

UPSC

CIVIL SERVICES
EXAMINATION
(PRELIMS)-CSAT

2016

PAPER

2

Max. Time: 2 Hours

Max. Marks: 200

General Instructions

1. This Test Booklet contains **80** items (questions). Each item comprises four responses (answers). In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
2. You have to mark all your responses **ONLY** on the separate OMR Sheet provided.
3. All items carry equal marks.
4. **Penalty for wrong answers:**
 - (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third (0.33)** of the marks assigned to that question will be deducted as penalty.
 - (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.
 - (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be no penalty for that question.

Direction for the following 6 (six) items: Read the following two passages and answer the items (1-6) that follow each passage. Your answers to these items should be based on the passages only.

Passage-1

Accountability, or the lack of it, in governance generally, and civil services, in particular, is a major factor underlying the deficiencies in governance and public administration. Designing an effective framework for accountability has been a key element of the reform agenda. A fundamental issue is whether civil services should be accountable to the political executive of the day or to society at large. In other words, how should internal and external accountability be reconciled? Internal accountability is sought to be achieved by internal performance monitoring, official supervision by bodies like the Central Vigilance Commission and Comptroller and Auditor General, and judicial review of executive decisions. Articles 311 and 312 of the Indian Constitution provide job security and safeguards

to the civil services, especially the All India Services. The framers of the Constitution had envisaged that provision of these safeguards would result in a civil service that is not totally subservient to the political executive but will have the strength to function in larger public interest. The need to balance internal and external accountability is thus built into the Constitution. The issue is where to draw the line. Over the years, the emphasis seems to have tilted in favour of greater internal accountability of the civil services to the political leaders of the day who in turn are expected to be externally accountable to the society at large through the election process. This system for seeking accountability to society has not worked out, and has led to several adverse consequences for governance.

Some special measures can be considered for improving accountability in civil services. Provisions of Articles 311 and 312 should be reviewed and laws and regulations framed to ensure external of civil services. The proposed

Civil Services Bill seeks to address some of these requirements. The respective roles of professional civil services and the political executive should be defined so that professions managerial functions and management of civil services are depoliticized. For this purpose, effective statutory civil service boards should be created at the centre and in the states. Decentralization and devolution of authority to bring government and decision making closer to the people also helps to enhance accountability.

1. According to the passage, which of the following factor/factors led to the adverse consequences for governance/public administration ?

1. Inability of civil services to strike a balance between internal and external accountabilities
2. Lack of sufficient professional training to the officers of All India Services
3. Lack of proper service benefits in civil services
4. Lack of constitutional provisions to define the respective roles of professional civil services vis-a-vis political executive in this context.

Select the correct answer using the code given below:

- (a) 1 only (b) 2 and 3 only
(c) 1 and 4 only (d) 2, 3 and 4

2. With reference to the passage, the following assumptions have been made:

1. Political executive is an obstacle to the accountability of the civil services to the society.
2. In the present framework of Indian polity, the political executive is no longer accountable to the society.

Which of these assumptions is/are valid ?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

3. Which one of the following is the essential message implied by this passage ?

- (a) Civil services are not accountable to the society they are serving.
(b) Educated and enlightened persons are not taking up political leadership.

(c) The framers of the constitution did not envisage the problems being encountered by the civil services.

(d) There is a need and scope for reforms to improve the accountability of civil services.

4. According to the passage, which one of the following is not a means of enhancing internal accountability of civil services ?

- (a) Better job security and safeguards
(b) Supervision by Central Vigilance Commission
(c) Judicial review of executive decisions
(d) Seeking accountability through enhanced participation by people in decision making process

Passage-2

In general, religious traditions stress our duty to God, or to some universal ethical principle. Our duties to one another derive from these. The religious concept of rights is primarily derived from our relationship to this divinity or principle and the implication it has on our other relationships. This correspondence between rights and duties is critical to any further understanding of justice. But, for justice to be practiced; virtue, rights and duties cannot remain formal abstractions. They must be grounded in a community (common unity) bound together by a sense of common union (communion). Even as a personal virtue, this solidarity is essential to the practice and understanding of justice.

5. With reference to the passage, the following assumptions have been made:

1. Human relationships are derived from their religious traditions.
2. Human beings can be duty bound only if they believe in God.
3. Religious traditions are essential to practice and understand justice.

Which of these assumption(s) is/are valid ?

- (a) 1 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

6. Which one of the following is the crux of this passage ?

- (a) Our duties to one another derive from our religious traditions.
(b) Having relationship to the divine principle is a great virtue.

- (c) Balance between rights and duties is crucial to the delivery of justice in a society.
- (d) Religious concept of rights is primarily derived from our relationship to God.
7. **A ate grapes and pineapple; B ate grapes and oranges; C ate oranges, pineapple and apple; D ate grapes, apple and pineapple. After taking fruits, B and C fell sick. In the light of the above facts, it can be said that the cause of sickness was:**
- (a) Apple (b) Pineapple
(c) Grapes (d) Oranges
8. **Consider the following statements:**
- The rate of population growth is increasing in the country.
 - The death rate is declining faster in the country compared to birth rate.
 - The birth rate is declining faster in the country compared to death rate.
- Rural-urban migration is taking place regularly in the country.
- Which one of the following conclusions may be true in the light of the above facts?
- (a) The rate of population growth is increasing due to rural-urban migration.
- (b) The rate of population growth is increasing due to decline in death rate only.
- (c) The rate of population growth is increasing due to increase in birth rate only.
- (d) The rate of population growth is increasing due to faster decline in death rate than in birth rate.
9. **A person X was driving in a place where all roads ran either north-south or east-west, forming a grid. Roads are at a distance of 1 km from each other in a parallel. He started at the intersection of two roads, drove 3 km north, 3 km west and 4 km south. Which further route could bring him back to his starting point, if the same route is not repeated ?**
- (a) 3 km east, then 2 km south
(b) 3 km east, then 1 km north
(c) 1 km north, then 2 km west
(d) 3 km south, then 1 km north
10. **Consider the following statement:**
- "We shall go either for a picnic or for trekking".
- Which of the following, if true, would falsify this claim ?
- (a) We go for a picnic but not for trekking.
(b) Activities such as picnic and trekking are encouraged by the health authorities.
(c) We go for trekking and not for picnic.
(d) We do not go either for picnic or for trekking.
11. **There were 50 faculty members comprising 30 males and the rest females. No male faculty member knew music, but many of the female faculty members did. The head of the institution invited six faculty members to a tea party by draw of lots. At the party it was discovered that no member knew music. The conclusion is that:**
- (a) the party comprised male faculty members only.
(b) the party comprised only those female faculty members who could not give renderings in music.
(c) the party comprised both male and female faculty members.
(d) nothing can be said about the gender composition of the party.
12. **Five people A, B, C, D and E are seated about a round table. Every chair is spaced equidistant from adjacent chairs.**
- (i) C is seated next to A
(ii) A is seated two seats from D
(iii) B is not seated next to A
- On the basis of above information, which of the following must be true ?
1. D is seated next to B
2. E is seated next to A.
3. D and C are separated by two seats
- Select the correct answer using the code given below:
- (a) 1 only
(b) 1 and 2 only
(c) 3 only
(d) Neither 1 nor 2 nor 3
13. **There are five hobby clubs in a college photography, yachting, chess, electronics and gardening. The gardening group meets every second day, the electronics group**

meets every third day, the chess group meets every fourth day, the yachting group meets every fifth day and the photography group meets every sixth day. How many times do all the five groups meet on the same day within 180 days ?

- (a) 5 (b) 18
(c) 10 (d) 3

14. There are some nectar-filled flowers on a tree and some bees are hovering on it. If one bee lands on each flower, one bee will be left out. If two bees land on each flower, one flower will be left out. The number of flowers and bees respectively are:

- (a) 2 and 4 (b) 3 and 2
(c) 3 and 4 (d) 4 and 3

Direction for the following 5 (five) items: Consider the following information and answer the five items (15-19) that follow:

There are five persons in a group — P, Q, R, S and T. The group has one doctor, one lawyer and one artist. P and S are unmarried students. T is a man married to one of the group members. Q is the brother of P and is neither doctor nor artist. R is not doctor.

15. Who is the doctor ?

- (a) T (b) P
(c) Q (d) R

16. Who is the artist ?

- (a) P (b) Q
(c) R (d) T

17. Who is the spouse of R ?

- (a) P (b) T
(c) Q (d) S

18. Who is the lawyer ?

- (a) P (b) Q
(c) R (d) S

19. Who of the following is definitely a man ?

- (a) P (b) S
(c) Q (d) None of the above

20. There is an order of 19000 quantity of a particular product from a customer. The firm produces 1000 quantity of that product per day out of which 5% are unfit for sale. In how many days will the order be completed?

- (a) 18 (b) 19
(c) 20 (d) 22

Direction for the following 5 (five) items: Read the following two passages and answer the items (21-25) that follow each passage. Your answers to these items should be based on the passages only.

Passage-1

Biomass as fuel for power, heat, and transport has the highest mitigation potential of all renewable sources. It comes from agriculture and forest residues as well as from energy crops. The biggest challenge in using biomass residues is a long-term reliable supply delivered to the power plant at reasonable costs; the key problems are logistical constraints and the costs of fuel collection. Energy crops, if not managed properly, compete with food production and may have undesirable impacts on food prices. Biomass production is also sensitive to the physical impacts of a changing climate.

Projections of the future role of biomass are probably overestimated, given the limits to the sustainable biomass supply, unless breakthrough technologies substantially increase productivity. Climate-energy models project that biomass use could increase nearly four-fold to around 150 – 200 exajoules, almost a quarter of world primary energy in 2050. However, the maximum sustainable technical potential of biomass resources (both residues and energy crops) without disruption of food and forest resources ranges from 80 – 170 exajoules a year by 2050, and only part of this is realistically and economically feasible. In addition, some climate models rely on biomass-based carbon capture and storage, an unproven technology, to achieve negative emissions and to buy some time during the first half of the century.

Some liquid biofuels such as corn-based ethanol, mainly for transport, may aggravate rather than ameliorate carbon emissions on a life-cycle basis. Second generation biofuels, based on ligno-cellulosic feedstocks – such as straw, bagasse, grass and wood – hold the promise of sustainable production that is high-yielding and emit low levels of greenhouse gases, but these are still in the R and D stage.

21. What is/are the present constraint/constraints in using biomass as fuel for power generation?

1. Lack of sustainable supply of biomass.
2. Biomass production competes with food production.

3. Bio-energy may not always be low carbon on a life-cycle basis.

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 3 only
(c) 2 and 3 only (d) 1, 2 and 3

22. Which of the following can lead to food security problem ?

1. Using agricultural and forest residues as feedstock for power generation.
2. Using biomass for carbon capture and storage.
3. Promoting the cultivation of energy crops.

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 3 only
(c) 2 and 3 only (d) 1, 2 and 3

23. In the context of using biomass, which of the following is/are the characteristic/ characteristics of the sustainable production of biofuel ?

1. Biomass as a fuel for power generation could meet all the primary energy requirements of the world by 2050.
2. Biomass as a fuel for power generation does not necessarily disrupt food for forest resources.
3. Biomass as a fuel for power generation could help in achieving negative emissions, given certain nascent technologies.

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 3 only
(c) 2 and 3 only (d) 1, 2 and 3

24. With reference to the passage, following assumptions have been made:

1. Some climate-energy models suggest that the use of biomass as a fuel for power generation helps in mitigating greenhouse gas emissions.
2. It is not possible to use biomass as a fuel for power generation without disrupting food and forest resources.

Which of these assumptions is/are valid?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Passage-2

We are witnessing a dangerous dwindling of biodiversity in our food supply. The green revolution is a mixed blessing. Over time farmers have come to rely heavily on broadly adapted, high yield crops to the exclusion of varieties adapted to the local conditions. Monocropping vast fields with the same genetically uniform seeds helps boost yield and meet immediate hunger needs. Yet high-yield varieties are also genetically weaker crops that require expensive chemical fertilizers and toxic pesticides. In our focus on increasing the amount of food we produce today, we have accidentally put ourselves at risk for food shortages in future.

25. Which among the following is the *most logical and critical inference* that can be made from the above passage?

- (a) In our agricultural practices, we have become heavily dependent on expensive chemical fertilizers and toxic pesticides only due to Green Revolution.
- (b) Monocropping vast fields with high-yield varieties is possible due to Green Revolution.
- (c) Monocropping with high-yield varieties is the only way to ensure food security to millions.
- (d) Green Revolution can pose a threat to biodiversity in food supply and food security in the long run.

26. A class starts at 11 : 00 am and lasts till 2 : 27 pm. Four periods of equal duration are held during this interval. After every period, a rest of 5 minutes is given to the students. The exact duration of each period is:

- (a) 48 minutes (b) 50 minutes
(c) 51 minutes (d) 53 minutes

27. Four friends A, B, C and D need to cross a bridge. A maximum of two persons can cross it at a time. It is night and they just have one lamp. Persons that cross the bridge must carry the lamp to find the way. A pair must walk together at the speed of slower person. After crossing the bridge, the person having faster speed in the pair will return with the lamp each time to accompany another person in the group. Finally, the lamp has to be returned at the original place and the person who returns the lamp has to cross the bridge again without lamp. To

cross the bridge, the time taken by them is as follows: A : 1 minute, B : 2 minutes, C : 7 minutes and D : 10 minutes.

What is the total minimum time required by all the friends to cross the bridge ?

- (a) 23 minutes (b) 22 minutes
(c) 21 minutes (d) 20 minutes
28. 30 g of sugar was mixed in 180 ml water in a vessel A, 40 g of sugar was mixed in 280 ml of water in vessel B and 20 g of sugar was mixed in 100 ml of water in vessel C. The solution in vessel B is:
- (a) sweeter than that in C
(b) sweeter than that in A
(c) as sweet as that in C
(d) less sweet than that in C
29. In aid of charity, every student of a class contributes as many rupees as the number of students in that class. With the additional contribution of ₹ 2 by one student only, the total collection is ₹ 443. Then how many students are there in the class ?
- (a) 12 (b) 21
(c) 43 (d) 45
30. Anita's Mathematics test had 70 problems carrying equal marks i.e., 10 Arithmetic, 30 Algebra and 30 Geometry. Although she answered 70% of the Arithmetic, 40% of the Algebra and 60% of the Geometry problems correctly, she did not pass the test because she got less than 60% marks. The number of more questions she would have to answer correctly to earn a 60% passing marks is:
- (a) 1 (b) 5
(c) 7 (d) 9
31. In a class, there are 18 very tall boys. If these constitute three-fourths of the boys and the total number of boys is two-thirds of the total number of students in the class, what is the number of girls in the class ?
- (a) 6 (b) 12
(c) 18 (d) 21
32. Consider the following statements:
1. Either A and B are of the same age or A is older than B
 2. Either C and D are of the same age or D is older than C
 3. B is older than C

Which of the following conclusions can be drawn from the above statements ?

- (a) A is older than B
(b) B and D are of the same age
(c) D is older than C
(d) A is older than C

33. The monthly average salary paid to all the employees of a company was ₹ 5000. The monthly average salary paid to male and female employees was ₹ 5200 and ₹ 4200 respectively. Then the percentage of males employed in the company is:

- (a) 75% (b) 80%
(c) 85% (d) 90%

Direction for the following 3 (three) items: Consider the given information and answer the three items (34-36) that follow.

Six boxes A, B, C, D, E and F have been painted with six different colours viz. violet, indigo, blue, green, yellow and orange and arranged from left to right (not necessarily either kept or painted with the colours in the same order). Each box contains a ball of any one of the following six games: cricket, hockey, tennis, golf, football and volleyball (not necessarily in the same order). The golf ball is in violet box and is not in the box D. The box A which contains tennis ball is orange in colour and is at the extreme right. The hockey ball is neither in box D nor in box E. The box C having cricket ball is painted green. The hockey ball is neither in the box painted blue nor in the box painted yellow. The box C is fifth from right and next to box B. The box B contains volleyball. The box containing the hockey ball is between the boxes containing golf ball and volleyball.

34. Which one of the following boxes contains the golf ball ?
- (a) F (b) E
(c) D (d) None of the above
35. Which of the following statements is/are correct?
- (a) D is painted yellow
(b) F is painted indigo
(c) B is painted blue
(d) All of the above
36. The football is in the box of which colour?
- (a) Yellow
(b) Indigo
(c) Cannot be determined as data are inadequate
(d) Blue

37. Two numbers X and Y are respectively 20% and 28% less than a third number Z. By what percentage is the number Y less than the number X ?
 (a) 12% (b) 10%
 (c) 9% (d) 8%
38. A daily train is to be introduced between station A and station B starting from each end at 6 AM and the journey is to be completed in 42 hours. What is the number of trains needed in order to maintain the shuttle service ?
 (a) 2 (b) 3
 (c) 4 (d) 7
39. A piece of tin is in the form of a rectangle having length 12 cm and width 8 cm. This is used to construct a closed cube. The side of the cube is:
 (a) 2 cm (b) 3 cm
 (c) 4 cm (d) 6 cm
40. In a question paper there are five questions to be attempted and answer to each question has two choices – True (T) or False (F). It is given that no two candidates have given the answers to the five question in an identical sequence. For this to happen the maximum number of candidates is:
 (a) 10 (b) 18
 (c) 26 (d) 32

Direction for the following 8 (eight) items: Read the following eight passages and answer the items (41-48) that follows each passage. Your answers to these items should be based on the passages only.

Passage-1

By killing transparency and competition, crony capitalism is harmful to free enterprise, opportunity and economic growth. Crony capitalism, where rich and the influential are alleged to have received land and natural resources and various licences in return for payoffs to venal politicians, is now a major issue to be tackled. One of the greatest dangers to growth of developing economies like India is the middle-income trap where crony capitalism creates oligarchies that slow down the growth.

41. Which among the following is the *most logical corollary* to the above passage ?
 (a) Launching more welfare schemes and allocating more finances for the current schemes are urgently needed.

- (b) Efforts should be made to push up economic growth by other means and provide licences to the poor.
 (c) Greater transparency in the functioning of the government and promoting the financial inclusion are needed at present.
 (d) We should concentrate more on developing manufacturing sector than service sector.

Passage-2

Climate adaptation may be rendered ineffective if policies are not designed in the context of other development concerns. For instance, a comprehensive strategy that seeks to improve food security in the context of climate change may include a set of coordinated measures related to agricultural extension, crop diversification, integrated water and pest management and agricultural information services. Some of these measures may have to do with climate changes and others with economic development.

42. What is the *most logical and rational inference* that can be made from the above passage ?
 (a) It is difficult to pursue climate adaptation in the developing countries.
 (b) Improving food security is a far more complex issue than climate adaptation.
 (c) Every developmental activity is directly or indirectly linked to climate adaptation.
 (d) Climate adaptation should be examined in tandem with other economic development options.

Passage-3

Understanding of the role of biodiversity in the hydrological cycle enables better policy-making. The term *biodiversity* refers to the variety of plants, animals, microorganisms, and the ecosystems in which they occur. Water and biodiversity are interdependent, in reality, the hydrological cycle decides how biodiversity functions. In turn vegetation and soil drive the movement of water. Every glass of water we drink has, at least in part, passed through fish, trees, bacteria, soil and other organisms. Passing through these ecosystems, it is cleansed and made fit for consumption. The supply of water is a critical service that the environment provides.

43. Which among the following is the most critical inference that can be made from the above passage ?

- (a) Biodiversity sustains the ability of nature to recycle water.
- (b) We cannot get potable water without the existence of living organisms.
- (c) Plants, animals and microorganisms continuously interact among themselves.
- (d) Living organisms could not have come into existence without hydrological cycle.

Passage-4

In the last decade, the banking sector has been restructured with a high degree of automation and products that mainly serve middle-class and upper middle-class society. Today, there is a need for a new agenda for the banking and non-banking financial services that does not exclude the common man.

44. Which one of the following is the message that is essentially implied in the above passage ?

- (a) Need for more automation and more products of banks.
- (b) Need for a radical restructuring of our entire public finance system.
- (c) Need to integrate banking and non-banking institutions.
- (d) Need to promote financial inclusion.

Passage-5

Safe and sustainable sanitation in slums has immeasurable benefits to women and girls in terms of their health, safety, privacy and dignity. However, women do not feature in most of the schemes and policies on urban sanitation. The fact that even now the manual scavenging exists, only goes to show that not enough has been done to promote pour-flush toilets and discontinue the use of dry latrines. A more sustained and rigorous campaign needs to be launched towards the right to sanitation on a very large scale. This should primarily focus on the abolition of manual scavenging.

45. With reference to the above passage, consider the following statements:

- 1. Urban sanitation problems can be fully solved by the abolition of manual scavenging only.
- 2. There is a need to promote greater awareness on safe sanitation practices in urban areas.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Passage-6

To understand the nature and quantity of government proper for man, it is necessary to attend to his character. As nature created him for social life, she fitted him for the station she intended. In all cases she made his natural wants greater than his individual powers. No one man is capable, without the aid of society, of supplying his own wants; and those wants, acting upon every individual, impel the whole of them into society.

46. Which among the following is the most logical and rational inference that can be made from the above passage ?

- (a) Nature has created a great diversity in human society.
- (b) Any given human society is always short of its wants.
- (c) Social life is a specific characteristic of man.
- (d) Diverse natural wants forced man towards social system.

Passage-7

The nature of the legal imperatives in any given state corresponds to the effective demands that state encounters, and that these, in their turn, depend, in a general way, upon the manner in which economic power is distributed in the society which the state controls.

47. The statement refers to:

- (a) the antithesis of Politics and Economics
- (b) the interrelationship of Politics and Economics
- (c) the predominance of Economics over Politics
- (d) the predominance of Politics over Economics

Passage-8

About 15 per cent of global greenhouse gas emissions come from agricultural practices. This includes nitrous oxide from fertilizers; methane from livestock, rice production, and manure storage; and carbon dioxide (CO₂) from burning biomass, but this excludes CO₂ emissions from soil management practices, savannah burning and deforestation. Forestry, land use, and land-use change account for another 17 per cent of

greenhouse gas emissions each year, three quarters of which come from tropical deforestation. The remainder is largely from draining and burning tropical peatland. About the same amount of carbon is stored in the world's peatlands as is stored in the Amazon rainforest.

48. Which among the following is the *most logical and rational inference* that can be made from the above passage ?

- (a) Organic farming should immediately replace mechanised and chemical dependant agricultural practices all over the world.
- (b) It is imperative for us to modify our land use practices in order to mitigate climate change.
- (c) There are no technological solutions to the problem of greenhouse gas emissions.
- (d) Tropical areas are the chief sites of carbon sequestration.

49. A person climbs a hill in a straight path from point 'O' on the ground in the direction of north-east and reaches a point 'A' after travelling a distance of 5 km. Then, from the point 'A' he moves to point 'B' in the direction of north-west. Let the distance AB be 12 km. Now, how far is the person away from the starting point 'O' ?

- (a) 7 km
- (b) 13 km
- (c) 17 km
- (d) 11 km

50. An agricultural field is in the form of a rectangle having length X_1 metres and breadth X_2 metres (X_1 and X_2 are variable). If $X_1 + X_2 = 40$ metres, then the area of the agricultural field will not exceed which one of the following values ?

- (a) 400 sq m
- (b) 300 sq m
- (c) 200 sq m
- (d) 80 sq m

51. The sum of the ages of 5 members comprising a family, 3 years ago was 80 years. The average age of the family today is the same as it was 3 years ago, because of an addition of a baby during the intervening period. How old is the baby ?

- (a) 6 months
- (b) 1 year
- (c) 2 years
- (d) 2 years and 6 months

52. The total emoluments of two persons are the same, but one gets allowances to the extent of 65% of his basic pay and the other gets allowances to the extent of 80% of his basic pay. The ratio of the basic pay of the former to the basic pay of the latter is:

- (a) 16 : 13
- (b) 5 : 4
- (c) 7 : 5
- (d) 12 : 11

53. A person is standing on the first step from the bottom of a ladder. If he has to climb 4 more steps to reach exactly the middle step, how many steps does the ladder have ?

- (a) 8
- (b) 9
- (c) 10
- (d) 11

Direction for the following 3 (three) items: Consider the given information and answer the three items (54-56) that follow.

When three friends A, B and C met, it was found that each of them wore an outer garment of a different colour. In random order, the garments are: jacket, sweater and tie; and the colours are: blue, white and black. Their surnames in random order are: Ribeiro, Kumar and Singh. Further, we know that:

- 1. Neither B nor Ribeiro wore a white sweater
- 2. C wore a tie
- 3. Singh's garment was not white
- 4. Kumar does not wear a jacket
- 5. Ribeiro does not like to wear the black colour
- 6. Each of the friends wore only one outer garment of only one colour

54. What is C's surname ?

- (a) Ribeiro
- (b) Kumar
- (c) Singh
- (d) Cannot be determined

55. What is the colour of the tie ?

- (a) Black
- (b) Blue
- (c) White
- (d) Cannot be determined

56. Who wore the sweater ?

- (a) A
- (b) B
- (c) C
- (d) Cannot be determined

57. AB is a vertical trunk of a huge tree with A being the point where the base of the trunk touches the ground. Due to a cyclone, the trunk has been broken at C which is at a height of 12 metres, broken part is partially attached to the vertical portion of the trunk at C. If the end of the broken part B touches the ground at D which is at a distance of 5 metres from A, then the original height of the trunk is:
- (a) 20 m (b) 25 m
(c) 30 m (d) 35 m
58. A person walks 12 km due north, then 15 km due east, after that 19 km due west and then 15 km due south. How far is he from the starting point ?
- (a) 5 km (b) 9 km
(c) 37 km (d) 61 km
59. A cube has all its faces painted with different colours. It is cut into smaller cubes of equal sizes such that the side of the small cube is one-fourth the big cube. The number of small cubes with only one of the sides painted is:
- (a) 32 (b) 24
(c) 16 (d) 8
60. Ram and Shyam work on a job together for four days and complete 60% of it. Ram takes leave then and Shyam works for eight more days to complete the job. How long would Ram take to complete the entire job alone ?
- (a) 6 days (b) 8 days
(c) 10 days (d) 11 days
61. A military code writes SYSTEM as SYSMET and NEARER as AENRER. Using the same code, FRACTION can be written as:
- (a) CARFTION (b) FRACNOIT
(c) NOITCARF (d) CARFMOIT
62. If R and S are different integers both divisible by 5, then which of the following is not necessarily true ?
- (a) $R - S$ is divisible by 5
(b) $R + S$ is divisible by 10
(c) $R \times S$ is divisible by 25
(d) $R^2 + S^2$ is divisible by 5
63. How many numbers are there between 100 and 300 which either begin with or end with 2 ?
- (a) 110
(b) 111
(c) 112
(d) None of the above
- Direction for the following 8 (eight) items: Read the following five passages and answer the items (64-71) that follow each passage. Your answers to these items should be based on the passages only.*
- Passage-1**
- As we look to 2050, when we will need to feed two billion more people, the question of which diet is best has taken on new urgency. The food we choose to eat in the coming decades will have dramatic ramifications for the planet. Simply put, a diet that revolves around meat and dairy, a way of eating that is on the rise throughout the developing world, will take a greater toll on the world's resources than one that revolves around unrefined grains, nuts, fruits and vegetables.
64. What is the *critical message* conveyed by the above passage ?
- (a) Our increasing demand for foods sourced from animals puts a greater burden on our natural resources.
(b) Diets based on grains, nuts, fruits and vegetables are best suited for health in developing countries.
(c) Human beings change their food habits from time to time irrespective of the health concerns.
(d) From a global perspective, we still do not know which type of diet is best for us.
- Passage-2**
- All humans digest mother's milk as infants, but until cattle began being domesticated 10,000 years ago, children once weaned no longer needed to digest milk. As a result, they stopped making the enzyme lactase, which breaks down the sugar lactose into simple sugars.
- After humans began herding cattle, it became tremendously advantageous to digest milk, and lactose tolerance evolved independently among cattle herders in Europe, the Middle East and Africa. Groups not dependent on cattle, such as the Chinese and Thai, remain lactose intolerant.

65. Which among the following is the most logical assumption that can be made from the above passage ?

- (a) About 10,000 years ago, the domestication of animals took place in some parts of the world.
- (b) A permanent change in the food habits of a community can bring about a genetic change in its members.
- (c) Lactose tolerant people only are capable of getting simple sugars in their bodies.
- (d) People who are not lactose tolerant cannot digest any dairy product.

Passage-3

"The conceptual difficulties in National Income comparisons between underdeveloped and industrialised countries are particularly serious because a part of the national output in various underdeveloped countries is produced without passing through the commercial channels."

66. In the above statement, the author implies that:

- (a) the entire national output produced and consumed in industrialized countries passes through commercial channels.
- (b) the existence of a non-commercialized sector in different underdeveloped countries renders the national income comparisons over countries difficult.
- (c) no part of national output should be produced and consumed without passing through commercial channels.
- (d) a part of the national output being produced and consumed without passing through commercial channels is a sign of underdevelopment.

Passage-4

An increase in human-made carbon dioxide in the atmosphere could initiate a chain reaction between plants and microorganisms that would unsettle one of the largest carbon reservoirs on the planet - soil. In a study, it was found that the soil, which contains twice the amount of carbon present in all plants and Earth's atmosphere combined, could become increasingly volatile as people add more carbon dioxide to the atmosphere. This is largely because of increased plant growth. Although a greenhouse gas and a pollutant, carbon dioxide

also supports plant growth. As trees and other vegetation flourish in a carbon dioxide-rich future, their roots could stimulate microbial activity in soil that may in turn accelerate the decomposition of soil carbon and its release into the atmosphere as carbon dioxide.

67. Which among the following is the most logical corollary to the above passage ?

- (a) Carbon dioxide is essential for the survival of microorganisms and plants.
- (b) Humans are solely responsible for the release of carbon dioxide into the atmosphere.
- (c) Microorganisms and soil carbon are mainly responsible for the increased plant growth.
- (d) Increasing green cover could trigger the release of carbon trapped in soil.

Passage-5

Historically, the biggest challenge to world agriculture has been to achieve a balance between demand for and supply of food. At the level of individual countries, the demand-supply balance can be a critical policy issue for a closed economy, especially if it is a populous economy and its domestic agriculture is not growing sufficiently enough to ensure food supplies, on an enduring basis; it is not so much and not always, of a constraint for an open, and growing economy, which has adequate exchange surpluses to buy food abroad. For the world as a whole, supply-demand balance is always an inescapable prerequisite for warding off hunger and starvation. However, global availability of adequate supply does not necessarily mean that food would automatically move from countries of surplus to countries of deficit if the latter lack in purchasing power. The uneven distribution of hunger, starvation, under or malnourishment, etc., at the world-level, thus owes itself to the presence of empty-pocket, hungry mouths, overwhelmingly confined to the underdeveloped economies. Inasmuch as 'a two-square meal' is of elemental significance to basic human existence, the issue of worldwide supply of food has been gaining significance, in recent times, both because the quantum and the composition of demand has been undergoing big changes, and because, in recent years, the capabilities of individual

countries to generate uninterrupted chain of food supplies have come under strain. Food production, marketing and prices, especially price-affordability by the poor in the developing world, have become global issues that need global thinking and global solutions.

68. According to the above passage, which of the following are the fundamental solutions for the world food security problem ?

1. Setting up more agro-based industries
2. Improving the price affordability by the poor
3. Regulating the conditions of marketing
4. Providing food subsidy to one and all

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1, 3 and 4 only (d) 1, 2, 3 and 4

69. According to the above passage, the biggest challenge to world agriculture is:

- (a) to find sufficient fund for agriculture and to expand food processing industries.
(b) to eradicate hunger in underdeveloped countries.
(c) to achieve a balance between the production of food and non-food items.
(d) to achieve a balance between demand for and supply of food.

70. According to the above passage, which of the following helps/help in reducing hunger and starvation in the developing economies ?

1. Balancing demand and supply of food
2. Increasing imports of food
3. Increasing purchasing power of the poor
4. Changing the food consumption patterns and practices

Select the correct answer using the code given below:

- (a) 1 only (b) 2, 3 and 4 only
(c) 1 and 3 only (d) 1, 2, 3 and 4

71. The issue of worldwide supply of food has gained importance mainly because of:

1. overgrowth of the population worldwide.
2. sharp decline in the area of food production.
3. limitation in the capabilities for sustained supply of food.

Select the correct answer using the code given below:

- (a) 1 and 2 only (b) 3 only
(c) 2 and 3 only (d) 1, 2 and 3

72. Four-digit numbers are to be formed using the digits 1, 2, 3 and 4; and none of these four digits are repeated in any manner. Further,

1. 2 and 3 are not to immediately follow each other
2. 1 is not to be immediately followed by 3
3. 4 is not to appear at the last place
4. 1 is not to appear at the first place

How many different numbers can be formed?

- (a) 6 (b) 8
(c) 9 (d) None of the above

73. A cylindrical overhead tank of radius 2 m and height 7 m is to be filled from an underground tank of size 5.5 m \times 4 m \times 6 m. How much portion of the underground tank is still filled with water after filling the overhead tank completely ?

- (a) $\frac{1}{3}$ (b) $\frac{1}{2}$
(c) $\frac{1}{4}$ (d) $\frac{1}{6}$

74. In a class of 60 students, where the number of girls is twice that of boys, Kamal, a boy, ranked seventeenth from the top. If there are 9 girls ahead of Kamal, the number of boys in rank after him is:

- (a) 13 (b) 12
(c) 7 (d) 3

75. A and B walk around a circular park. They start at 8 a.m. from the same point in the opposite directions. A and B walk at a speed of 2 rounds per hour and 3 rounds per hour respectively. How many times shall they cross each other after 8.00 a.m. and before 9.30 a.m. ?

- (a) 7 (b) 6
(c) 5 (d) 8

76. W can do 25% of a work in 30 days, X can do $\frac{1}{4}$ of the work in 10 days, Y can do 40% of the work in 40 days and Z can do $\frac{1}{3}$ of the work in 13 days. Who will complete the work first ?

- (a) W (b) X
(c) Y (d) Z

77. The average monthly income of a person in a certain family of 5 is ₹ 10,000. What will be the average monthly income of a person in the same family if the income of one person increased by ₹ 1,20,000 per year ?
(a) ₹ 12,000 (b) ₹ 16,000
(c) ₹ 20,000 (d) ₹ 34,000
78. In a race, a competitor has to collect 6 apples which are kept in a straight line on a track and a bucket is placed at the beginning of the track which is a starting point. The condition is that the competitor can pick only one apple at a time, run back with it and drop it in the bucket. If he has to drop all the apples in the bucket, how much total distance he has to run if the bucket is 5 metres from the first apple and all other apples are placed 3 metres apart?
(a) 40 m (b) 50 m
(c) 75 m (d) 150 m
79. A round archery target of diameter 1 m is marked with four scoring regions from the centre outwards as red, blue, yellow and white. The radius of the red band is 0.20 m. The width of all the remaining bands is equal. If archers throw arrows towards the target, what is the probability that the arrows fall in the red region of the archery target ?
(a) 0.40 (b) 0.20
(c) 0.16 (d) 0.04
80. A person allows a 10% discount for cash payment from the marked price of a toy and still he makes a 10% gain. What is the cost price of the toy which is marked ₹ 770 ?
(a) ₹ 610 (b) ₹ 620
(c) ₹ 630 (d) ₹ 640

OMR SHEET

Darken the circle for each question.

Q.No.	Response
1.	(a) (b) (c) (d)
2.	(a) (b) (c) (d)
3.	(a) (b) (c) (d)
4.	(a) (b) (c) (d)
5.	(a) (b) (c) (d)
6.	(a) (b) (c) (d)
7.	(a) (b) (c) (d)
8.	(a) (b) (c) (d)
9.	(a) (b) (c) (d)
10.	(a) (b) (c) (d)
11.	(a) (b) (c) (d)
12.	(a) (b) (c) (d)
13.	(a) (b) (c) (d)
14.	(a) (b) (c) (d)
15.	(a) (b) (c) (d)
16.	(a) (b) (c) (d)
17.	(a) (b) (c) (d)
18.	(a) (b) (c) (d)
19.	(a) (b) (c) (d)
20.	(a) (b) (c) (d)

Q.No.	Response
21.	(a) (b) (c) (d)
22.	(a) (b) (c) (d)
23.	(a) (b) (c) (d)
24.	(a) (b) (c) (d)
25.	(a) (b) (c) (d)
26.	(a) (b) (c) (d)
27.	(a) (b) (c) (d)
28.	(a) (b) (c) (d)
29.	(a) (b) (c) (d)
30.	(a) (b) (c) (d)
31.	(a) (b) (c) (d)
32.	(a) (b) (c) (d)
33.	(a) (b) (c) (d)
34.	(a) (b) (c) (d)
35.	(a) (b) (c) (d)
36.	(a) (b) (c) (d)
37.	(a) (b) (c) (d)
38.	(a) (b) (c) (d)
39.	(a) (b) (c) (d)
40.	(a) (b) (c) (d)

Q.No.	Response
41.	(a) (b) (c) (d)
42.	(a) (b) (c) (d)
43.	(a) (b) (c) (d)
44.	(a) (b) (c) (d)
45.	(a) (b) (c) (d)
46.	(a) (b) (c) (d)
47.	(a) (b) (c) (d)
48.	(a) (b) (c) (d)
49.	(a) (b) (c) (d)
50.	(a) (b) (c) (d)
51.	(a) (b) (c) (d)
52.	(a) (b) (c) (d)
53.	(a) (b) (c) (d)
54.	(a) (b) (c) (d)
55.	(a) (b) (c) (d)
56.	(a) (b) (c) (d)
57.	(a) (b) (c) (d)
58.	(a) (b) (c) (d)
59.	(a) (b) (c) (d)
60.	(a) (b) (c) (d)

Q.No.	Response
61.	(a) (b) (c) (d)
62.	(a) (b) (c) (d)
63.	(a) (b) (c) (d)
64.	(a) (b) (c) (d)
65.	(a) (b) (c) (d)
66.	(a) (b) (c) (d)
67.	(a) (b) (c) (d)
68.	(a) (b) (c) (d)
69.	(a) (b) (c) (d)
70.	(a) (b) (c) (d)
71.	(a) (b) (c) (d)
72.	(a) (b) (c) (d)
73.	(a) (b) (c) (d)
74.	(a) (b) (c) (d)
75.	(a) (b) (c) (d)
76.	(a) (b) (c) (d)
77.	(a) (b) (c) (d)
78.	(a) (b) (c) (d)
79.	(a) (b) (c) (d)
80.	(a) (b) (c) (d)

ANSWERS WITH EXPLANATION

1. Option (c) is correct.

The civil servants struggle to strike a balance in the outer accountability for society and the inner accountability towards their performance standards judged by various agencies. They often fail to understand that outer accountability is for society at large not for the political class. This dilemma leads to an adverse effect on the administration quality. Hence, statement 1 is correct.

The author has not discussed the requirement and efficiency of training for civil servants. So, statement 2 can be neglected.

The poor administration and governance issues are not linked with the lack of benefits for the civil servants. So, statement 3 is out of context of the passage.

The main point of discussion in the passage is the inability of bureaucrats to understand their proper accountability. They tend to tilt towards the political executive who moulds them according to their vested political interests. The real accountability of a civil servant is towards the public at large. There is no constitutional provision to solve the conflict of a civil servant. The author has demanded statutory boards for the depoliticization of civil services. This makes statement 4 also correct.

2. Option (a) is correct.

With reference to the given passage, we can assume that Political executive is an obstacle to the accountability of the civil services to the society. Hence statement 1 is correct.

Accountability of the political class for society is not discussed in the passage. It is not clear whether they are no longer accountable to society or not.

Statement 2 is not correct.

3. Option (d) is correct.

Civil servants are important blocks of administration. They are in confusion to decide their correct accountability. They are working for society anyhow. Statement (a) is not correct. It is not the message of the author in the passage.

Statement (b) is out of the context of the passage.

Option (c) is not correct. The framers of the constitution had the vision to see the prospective problem of accountability hence

they provided job security and other provisions so that civil servants do not become subservient to the political class. They envisaged a strong bureaucracy.

Statement (d) is correct. This is the main message that the author wants to convey through the passage. He has demanded a clear definition for accountability of civil servants to make them professional managers.

4. Option (d) is correct.

Option (a) is discussed in the passage as the vision of framers of the constitution to make civil services independent of political pressures.

Option (b) is discussed in the passage for enhancing the inner accountability of civil servants towards the goal of efficient administration.

Option (c) is discussed in the passage to make political executives accountable in law-making. This makes them responsible and they do not put undue pressure on civil servants.

Option (d) is not mentioned in the passage as a measure to increase the efficiency and accountability of the civil servants. But this is related to the government's accountability. The author has suggested devolution of power and decentralization in the last part of the passage to increase the efficiency of government.

5. Option (a) is correct.

Statement 1 is correct in the given context. The passage has linked the human rights and subsequent duties with the religious obligations.

Statement 2 is incorrect as it is not the intention of the author in the passage. This has not been mentioned in any part of the passage.

Statement 3 is false. The author has connected justice with a sense of common good. He has not linked it with God or religion. He has linked only duties and rights with religion.

6. Option (c) is correct.

Statement (a) is correct. But it is in supporting role for the argument and shows only a part of the argument. It is not the crux of the passage. In the same way, statement (d) is true but not the main idea the author is trying to propagate through this prose.

Statement (b) is a judgement that is not based

on the content of the passage.

Option (c) gives the main idea of the passage. It has highlighted the link between the duties and justice that the author is trying to establish. He wants to convey that a balance between rights and duties can lead to the delivery of justice in society.

7. Option (d) is correct.

According to the question, we will make a table.

	Grapes	Pineapple	Oranges	Apples
A	3	3	7	7
B	3	7	3	7
C	7	3	3	3
D	3	3	7	3

After taking fruits, B and C fell sick.

As we can observe that oranges had been eaten by both B and C.

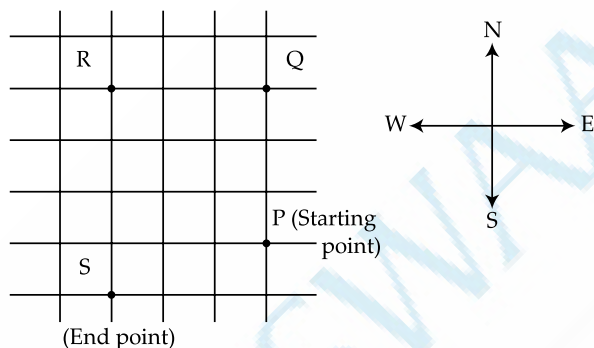
So, cause of sickness are oranges.

8. Option (d) is correct.

As per the given statements, we can conclude clearly that rate of population growth is increasing due to faster decline in death rate than in birth rate.

9. Option (b) is correct.

Given, roads are at distance of 1 km from each other.



Person X started from point P and drove 3 km north to Q, 3 km west to R and finally reached at S.

It is clear from the diagram that X needs to drive 3 km east, then 1 km north to reach at starting point P.

10. Option (d) is correct.

To falsify the statement "We shall go either for picnic or for trekking", the correct statement will be "We do not go either for picnic or for trekking".

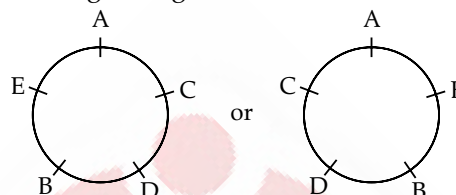
11. Option (d) is correct.

It is given that no male faculty member knew music, but it is also not given that all female faculty members knew music.

So, six faculty members who did not know music can be male or female. Therefore, nothing can be said about the gender composition of the party.

12. Option (b) is correct.

According to the given information, two cases of sitting arrangement can be there.



It is clear from both the diagrams that D is seated next to B and E is seated next to A.

13. Option (d) is correct.

The various groups meet after 2, 3, 4, 5 and 6 days.

They will meet after (LCM of 2, 3, 4, 5, 6) days i.e. 60 days.

In 180 days, they will meet $\frac{180}{60}$ i.e. 3 times.

14. Option (c) is correct.

Let the number of flowers = x
and number of bees = y

According to the first condition

$$y - x = 1$$

$$\Rightarrow y = x + 1 \quad \dots(i)$$

According to the second condition

$$x - \frac{y}{2} = 1$$

$$\Rightarrow 2x - y = 2$$

Using first equation

$$\Rightarrow 2x - x - 1 = 2$$

$$\Rightarrow x = 3$$

Put in e.g., (i)

$$y = 3 + 1 = 4$$

So, number of flowers = 3

and number of bees = 4

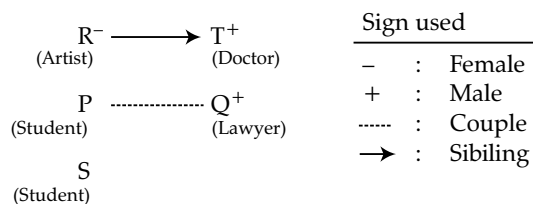
15. Option (a) is correct.

(i) There are 5 persons – P, Q, R, S and T.

(ii) Group has 1 doctor, 1 lawyer and 1 artist

(iii) P & Q are unmarried students.

- (iv) T is married man
 (v) Q is brother of P and is neither doctor nor artist.
 (vi) R is not a doctor.



Therefore, T is doctor.

16. Option (c) is correct.

From the above diagram, R is artist.

17. Option (b) is correct.

T is SPOUSE of R.

18. Option (b) is correct.

Q is lawyer.

19. Option (c) is correct.

From the above diagram, Q is definitely a man.

20. Option (c) is correct.

According to the given information,

Quantity produced in one day = 1000

$$\text{Unfit quantity} = 5\% \text{ of } 1000 = \frac{5}{100} \times 1000 = 50$$

$$\text{So, quantity fit for sell in 1 day} = 1000 - 50 = 950$$

$$\text{Number of days required to complete the order} = \frac{19000}{950} = 20$$

21. Option (d) is correct.

Statement (1) is correct as it has been mentioned in the passage that the lack of supply of biomass at reasonable costs is the biggest constraint in the use of biomass as fuel for power generation.

The last part of the first paragraph of the passage mentions that energy crops if not properly managed will compete with food production. This makes statement (2) correct.

The author has hinted that not all biofuels are good for atmosphere. He has given the example of ethanol which can aggravate rather than reduce carbon emissions on a life cycle basis. This argument makes statement (3) correct.

22. Option (b) is correct.

Biomass residues will not create problems for food security, but excess in energy crops

cultivation can compete with the cultivation of food crops. It may lead to undesirable inflation in the prices of food items. Statement 2 is not correct as using biomass for carbon capture and storage is independent of the food security problem. The passage fails to establish a link in these.

23. Option (c) is correct.

Statement 1 is incorrect as it has been mentioned in the passage that one-third of the energy needs of the world will be met by biomass fuels in 2050. However, it is incorrect to say that biomass fuels would be able to meet all the energy requirements of the whole world by 2050.

Statement 2 is correct. Since bio fuels comes from agriculture and forest residues as well as from energy crops, it does not disrupt food and forest resources.

Statement 3 is correct as the last part of the passage supports it. It says that the second-generation biofuels based on the lignocellulosic feedstocks, though in a nascent stage of R&D are promising for sustainable production.

24. Option (a) is correct.

The passage supports Statement 1. It says that some models suggest that biomass fuels can capture carbon dioxide and hence can lead to a reduction in the release of it into the atmosphere. This will lead to a reduction in greenhouse gases.

Statement 2 is a type of judgement. It is not supported by the passage. It might be possible but not discussed in the passage.

25. Option (d) is correct.

The Green Revolution has mixed results. The Green Revolution has led to the monocropping of high yielding crops to satisfy the hunger needs of the increasing population of the world. These crops are weaker varieties with the need for excessive use of pesticides. Monocropping and excessive use of pesticides are not good for agriculture. It can lead to low productions in the future. Hence, the author has concluded in the last line that in the Green Revolution, human beings have put themselves at risk of food problems in future.

Option (a) is incorrect as it is not the requirement of the Green Revolution to use pesticides.

Option (b) is a stated fact in the passage, it is not the inference based on the facts presented in the passage.

Option (c) uses 'only' incorrectly. The author has not presented monocropping as the only option for meeting the hunger needs of the world population.

26. Option (a) is correct.

According to the question, class starts at 11 am and lasts till 2 : 27 pm.

So, total duration of classes & rests

= 3 h and 27 min

= $(3 \times 60 + 27)$ min = 207 min

Between 4 classes, we must have rest of (5 min (5 min rest between two classes)).

Total duration of 4 classes = $207 - 15 = 192$ min

So, duration of each period = $\frac{192}{4} = 48$ min

27. Option (a) is correct.

According to given information, they will cross bridge in following way.

(i) A and B will cross the bridge in 2 min.

(ii) A will return back in 1 min.

(iii) A and C cross the bridge in 7 min.

(iv) A will return back in 1 min.

(v) A and D cross the bridge in 10 min.

(vi) A will curve back at starting to return lamp anglo back in 2 min.

So, total time = $2 + 1 + 7 + 1 + 10 + 2 = 23$ min

28. Option (d) is correct.

To find the sweetest solution among given solutions

We will find percentage of sugar in solution.

Percentage of sugar in vessel A

$$= \frac{30}{210} \times 100 = \frac{100}{7} \%$$

Percentage of sugar in vessel B

$$= \frac{40}{320} \times 100 = \frac{100}{8} \%$$

Percengate of sugar in vessel C

$$= \frac{20}{120} \times 100 = \frac{100}{6} \%$$

Clearly, solution in vessel B is less sweet than that in C.

29. Option (b) is correct.

Total number of students = x (Assume)

Total collection = $x^2 + 2$

According to question,

$$x^2 + 2 = 443$$

$$\Rightarrow x^2 = 441$$

$$\Rightarrow x = \sqrt{441} = 21$$

So, total number of students = 21.

30. Option (b) is correct.

Let each question carry 1 mark.

Total marks scored by Anita

= 70% of 10 + 40% of 30 + 60% of 30

(Arithmetic) (Algebra) (Geometry)

= $7 + 12 + 18 = 37$

Marks required to pass = 60% of total marks

$$= \frac{60}{100} \times 70 = 42$$

\therefore Number of questions she would have to answer more = $42 - 37 = 5$.

31. Option (b) is correct.

Let total number of students = x

\therefore Number of boys = $\frac{2}{3}x$

Number of very tall boys = $\frac{3}{4} \left(\frac{2}{3}x \right)$

According to question,

$$\frac{3}{4} \times \frac{2x}{3} = 18$$

$$\Rightarrow \frac{2x}{4} = 18$$

$$\Rightarrow x = 36$$

\therefore Number of girls = $\frac{1}{3}x = \frac{36}{3} = 12$

32. Option (d) is correct.

According to given question,

(i) $A = B$ or $A > B$

(ii) $C = D$ or $D > C$

(iii) $B > C$

It can clearly conclude that $A > C$ i.e., A is older than C.

33. Option (b) is correct.

Let number of male employees = x

& number of female employees = y

Average salary of all employees = ₹ 5000

Average salary of male employees = ₹ 5200

Average salary of female employees = ₹ 4200

According to question,

$$5000(x + y) = 5200x + 4200y$$

$$\Rightarrow 5000x = 5000y = 5200x + 4200y$$

$$\Rightarrow 800y = 200x$$

$$\Rightarrow 4y = x$$

...(i)

$$\begin{aligned}\text{Percentage of male employees} &= \frac{x}{x+y} \times 100 \\ &= \frac{4y}{4y+y} \times 100 \quad (\text{Using (i)}) \\ &= \frac{400}{5} = 80\%\end{aligned}$$

34. Option (b) is correct.

According to given information, we arrange all details in tabular form to have better view.

Box	D	C	B	F	E	A
Ball	Football	Cricket	Volley ball	Hockey	Golf	Tennis
Colour	Blue/yellow	Green	Blue/yellow	Indigo	Violet	Orange

Box E contains the golf ball.

35. Option (b) is correct.

Box F is painted indigo.

36. Option (c) is correct.

We cannot determine colour of the box having football.

37. Option (b) is correct.

Let third number, $Z = 100$

$\therefore X$ (20% less than Z) = 80

& Y (28% less than Z) = 72

Required percentage

$$= \frac{X - Y}{X} \times 100 = \frac{80 - 72}{80} \times 100 = \frac{800}{80} = 10\%$$

38. Option (c) is correct.

According to the given question, trains must be started at 6 am from both stations.

For first day, we need two trains each from station A & B. These trains from each station will reach to other station third day at 12:00 midnight. So, we need two more trains each at both station for second day. In this way, we need total 4 trains in order to maintain shuttle service.

39. Option (c) is correct.

Given that, length of rectangular tin = 12 cm

and breadth of rectangular tin = 8 cm

Area of rectangular tin = $12 \times 8 = 96 \text{ cm}^2$

Now, to make cube of side " a " cm, we need to equate surface area of cube equal to rectangular tin.

$$\text{e.g.,} \quad 6a^2 = 96$$

$$\Rightarrow \quad a^2 = \frac{96}{6} = 16$$

$$\Rightarrow \quad a = \sqrt{16} = 4 \text{ cm}$$

So, side of required cube = 4 cm.

40. Option (d) is correct.

According to question, every question has two choices true or false *i.e.* two choices.

Total number of different ways to answer all 5 questions = $2 \times 2 \times 2 \times 2 \times 2 = 32$

\therefore Required number of candidates = 32

41. Option (c) is correct.

Statement (c) is correct as crony capitalism is detrimental to transparency in governance and it kills competition as well. It leads to oligarchy. This is the major problem and is to be tackled immediately as it is a threat to the development aspirations of our country. It is supported by the passage.

Option (a) is out of the scope of the passage.

Option (b) is not the intention of the author. Licences to the poor seem illogical and misplaced.

Option (d) is irrelevant in the present discussion. It is out of context.

42. Option (d) is correct.

According to the passage, climate adaptation can become ineffective if it is not examined in the context of the other options related to economic development. The first line and the last line of the passage are relevant in finding the answer to this question. Option (d) is the most logical and rational inference.

Other options seem illogical and irrelevant.

Option (a) is incorrect as nothing about developing countries have been mentioned in the passage.

Option (b) is incorrect as the passage does not compare the severity of food security and climate adaptation with each other.

Option (c) is incorrect in the usage of the word 'every'. The passage provides limited information on the relationship between development activities and climate adaptation. It is not possible to decide if all the developmental activities are linked with climate adaptation.

43. Option (a) is correct.

Option (a) is a logical and critical inference based on the facts presented in the passage. Water and biodiversity are interlinked and mutually dependent. If the hydrological cycle decides the function of the variety of organisms found in the ecosystem, they, in turn, drive the movement of water. Every element of the ecology performs its part in recycling water as mentioned in the last line of the passage.

Option (b) seems an extreme judgment that is independent of the facts of the passage.

Option (c) is irrelevant in the context of the passage.

Option (d) is an illogical hypothesis. It is not discussed in the passage.

44. Option (d) is correct.

The banking innovations and upgrades done in recent times are done by keeping the middle class and upper-middle class in focus. It can be inferred that the common man is still left out of the banking systems as the author has called for the inclusion of the common man in the process. Option (d) captures the intent of the author in the passage.

Option (a) is incorrect as automation is useless if it fails to include the common man.

Option (b) looks attractive, but it is not the message of the author.

Option (c) is irrelevant as no comparison has been made between banking and non-banking financial institutions in the passage.

45. Option (b) is correct.

Statement 1 is not based on the passage. It is a very certain type of statement with the use of words like 'fully' and 'only'. It is not certain from the passage whether the abolition of manual scavenging can lead to the total eradication of the problem of sanitation.

The passage is about urban sanitization. It highlights the need to include women-centric policies to increase awareness regarding urban sanitisation with the use of more latrines. A rigorous campaign is required to increase awareness. These are the stated facts in the passage. So, we can say that statement 2 is correct.

46. Option (d) is correct.

Nature has made plans for man. Man's powers are limited if his natural wants are compared. He can derive his individual wants from the society only. Human beings are forced to become social to fulfil their diverse demands. Option (d) is correct according to the passage. Option (a) is not correct. It is not based on the passage. Nature is not discussed in this reference.

Option (b) is not correct as the author has not discussed the paucity of the resources to fulfil the wants of human beings.

Option (c) is correct in reality but it is not deducted from the passage. So, it can be ignored.

47. Option (b) is correct.

Politics and economics are shown in interdependent roles, not in mutual exclusive ones.

Option (a) is not correct.

Every society has some type of distribution of wealth among its members. The people at the lowest strata and the highest strata have different expectations from the government. The government through policies can correspond to the effective demands that are just. So, politics and economics are interrelated.

Option (c) and Option (d) can be discarded as the author has not reached the supremacy of politics over economics or vice versa in the passage.

48. Option (b) is correct.

A student shall attempt this question by the elimination method.

Option (c) is the first one to be eliminated. Observe that the author has not drawn such an extreme type of conclusion in the passage.

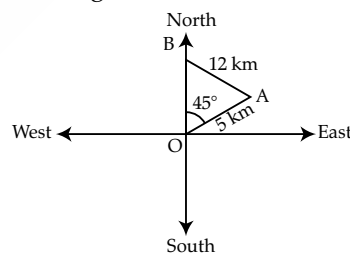
Now, eliminate option (d), the passage has discussed the tropical region to show that coal obtained from there is responsible for pollution. This option presents it in an incorrect sense.

Out of the remaining options, option (b) raises the issue of change in land usage, forestry and its uses contributes 17 % of greenhouse gas emissions each year, 75 % of which comes from tropical deforestation. This issue seems to be an imperative one based on the reading of the passage.

Option (a) incorrect also.

49. Option (b) is correct.

According to given information, we make a direction diagram.



Person will move from O to A making 45° with horizontal line and move from A to B making 90° with OA. Distance between O & B is

$$OB = \sqrt{OA^2 + AB^2}$$

[Using pythagoras theorem]

$$\Rightarrow OB = \sqrt{5^2 + 12^2}$$

$$\Rightarrow OB = \sqrt{25 + 144} = \sqrt{169} = 13 \text{ km}$$

50. Option (a) is correct.

Given that, length of rectangular field = X_1 m
and breadth of rectangular field = X_2 m

$$\text{Also, } X_1 + X_2 = 40 \text{ m}$$

$$\text{Since, area of field} = X_1 \cdot X_2 \text{ m}^2$$

For maximum possible value of area X_1 must be equal to X_2 in this case.

$$\text{i.e. } X_1 = X_2 = 20 \text{ m}$$

$$\therefore \text{Maximum possible area} = 20 \times 20 = 400 \text{ m}^2$$

So, area of field will not exceed 400 m^2 .

51. Option (b) is correct.

Sum of the ages of 5 members, 3 years back
= 80 year

$$\text{So, then average age} = \frac{80}{5} = 16 \text{ years}$$

\Rightarrow Their present average age including age of baby = 16 years

$$\therefore \text{Sum of their ages at present} = 6 \times 16 = 96 \text{ years}$$

$$\text{and sum of their ages at present excluding baby} = 80 + 5 \times 3 = 95 \text{ year}$$

$$\text{So, age of baby} = 96 - 95 = 1 \text{ year.}$$

52. Option (d) is correct.

Let basic pays of both person are x & y respectively.

$$\text{Total emoluments of first person} = \frac{165}{100}x$$

$$\text{Total emoluments of second person} = \frac{180}{100}y$$

According to question,

$$\frac{165}{100}x = \frac{180}{100}y$$

$$\Rightarrow \frac{x}{y} = \frac{180}{165} = \frac{12}{11}$$

$$\Rightarrow x : y = 12 : 11$$

So, ratio of their basic pays = 12 : 11.

53. Option (b) is correct.

Give that, person is on first step. He will be on 5th step after climbing 4 more steps.

5th step is the middle step. Therefore, ladder will have 9 steps in total.

54. Option (a) is correct.

Friend	Garment	Surname
A	White sweater	Kumar
B	Black jacket	Singh
C	Blue tie	Ribeiro

Now, we can answer questions on bass of table.

C's surname is Ribeiro.

55. Option (b) is correct.

Colour of the tie is blue.

56. Option (a) is correct.

A wore sweater.

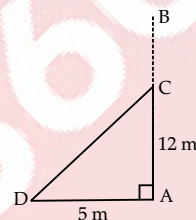
57. Option (b) is correct.

According to given information, we make diagram.

Using pythagoras theorem,

$$CD = \sqrt{AC^2 + AD^2} = \sqrt{12^2 + 5^2}$$

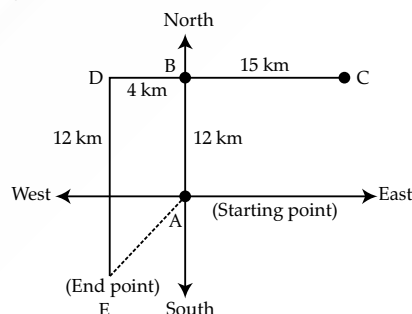
$$\Rightarrow CD = \sqrt{169} = 13 \text{ m}$$



$$\therefore \text{Height of vertical trunk} = AC + CD = 12 + 13 = 25 \text{ m}$$

58. Option (a) is correct.

According to question, we make direction diagram.



Person started from A and ended at E.

Using pythagoras theorem,

$$\begin{aligned} EA &= \sqrt{3^2 + 4^2} \\ &= \sqrt{25} = 5 \text{ m} \end{aligned}$$

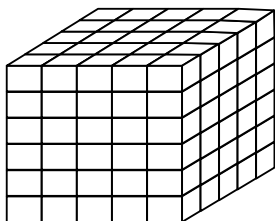
59. Option (b) is correct.

Let side of original cube = 4 units

\therefore side of smaller cubes = 1 units

As we can see, every face of bigger cube has 4 smaller cubes whose one face is painted.

∴ Required number such cubes = $6 \times 4 = 24$



60. Option (c) is correct.

Let number of days taken by Ram to complete work = x and number of days taken by Shyam to complete work = y .

According to question,

$$4 \left[\frac{1}{x} + \frac{1}{y} \right] = \frac{60}{100} = \frac{3}{5} \quad \dots(i)$$

$$\text{Remaining work} = 1 - \frac{3}{5} = \frac{2}{5}$$

Shyam is taking 8 days to complete remaining work

$$\therefore \frac{8}{y} = \frac{2}{5}$$

$$\Rightarrow 2y = 40$$

$$\Rightarrow y = 20$$

Put in e.g. (i)

$$4 \left[\frac{1}{x} + \frac{1}{20} \right] = \frac{3}{5}$$

$$\Rightarrow \frac{4}{x} + \frac{1}{5} = \frac{3}{5}$$

$$\Rightarrow \frac{4}{x} = \frac{3}{5} - \frac{1}{5} = \frac{2}{5}$$

$$\Rightarrow \frac{1}{x} = \frac{1}{10}$$

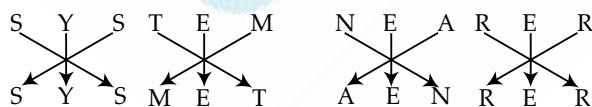
$$\Rightarrow x = 10$$

∴ Ram will take 10 days to complete work.

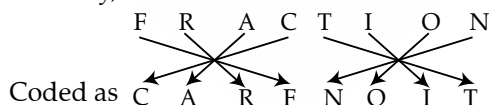
61. Option (d) is correct.

As we can observe,

Coded as



Similarly,



62. Option (b) is correct.

Let $R = 25$

& $S = 10$

$$\therefore R + S = 25 + 10 = 35$$

and 35 is not divisible by 10

∴ $R + S$ is not necessarily divisible by 10.

63. Option (a) is correct.

There are 10 such numbers which end with 2 between 100 to 199

i.e., 102, 112, 122, 132, 142, 152, 162, 172, 182, 192

Numbers starting from 2 i.e., 200 – 299 will equal to 100.

∴ Total numbers = $100 + 10 = 110$.

64. Option (a) is correct.

We have to select our food very thoughtfully in the future. Our increasing demand for foods that revolves around meat will indeed put a greater burden on our natural resources. It will have ramifications on the biodiversity and food cycle. These are the facts presented in the passage which makes option (a) to be the correct answer.

For health, both vegetarian and non-vegetarian foods are required but the latter one's demands the use of more natural resources before getting processed. So, option (b) is incorrect.

Option (c) is out of the context of the passage. It cannot be ascertained from the passage.

Option (d) is also out of the context of the passage. This is neither the topic of discussion in the passage, nor a supporting idea.

65. Option (b) is correct.

Option (a) is not the main point of discussion in the passage. It is a fact not an assumption. The first line clearly states it.

Chinese and Thai people are lactose intolerant because their ancestors did not domesticate cattle and thus, did not develop lactose intolerance. This became a habit which was passed on to the future generations. Hence, option (b) seems to be the most logical assumption.

When an option statement uses 'only', 'any', 'everyone', 'all', 'none' or 'always', it limits the scope of the statement. These statements shall be read minutely about the facts of the passage. This strategy helps in eliminating the wrong options.

Option (c) says 'only' people who consume milk have lactase enzyme to convert sugar in simple forms. It is not certain from the passage. In the

same way, option (d) is using 'any'. It is not clear whether lactose-intolerant people cannot digest 'any' dairy product. Hence, options (c) and (d) are not correct.

66. Option (b) is correct.

Option (c) is incorrect. It is a judgement not based on the passage.

Option (a) is an assumption, not the implication.

Option (d) misses mentioning the comparison in developed and underdeveloped countries as discussed in the passage. It includes all the countries which are not correct.

The passage highlights that there is a difference in the sectors that contribute to the national incomes in the developed and underdeveloped nations. According to the passage, the existence of a non-commercialized sector in different underdeveloped countries renders the national income comparisons over countries difficult.

Hence option (b) is correct.

67. Option (d) is correct.

The last two lines of the passage state that although carbon dioxide is a pollutant but it encourages plant growth also. With the growth of plants and vegetation, more and more carbon dioxide is released into the atmosphere. So, option (d) is the correct implication.

Soil stores carbon dioxide and is also capable of releasing it into the atmosphere. So, option (b) is incorrect.

Option (c) is incorrect as the author says that plant growth is linked with carbon dioxide, not soil carbon or microorganisms.

Though carbon dioxide is essential for plants, it is not clear from the passage whether carbon dioxide is required for the growth of microorganisms. Hence, option (a) is not the correct corollary.

68. Option (b) is correct.

The author has raised the issue of food insecurity in the passage. He is concerned about the potential mismatch in the demand for and supply of food.

The author emphasises that the poor countries are at a disadvantage. They neither have the purchasing power to import food nor have the required agricultural technology to feed their entire population. People in such poor nations do not have the finance to purchase food from outside which makes it important to increase their price affordability.

Statement 1 is not discussed in the passage.

A subsidy is not suggested as a solution for the food insecurity problem which makes statement 4 incorrect.

69. Option (d) is correct.

The biggest challenge is to satisfy the food needs of the entire population of the world. There is a need to achieve a balance between demand for and supply of food. The demand-supply balance can be a critical issue for a closed economy, especially if it is a populous economy and its domestic agriculture is not growing sufficiently enough to ensure food supplies. The problem becomes more severe with the low purchasing power of the citizens of poor countries. This argument makes option (d) as the correct option.

The shortage of land and food processing industries is not discussed in the passage which makes option (a) incorrect.

70. Option (c) is correct.

According to the passage, even if food import is increased, then also, due to low purchasing power, people will not be able to buy the expensive imported food. Hence, statement 2 does not provide a suitable measure to reduce hunger and starvation in developing economies.

Change in the food consumption patterns and practices is not discussed in the passage as a viable solution to decrease the hunger and food problem. Thus, statement 4 can be ignored.

Statement 1 is correct as to maintain the demand-supply balance is always an inescapable prerequisite for warding off hunger and starvation for developing countries.

The author says that in many developing economies a large number of people do not have the purchasing power to buy food which arises the need to increase their purchasing power. This argument makes statement (3) as one of the correct options.

71. Option (b) is correct.

Statement 1 is incorrect as the capabilities of individual countries to generate an uninterrupted chain of food supplies have come under strain due to the increased population.

According to the passage, there is an imbalance between sustainable provision and supply for the food worldwide. Thus the issue of worldwide supply of food has gained importance mainly because of limitation in the capabilities for sustained supply of food. Hence only statement 3 is correct

Statement 2 is not correct as there is no limitation in sustained supply but the process is expensive.

72. Option (a) is correct.

According to given question, we will have 6 such numbers.

2431, 2143, 3412, 3142, 4312, 3421

73. Option (a) is correct.

According to question,

Radius of overhead tank = 2 m

& height of overhead tank = 7 m

∴ Volume of overhead tank

$$= \frac{22}{7} \times 2 \times 2 \times 7 = 88 \text{ m}^3$$

$$[\text{Volume of cylinder} = \pi r^2 h]$$

Volume of underground tank = $5.5 \times 4 \times 6$

$$= 132 \text{ m}^3$$

Water left in underground tank

= Volume of underground tank

– Volume of overhead tank

$$= 132 - 88 = 44 \text{ m}^3$$

∴ $\frac{44}{132}$ i.e. $\frac{1}{3}$ portion of underground still filled with water.

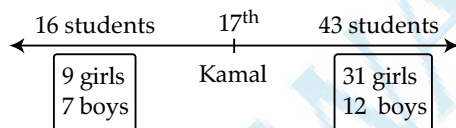
74. Option (b) is correct.

Given that, total number of students = 60

∴ Number of girls = $2 \times$ number of boys

⇒ Number of girls = 40 and number of boys = 20

As per given information,



∴ 12 boys are after Kamal.

75. Option (a) is correct.

Speed of A = 2 rounds/hour

& Speed of B = 3 rounds/hour

∴ In one hour they will cross each other 5 (2 + 3) times. But they will be able to cross each other only 2 times in next half an hour.

So, they will cross each other 7 times from 8:00 am to 9:30 am.

76. Option (d) is correct.

According to given information,

Time taken by W to do complete work

$$= 30 \times 4 = 120 \text{ days}$$

Time taken by X to do complete work

$$= 10 \times 4 = 40 \text{ days}$$

Time taken by Y to do complete work

$$= 40 \times 2.5 = 100 \text{ days}$$

Time taken by Z to do complete work

$$= 13 \times 3 = 39 \text{ days}$$

⇒ Z will complete work first.

77. Option (a) is correct.

According to question,

Total monthly income of 5 members

$$= 10000 \times 5 = ₹ 50000$$

Increment of one person per month

$$= \frac{120000}{12} = ₹ 10000$$

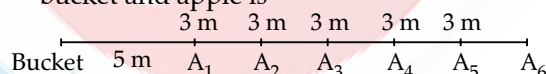
New monthly income of 5 members

$$= 50000 + 10000 = ₹ 60000$$

$$\therefore \text{New average income} = \frac{60000}{5} = ₹ 12000$$

78. Option (d) is correct.

According to question, the arrangement of bucket and apple is



Total distance covered by competitor

$$= 10 + 16 + 22 + 28 + 34 + 40 = 150 \text{ m}$$

79. Option (c) is correct.

Given that, diameter of target = 100 cm

∴ Radius of target = 50 cm

$$\therefore \text{Area of target} = \pi (50)^2 = 2500 \pi \text{ cm}^2$$

Now radius of red band = 0.2 m = 20 cm

$$\therefore \text{Its area} = \pi (20)^2 = 400 \pi \text{ cm}^2$$

$$\text{So, required probability} = \frac{400\pi}{2500\pi} = \frac{4}{25} = 0.16$$

80. Option (c) is correct.

Given that, marked price of toy, MP = ₹ 770

∴ Selling price, SP (after 10% discount)

$$= \frac{100 - 10}{100} \times 770 = ₹ 693$$

Since, person is gaining 10% on toy

$$\therefore \text{Cost price} = \frac{100 \times 693}{110} = ₹ 630$$