those who have been working for a better climate, the full 3,000-page report contains an astonishingly frank assessment of the organised efforts used to thwart climate action. The intertwined relationship between fossil fuels and governments goes deep: last month, for example, we learned that the former UK boss of BP is to be appointed by the government to champion the UK's transition to a low-carbon economy. Each year that passes adds further reasons to stop using fossil fuels. Last year, it became clear that gas prices would rise sharply, affecting millions. This year, we can add that fossil fuels fund the Russian military and its atrocities. Add these to ending urban air pollution and avoiding hundreds of millions of people suffering heatwaves, drought and floods. And the price? Investing a few per cent of GDP and some new legislation.

- 96.** According to the author, which is dangerous misunderstanding about population and its relationship to climate change
- The climate crisis is driven by how the world's wealthy currently live, consume and invest.
 - Consumption by the top 10% of households comprises over a third of global greenhouse gases.
 - Population growth is one of the most important drivers of increases in CO₂ emissions from fossil fuel combustion.
 - Blame the poor for having more children and contributing to population growth.
 - Both 'c' and 'd'

97. The author says that the latest IPCC report is “essentially a manifesto for ending the fossil fuel age”. The main basis for his claim is that::
- There has been a failure to invest in the low carbon alternatives.
 - The cost of clean renewables has plummeted and therefore investments in cleaner alternatives will not happen.
 - The world already has enough existing and planned high-carbon infrastructure to blast past 1.5C.
 - There are those who argue that later this century we will be able to suck carbon out of the air, so why bother cutting emissions as sharply as possible today.
 - All of the above.
98. The intertwined relationship between fossil fuels and governments goes deep. This is reflected in the following statement(s):
- The fossil fuels fund the Russian military and its atrocities.
 - The former UK boss of BP is to be appointed by the government to champion the UK’s transition to a low-carbon economy.
 - The full 3,000-page IPCC report contains an astonishingly frank assessment of the organised efforts used to thwart climate action.
 - All of the above
 - None of the above.
99. What targets for limiting temperature increase were set by Paris Agreement?
- 1.5C above pre-industrial levels
 - “Keeping 1.5C alive” but well below 2C
 - Between 2C and 3C above pre-industrial levels.
 - A minimum of 2C above pre-industrial levels.
 - Between 1.5C and 3C above pre-industrial levels.
100. The report rightly makes clear how unrealistic very high carbon removal pathways are, in stronger terms than ever before. This is because:
- Every government now agrees that the climate crisis is driven by how the world’s wealthy and the wealthy cannot be coerced to change their lifestyles.
 - There is no need for high carbon removal pathways because we can electrify everything, and power everything using clean renewables and storage as their prices have plummeted in the last decade.
 - There are number of barriers to deploying carbon removal technologies currently.
 - Last year, it became clear that gas prices would rise sharply, affecting millions, hence gas use would be reduced and there would be no need for carbon removal technologies.
 - All of the above.

Figure: Final energy consumption per capita by state (Source: International Energy Agency, 2021)



The above figure shows final energy consumption in Million tons of oil equivalent (Mtoe) and per capita energy consumption in (toe/capita) for each state in India. The colours represent various energy supply sources.

Reference: IEA International Energy Agency. 2021. *India Energy Outlook 2021*. OECD.