

**STAFF SELECTION COMMISSION**  
**SUB-INSPECTOR IN DELHI POLICE AND**  
**CENTRAL ARMED POLICE FORCES EXAMINATION (PAPER-I)**

**SOLVED PAPER**

**(2<sup>nd</sup> July 2017: Shift-3)**

**Time Allotted- 2 hours**

**Max marks- 200**

**General Intelligence and Reasoning**

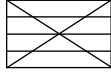

1. In the following question, select the related word from the given alternatives.  
 Punjab : Bhangra :: Gujarat : ?  
 1. Bihu      2. Garba      3. Ghumar      4. Kathak
2. In the following question, select the related word from the given alternatives.  
 Weak : Feeble :: Large : ?  
 1. Strong                              2. Insignificant  
 3. Colossal                            4. Teeny
3. In the following question, select the related letters from the given alternatives.  
 INQV : JPTZ :: HNSG : ?  
 1. IPVK      2. PIVK      3. IPKV      4. IRVK
4. In the following question, select the related letters from the given alternatives.  
 GHIJ : HJIL :: NOPQ : ?  
 1. OQQS      2. OSSQ      3. PPRS      4. OQSQ
5. In the following question, select the related number from the given alternatives.  
 6 : 216 :: 5 : ?  
 1. 125      2. 50      3. 75      4. 150
6. In the following question, select the related number from the given alternatives.  
 107 : 11449 :: 106 : ?  
 1. 10636      2. 11206      3. 11236      4. 11272
7. In the following question, select the odd word from the given alternatives.  
 1. Walls      2. Doors      3. Floor      4. Foundation
8. In the following question, select the odd word pair from the given alternatives.  
 1. Clouds : Rain                      2. Injury : Pain  
 3. Boiling : Evaporation          4. Freezing : Cold
9. In the following question, select the odd letters from the given alternatives.  
 1. DU      2. KP      3. JQ      4. GT
10. In the following question, select the odd letters from the given alternatives.  
 1. IM      2. DH      3. MS      4. UY
11. In the following question, select the odd number pair from the given alternatives.  
 1. 121 – 196      2. 441 – 484      3. 25 – 36      4. 169 – 196
12. In the following question, select the odd number pair from the given alternatives.  
 1. 47 – 74      2. 49 – 96      3. 63 – 36      4. 97 – 79
13. Arrange the given words in the sequence in which they occur in the dictionary.  
 1. Prayer              2. Plane              3. Prey  
 4. Predate            5. Picture  
 1. 51234      2. 51243      3. 52143      4. 52134
14. Arrange the given words in the sequence in which they occur in the dictionary.  
 1. Temple              2. Trained      3. Training  
 4. Troupe              5. Tented  
 1. 15234      2. 15243      3. 15432      4. 14532
15. A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.  
 BD, CE, DF, EG, ?  
 1. FG      2. DH      3. FH      4. EH
16. A series is given with one term missing. Select the correct alternative from the given ones that will complete the series.  
 AVA, BUC, CTE, ?  
 1. DVG      2. DSF      3. DSG      4. GSD
17. In the following question, select the missing number from the given series.  
 84, 42, 28, 21, ?  
 1. 10.5      2. 16.8      3. 18.4      4. 19.6
18. In the following question, select the missing number from the given series.  
 2.2, 14.8, 40, 90.4, ?  
 1. 191.2      2. 194.4      3. 196.2      4. 208.4
19. Raman remembers that the examination is after 15th May but before 18th May, while Deep remembers that the examination is before 21st May but after 16th May. On which date of May is the examination?  
 1. 17      2. 18      3. 19      4. 20
20. In a class of 42 students, Swati's rank is 19<sup>th</sup> from the bottom. Purshottam is 6 ranks below Swati. What is Purshottam's rank from the top?  
 1. 30<sup>th</sup>      2. 32<sup>nd</sup>      3. 33<sup>rd</sup>      4. 34<sup>th</sup>
21. Pointing to a lady in the photograph Amit said, "She is the mother of the only grandson of my mother". How is the lady related to Amit?  
 1. Mother      2. Daughter      3. Niece      4. Wife
22. In the following question, select the word which cannot be formed using the letters of the given word.  
 CAPABILITIES  
 1. PLATE      2. PLIABLE      3. PALATE      4. PAYABLE
23. In the following question, select the word which cannot be formed using the letters of the given word.  
 CARBONATE  
 1. CARBON      2. BORN      3. EARN      4. BOSE
24. In a certain code language, "SOULFUL" is written as "ORIXLV" and "GATHER" is written as "OHEWXJ". How is "TIDAL" written in that code language?  
 1. IDALQ      2. WFGXO      3. OXGFW      4. QLADI
25. In a certain code language, "PLATE" is written as "32876" and "BLEND" is written as "52694". How is "DENTED" written in that code language?  
 1. 869768      2. 295329      3. 469764      4. 538635
26. In the following question, by using which mathematical operators will the expression become correct?  
 69 ? 3 ? 2 ? 9 ? 3  
 1. ÷, -, > and ×                      2. ÷, +, < and ×  
 3. ÷, -, = and ×                      4. ×, +, < and ×

27. In the following question, by using which mathematical operators will the expression become correct?  
 $9 ? 3 ? 6 ? 8 ? 4$   
 1. -, ×, = and ×                      2. ÷, +, > and +  
 3. +, ×, < and ×                      4. ×, +, < and ×
28. If  $1 \$ 9 \& 5 = 14$  and  $2 \& 4 \$ 3 = -41$ , then  $7 \$ 9 \& 9 = ?$   
 1. 72                      2. 70                      3. 68                      4. 64
29. If  $8 * 9 \# 3 = 51$  and  $12 * 6 \# 4 = 72$ , then  $13 * 11 \# 6 = ?$   
 1. 156                      2. 128                      3. 136                      4. 144
30. In the following question, select the number which can be placed at the sign of question mark (?) from the given alternatives.

3	4	2
7	5	1
8	6	3
?	54	9

1. 60                      2. 70                      3. 75                      4. 80
31. In the following question, select the number which can be placed at the sign of question mark (?) from the given alternatives.

5	1	3	7
6	2	4	4
1	?	2	7

1. 3                      2. 4                      3. 5                      4. 6
32. How many triangles are there in the given figure?  

1. 18                      2. 20                      3. 22                      4. 24
33. How many triangles are there in the given figure?  


1. 8                      2. 10                      3. 12                      4. 16
34. In each of the following question below are given some statements followed by some conclusions. Taking the given statements to be true even if they seem to be at variance from commonly known facts, read all the conclusions and then decide which of the given conclusion logically follows the given statements.

**Statements:**

- I. Some knives are spoons.  
 II. Some forks are knives.  
 III. No fork is a green.

**Conclusions:**

- I. Some spoons are forks.  
 II. Some knives are green.  
 III. Some green are not knives.  
 IV. Some knives are not green.

1. Only conclusion (IV) follows  
 2. Only conclusion (III) follows  
 3. Only conclusion (III) and (I) follow  
 4. Only conclusion (I) and (II) follow

35. In each of the following question below are given some statements followed by some conclusions. Taking the given statements to be true even if they seem to be at variance from commonly known facts, read all the conclusions and then decide which of the given conclusion logically follows the given statements.

**Statements:**

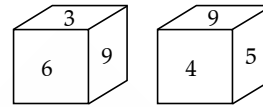
- I. Some mangoes are not red.  
 II. All red are raw.

III. Some raw are mangoes.

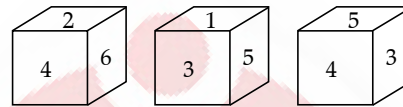
**Conclusions:**

- I. Some mangoes are not raw.  
 II. Some red are not mangoes.  
 III. All raw are red.  
 1. Only conclusion (I) follows  
 2. Only conclusion (II) and (III) follow  
 3. Only conclusion (I) and (III) follow  
 4. No conclusion follows

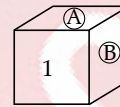
36. Two position of a cube are shown below. What will come opposite to face containing '5'?



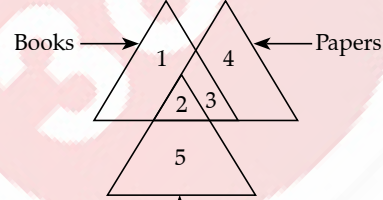
1. 6                      2. 4                      3. 6 or 3                      4. 3
37. Three position of a cube are shown below.



Which numbers will come on two faces marked 'A and B'?

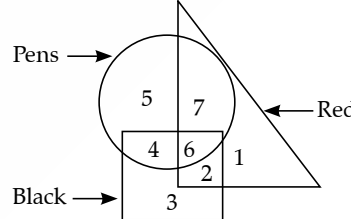


1. 4 and 3                      2. 4 and 5                      3. 2 and 5                      4. 2 and 4
38. In the given figure, which number/numbers represent papers which are books?

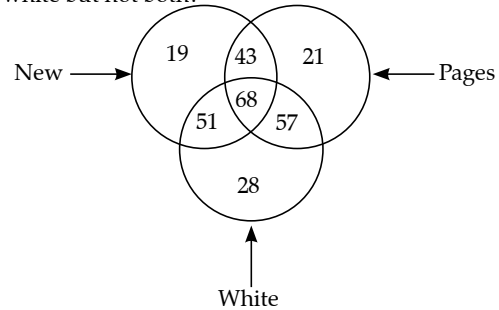


5. Academic  
 1. 2 and 3                      2. 2 and 5                      3. 3 and 4                      4. Only 2

39. In the given figure, which number represents pens which are black but not red?

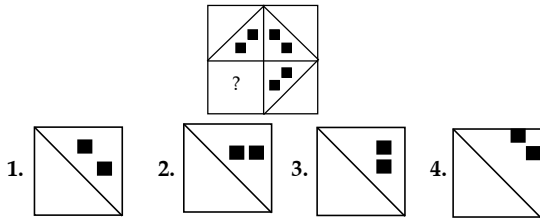


1. 4                      2. 5                      3. 6                      4. 3
40. In the given figure, how many pages are either new or white but not both?

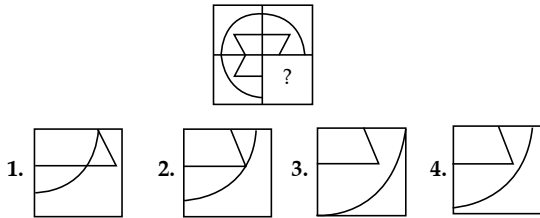


1. 111                      2. 100                      3. 125                      4. 168

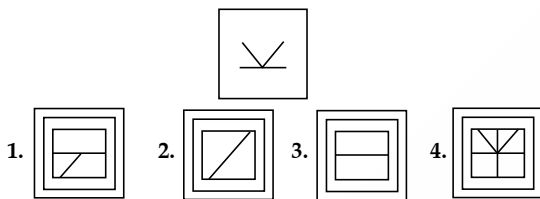
41. Which answer figure will complete the pattern in the question figure?



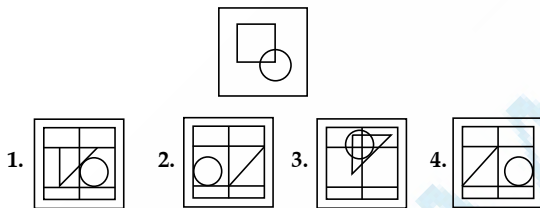
42. Which answer figure will complete the pattern in the question figure?



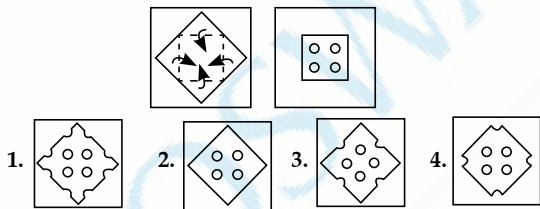
43. From the given answer figures, select the one in which the question figure is hidden/embedded.



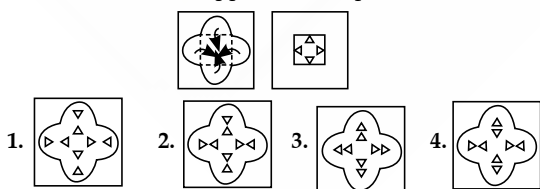
44. From the given answer figures, select the one in which the question figure is hidden/embedded.



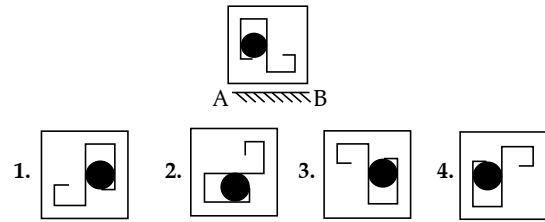
45. A piece of paper is folded and punched as shown below in the question figures. From the given answer figures, indicate how it will appear when opened?



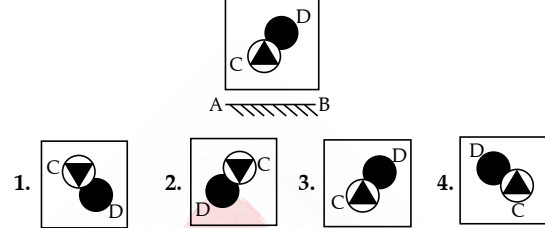
46. A piece of paper is folded and punched as shown below in the question figures. From the given answer figures, indicate how it will appear when opened?



47. If a mirror is placed on the line AB, then which of the answer figures is the right image of the given figure?



48. If a mirror is placed on the line AB, then which of the answer figures is the right image of the given figure?



49. A word is represented by only one set of numbers given in any one of the alternatives. The sets of numbers given in the alternatives are represented by two classes of alphabets as shown in the given two matrices. The columns and rows of Matrix-I are numbered from 0 to 4 and that of Matrix-II are numbered from 5 to 9. A letter from these matrices can be represented first by its row and next by its column, for example, 'H' can be represented by 00, 24, etc. and 'L' can be represented by 56, 98, etc. Similarly, you have to identify the set for the word "HALT".

**Matrix-I**

	0	1	2	3	4
0	H	G	T	I	N
1	I	N	H	G	T
2	G	T	I	N	H
3	N	H	G	T	I
4	T	I	N	H	G

**Matrix-II**

	5	6	7	8	9
5	E	L	X	B	A
6	A	E	L	X	B
7	L	B	E	A	X
8	X	A	B	E	L
9	B	X	A	L	E

- 1. 31, 59, 68, 21
- 2. 43, 86, 99, 40
- 3. 24, 78, 56, 02
- 4. 12, 97, 88, 33

50. A word is represented by only one set of numbers given in any one of the alternatives. The sets of numbers given in the alternatives are represented by two classes of alphabets as shown in the given two matrices. The columns and rows of Matrix-I are numbered from 0 to 4 and that of Matrix-II are numbered from 5 to 9. A letter from these matrices can be represented first by its row and next by its column, for example, 'K' can be represented by 10, 41, etc. and 'N' can be represented by 56, 97, etc. Similarly, you have to identify the set for the word 'TREND'.

**Matrix-I**

	0	1	2	3	4
0	A	R	T	E	K
1	K	A	E	R	T
2	R	T	A	K	E
3	T	E	K	A	R
4	E	K	R	T	A

**Matrix-II**

	5	6	7	8	9
5	S	N	D	L	I
6	N	L	S	I	D
7	D	I	L	N	S
8	L	S	I	D	N
9	I	D	N	S	L

- 1. 14,13, 12, 65, 76
- 2. 43, 42, 40, 78, 88
- 3. 21, 34, 24, 57, 95
- 4. 30, 01, 31, 97, 59

### General Knowledge and General Awareness

51. Offloading of government shares to private companies is known as \_\_\_\_\_ .  
 1. Investment                      2. Disinvestment  
 3. Centralization                      4. Decentralization
52. Which among the following comes under primary sector of Indian Economy?  
 1. Sugar Industry                      2. Dairy  
 3. Banking                      4. Transport of Goods
53. What is moderate degree of controlled inflation called as?  
 1. Reflation                      2. Stagflation  
 3. Hyper-inflation                      4. Disinflation
54. What is the full form of 'CARE', the third credit rating agency in India?  
 1. Credit Analysis and Rating Enterprise  
 2. Credit Agency of Rating Equities  
 3. Credit Agency of Rating Enterprise  
 4. Credit Analysis and Research
55. What is difference of Revenue expenditure and Revenue receipts called as?  
 1. Revenue                      2. Total expenditure  
 3. Revenue Deficit                      4. Total revenue
56. What is the main objective of Marxism?  
 1. Dictatorship  
 2. Stateless society  
 3. To establish strong centre  
 4. Protection of weaker sections
57. In \_\_\_\_\_ government each adult citizen must have one vote and each vote must have one value.  
 1. Democratic                      2. Autocratic  
 3. Monarchic                      4. Authoritarian
58. Who among the following gave the concept of 'Distributive Justice'?  
 1. Aristotle                      2. Plato                      3. Hegel                      4. Ritchie
59. Vice-President of India is also ex-officio chairman of \_\_\_\_\_ .  
 1. Lok Sabha  
 2. Rajya Sabha  
 3. Parliament  
 4. Union Public Service Commission
60. What are the maximum number of seats fixed for Rajya Sabha in India?  
 1. 245 seats                      2. 252 seats                      3. 260 seats                      4. 250 seats
61. Who appoints the Chief Minister of any of the state in India?  
 1. President of India  
 2. Governor of the state  
 3. Judge of High Court  
 4. Attorney General of India
62. High Court of Andaman and Nicobar Islands is located in which state of India?  
 1. Tamil Nadu                      2. West Bengal  
 3. Andhra Pradesh                      4. Karnataka
63. In how many ways Indian citizenship can be acquired?  
 1. Three                      2. Four                      3. Five                      4. Six
64. Which of the following Vedas is not a part of Vedatrayi?  
 1. Rig Veda                      2. Yajur Veda  
 3. Sama Veda                      4. Atharva Veda
65. Who among the following is known as 'Bismarck of India'?  
 1. Sardar Vallabhbhai Patel                      2. Bhagat Singh  
 3. Swami Vivekanand                      4. Lala Lajpat Rai
66. In Indus valley civilization, Lothal was famous for which of the following?  
 1. The Rock cut architecture                      2. Dockyard  
 3. Cotton cultivation                      4. Pottery
67. Who among the following built the Sanchi Stupa?  
 1. Ashoka                      2. Gautam Buddha  
 3. Cholas                      4. Pallavas
68. Lord Macaulay is generally associated for bringing \_\_\_\_\_ in India.  
 1. Unity in Army                      2. Economic reforms  
 3. English Education                      4. Modern Technologies
69. Which of the following pair is INCORRECT?  
 1. 0° longitude – Prime Meridian  
 2. 0° longitude – Equator  
 3. 0° latitude – Equator  
 4. 23.5° North – Tropic of Cancer 23.5°
70. What is an isthmus?  
 1. A water body separating two land masses  
 2. A narrow strip of land separating two water bodies  
 3. Deep penetration of a water body in land  
 4. None of these
71. 'Red Indians' are natives of which of the following country?  
 1. India                      2. Pakistan  
 3. North America                      4. West Africa
72. What is the time difference between Indian Standard Time [IST] and Greenwich Mean Time [GMT]?  
 1. 7 hours 30 minutes.                      2. 6 hours 30 minutes.  
 3. 5 hours 30 minutes.                      4. 4 hours 30 minutes.
73. Which of the following is also known as 'Doctor winds'?  
 I. Foehn                      II. Harmattan  
 III. Chinook  
 1. I and III                      2. Only II  
 3. Only III                      4. I and II Both I
74. Which of the following drug is used to get pain relief in muscles?  
 1. Analgesics                      2. Antibiotic                      3. Antiseptics                      4. Antidotes
75. Which of the following protein is found in hair?  
 1. Histone                      2. Keratin                      3. Elastin                      4. Actin
76. Which among the following is an example of dicot seed?  
 1. Rice                      2. Wheat                      3. Pulses                      4. Maize
77. Which liquid is contained inside the nucleus of a cell?  
 1. Cytoplasm                      2. Protoplasm  
 3. Nucleoplasm                      4. Nucleosome
78. Which of the following is a communicable disease?  
 I. Malaria                      II. Tuberculosis  
 III. Measles  
 1. Only II                      2. Both I and III  
 3. Both II and III                      4. Only III
79. The chicory powder which is mixed with coffee powder is obtained from which of the following part of plant?  
 1. Stem                      2. Fruit                      3. Flower                      4. Root
80. Match the following:
- | Quantity               | SI Unit                |
|------------------------|------------------------|
| 1. Frequency           | a. Ohm                 |
| 2. Force               | b. Hertz               |
| 3. Resistance          | c. Newton              |
| 1. 1 – b, 2 – c, 3 – a | 2. 1 – a, 2 – c, 3 – b |
| 3. 1 – c, 2 – b, 3 – a | 4. 1 – b, 2 – a, 3 – c |
81. Energy in the foods can be measured in which units?  
 1. Kelvin                      2. Joule                      3. Calorie                      4. Celsius
82. Ability to distinguish two closely placed objects is \_\_\_\_\_ .  
 1. Resolving power                      2. Video power  
 3. Distinguish power                      4. Magnifying power



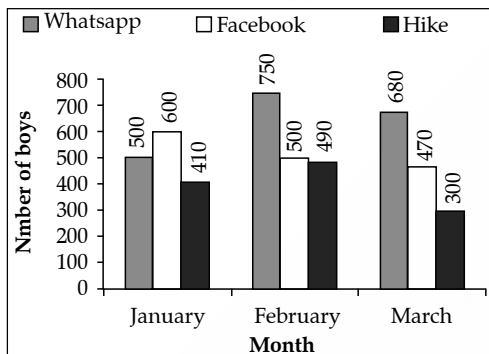
83. \_\_\_\_\_ are used for communication in artificial satellites.
1. Infrared waves
  2. Radio waves
  3. Ultraviolet (UV) rays
  4. Amplitude Modulation (A.M.) waves
84. Multicasting is \_\_\_\_\_ .
1. sending a frame to a group of stations
  2. sending a frame to a single station
  3. sending a frame to minimum 100 group of stations
  4. not sending a frame to any group of station
85. Which of the following pair is INCORRECT?
- I. Touch Pad – Locator device
  - II. Microphone – Output device
  - III. Monitor – Output device
1. I and II
  2. I and III
  3. Only II
  4. All options are correct.
86. Which among the following is used in fire extinguisher?
- I. Carbon dioxide
  - II. Oxygen
  - III. Sulphur dioxide
1. Only I
  2. Only II
  3. Only III
  4. All options are correct.
87. Which of the following is used as coolant in Atomic reactor?
1. Water
  2. Uranium
  3. Graphite
  4. Boron
88. Which of the following metal is the heaviest?
1. Iron
  2. Silver
  3. Nickel
  4. Osmium
89. Which of the following is an example of sublimation?
- I. Dry ice
  - II. Camphor
  - III. Ice
1. I and II
  2. I, II and III
  3. Only I
  4. Only II
90. Which of the following is an artificial ecosystem?
1. Aquarium
  2. Zoo
  3. Sanctuary
  4. National Park
91. Which of the following primarily causes Mercury Pollution?
1. CFL Lamp
  2. Automobile Battery
  3. Polymer
  4. Diesel Engine
92. Dodo is a bird categorized under \_\_\_\_\_ .
1. Extinct
  2. Endangered
  3. Critically endangered
  4. Rare
93. The first UDAN flight under 'Regional Connectivity Scheme' was flagged off between which of the following two cities?
1. Guntoor-Chennai
  2. Shimla-Hyderabad
  3. Nanded-Mumbai
  4. Kadapa-Chennai
94. Who invented electric motor?
1. Michael Faraday
  2. Guglielmo Marconi
  3. James Watt
  4. Isaac Newton
95. Winter Olympics 2018 was hosted by which country?
1. Japan
  2. Vietnam
  3. China
  4. South Korea
96. Match the following.
- | Monument                 | Country   |
|--------------------------|-----------|
| 1. Great Pyramid of Giza | a. Mexico |
| 2. Great wall of China   | b. Italy  |
| 3. Colosseum             | c. Egypt  |
| 4. Chichen Itza          | d. China  |
1. 1-b, 2-d, 3-a, 4-c
  2. 1-c, 2-d, 3-b, 4-a
  3. 1-a, 2-d, 3-b, 4-c
  4. 1-b, 2-a, 3-d, 4-c
97. Who among the following is a recipient of Nobel Prize 2016 in the field of Physiology or medicine?
1. Bengt Holmstrom
  2. Bob Dylan
  3. Yoshinori Ohsumi
  4. Juan Mannuel Santos
98. Which Lok Sabha speaker has authored the book 'Matoshree'?
1. Sumitra Mahajan
  2. Meira Kumar
  3. Somnath Chatterjee
  4. Manohar Joshi

99. How many agreements have been signed by India and Cyprus on 28 April 2017?
1. 3
  2. 4
  3. 5
  4. 6
100. Farraka barrage is a major reason for contention between India and \_\_\_\_\_ .
1. Bangladesh
  2. Pakistan
  3. China
  4. Nepal

### Quantitative Aptitude

101. If  $P = (\sqrt{7} - \sqrt{6}) / (\sqrt{7} + \sqrt{6})$ , then what is the value of  $P + (1/P)$ ?
1. 12
  2. 13
  3. 24
  4. 26
102. Which value among  $3^{200}$ ,  $2^{300}$  and  $7^{100}$  is the largest?
1.  $3^{200}$
  2.  $2^{300}$
  3.  $7^{100}$
  4. All are equal
103. What is the value of  $3^2 + 7^2 + 11^2 + 13^2 + 17^2 - 1^2 - 5^2 - 9^2 - 11^2 - 15^2$ ?
1. 5
  2. 72
  3. 92
  4. 184
104. What is the value of  $\frac{(0.7)^3 - (0.4)^3}{(0.7)^2 + 0.7 \times 0.4 + (0.4)^2}$ ?
1. 0.3
  2. 0.4
  3. 0.7
  4. 1.1
105. How many positive factors of 40 are there?
1. 3
  2. 4
  3. 6
  4. 8
106. A is 20% more efficient than B. If B alone can complete a piece of work in 12 days, then A alone can complete the same work in how many days?
1. 10
  2. 12
  3. 14
  4. 16
107. A and B together can complete a work in 10 days. They started together but A left after 2 days and the remaining work was completed by B in 12 days. In how many days can A complete the entire work while working alone?
1. 15
  2. 20
  3. 30
  4. 45
108. What will be the net discount (in percentage) after two successive discounts of 50% and 50%?
1. 85
  2. 75
  3. 100
  4. 95
109. An article is sold for Rs 5330 after a discount of 18%. What is the marked price (in Rs) of the article?
1. 6250
  2. 6450
  3. 6800
  4. 6500
110. Raman, Rohit and Raja are partners and invest in a business. Raman invests 1/4th of total and Rohit invest 1/3th of the total. What is the ratio of profit of Raman, Rohit and Raja respectively?
1. 4 : 3 : 1
  2. 3 : 4 : 4
  3. 3 : 4 : 5
  4. 4 : 3 : 5
111. If  $a - b : b - c : c - d = 1 : 2 : 3$ , then what is the value of  $(a + d) : c$ ?
1. 1 : 2
  2. 2 : 1
  3. 4 : 1
  4. 3 : 1
112. The average age of Rustam and Preetam is 39 years. The average age of Preetam and Geetam is 28 years. The average age of Rustam and Geetam is 34 years. What will be the age (in years) of the youngest of the three after 10 years?
1. 13
  2. 23
  3. 33
  4. 43
113. The average age of 6 members of a family is 25 years. If the youngest member of the family is 15 years old, then what was the average age (in years) of the family at the time of the birth of the youngest member?
1. 9
  2. 12
  3. 18
  4. 24
114. On an article the profit is 230% of the cost price. If the cost price increases by 50% but the selling price remains constant, then what is the new profit percentage?
1. 54.54
  2. 80
  3. 120
  4. 150
115. A trader buys two articles for Rs 4000 each. While selling if he gains 12.5% on one and losses 20% on the other, then what will be the overall loss percentage?
1. 2.5
  2. 3.75
  3. 5
  4. 5.25

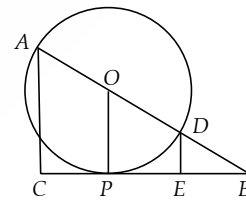
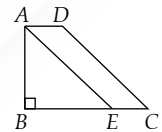
116. X is 30% more than Y and 25% less than Z. If value of Y is Rs 300, then what is the value (in Rs) of Z?  
1. 390      2. 400      3. 470      4. 520
117. The price of motor cycle depreciates every year by 10%. If the value of the motor cycle after 3 years will be Rs 36450, then what is the present value (in Rs) of the motor cycle?  
1. 45000      2. 50000      3. 48000      4. 51000
118. Two boats are travelling with speed of 36 km/hr and 54 km/hr respectively towards each other. What is the distance (in metres) between the two boats one second before they collide?  
1. 10      2. 15      3. 25      4. 5
119. A car left 3 minutes early than the scheduled time and in order to reach the destination 126 km away in time, it has to slow its speed by 6 km/h from the usual. What is the usual speed (in km/hr) of the car?  
1. 56      2. 63      3. 94.5      4. 126
120. If a certain sum becomes 3 times in 6 years at compound interest, then in how many years, it will become 81 times?  
1. 81      2. 162      3. 27      4. 24
121. What is the simple interest on Rs 5400 in 5 years at the rate of 12% per annum?  
1. 2700      2. 2950      3. 3120      4. 3240
- The bar graph given below represents the number of boys in a school using three apps for three months.



122. What is the total number of boys using the three apps in month of March?  
1. 1420      2. 1480      3. 1450      4. 1500
123. Number of boys using Whatsapp in February is how much percent more than the number of boys using Facebook in February?  
1. 50      2. 33.33      3. 66.66      4. 44.22
124. What is the percentage decrease in number of boys using Facebook from January to February?  
1. 26.66      2. 20      3. 21.33      4. 16.66
125. Number of boys using Whatsapp in March is what percent of number of boys using Facebook in February?  
1. 126.47      2. 136      3. 128      4. 131.3
126. The perimeter of base of a right circular cone is 132 cm. If the height of the cone is 72 cm, then what is the total surface area (in  $\text{cm}^2$ ) of the cone?  
1. 6600      2. 6336      3. 4224      4. 5784
127. A solid metallic sphere of radius 14 cm is melted and recast into a cone with diameter of the base as 14 cm. What is the height (in cm) of the cone?  
1. 236      2. 64      3. 112      4. 224
128. The radius of a wheel is 21 cm what is the distance (in cm) travelled by the wheel in 10 revolutions?  
1. 660      2. 1320      3. 1980      4. 2640
129. Three circles of radius 21 cm are placed in such a way that each circle touches the other two. What is the area of the portion enclosed by the three circles?  
1.  $441\sqrt{3} - 693$       2.  $882\sqrt{3} - 693$   
3.  $882\sqrt{3} - 462$       4.  $441\sqrt{3} - 462$

130. If the perimeter of a square is 80 cm, then what is the diagonal of the square (in cm)?  
1.  $20\sqrt{2}$       2.  $40\sqrt{2}$       3.  $80\sqrt{2}$       4. 20
131. If  $(1/x) + (1/y) + (1/z) = 0$  and  $x + y + z = 11$ , then what is the value of  $x^3 + y^3 + z^3 - 3xyz$ ?  
1. 1331      2. 2662      3. 3993      4. 14641
132. What is the simplified value of  $\left[ \frac{(1+x^3)}{(x^2-1)} \div \frac{(x^2+1-x)}{(x+1)} \right] \times (x-1)$ ?  
1. 1      2. x      3. x + 1      4.  $1/(x-1)$
133. If  $\frac{x + \sqrt{x^2-1}}{x - \sqrt{x^2-1}} + \frac{x - \sqrt{x^2-1}}{x + \sqrt{x^2-1}} = 62$ , then what is the value of x ( $x < 0$ )?  
1. -4      2. 0      3. 3      4. 16
134. If  $x^2 - 3x + 1 = 0$ , then what is the value of  $x^2 + \frac{1}{x^2}$ ?  
1. 3      2. 7      3. 9      4. 11
135. If  $x^4 + \frac{1}{x^4} = 98$  and  $x > 1$ , then what is the value of  $x - \frac{1}{x}$ ?  
1. 2      2.  $2\sqrt{2}$       3.  $\sqrt{5}$       4.  $\sqrt{3}$

136. In  $\triangle ABC$ ,  $\angle BCA = 90^\circ$ ,  $AC = 24$  cm and  $BC = 10$  cm. What is the radius (in cm) of the circum-circle of  $\triangle ABC$ ?  
1. 12.5      2. 13      3. 25      4. 26
137. A chord of length 7 cm subtends an angle of  $60^\circ$  at the centre of a circle. What is the radius (in cm) of the circle?  
1.  $7\sqrt{2}$       2.  $7\sqrt{3}$       3. 7      4. 14
138. If  $\triangle PQR$  is right angled at Q,  $PQ = 12$  and  $\angle PRQ = 30^\circ$ , then what is the value of QR?  
1.  $12\sqrt{3}$       2.  $12\sqrt{2}$       3. 12      4. 24
139. In the given figure, area of isosceles triangle ABE is  $72 \text{ cm}^2$  and  $BE = AB$  and  $AB = 2AD$ ,  $AE \parallel DC$ , then what is the area (in  $\text{cm}^2$ ) of the trapezium ABCD?  
1. 108      2. 124      3. 136      4. 144
140. In the given figure, AC and DE are perpendicular to tangent CB. AB passes through centre O of the circle whose radius is 20 cm. If  $AC = 36$  cm, what is the length (in cm) of DE?

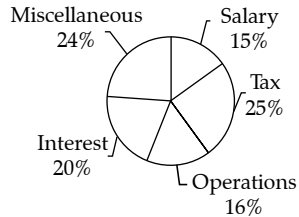


1. 4      2. 6      3. 2      4. 8
141. If  $4\sin^2 \theta - 3 = 0$  and  $\theta$  is acute, then what is the value of  $(\cot^2 \theta + \tan^2 \theta)$ ?  
1. 2      2. 0      3.  $10/3$       4. 6
142. If  $\frac{\cos \theta}{1 + \sin \theta} + \frac{\cos \theta}{1 - \sin \theta} = 4$  and  $\theta$  is acute, then what is the value (in degrees) of  $\theta$ ?  
1. 30      2. 45      3. 60      4. 90
143. If  $\frac{1}{\sin \theta + \operatorname{cosec} \theta} = \frac{1}{2}$ , then what is the value of  $\sin 100^\circ \theta + \operatorname{cosec} 100^\circ \theta$ ?  
1. -1      2. 0      3. 1      4. 2

144. What is the value of  $\frac{\tan^2 25^\circ}{\operatorname{cosec}^2 65^\circ} + \frac{\cot^2 25^\circ}{\sec^2 65^\circ} + 2 \tan 20^\circ \tan 45^\circ \tan 70^\circ$ ?
1. 1            2. 2            3. 3            4. 4
145. If  $\operatorname{cosec} \theta + \operatorname{cosec}^2 \theta = 1$ , then what is the value of  $(\cot^{12} \theta - 3 \cot^{10} \theta + 3 \cot^8 \theta - \cot^6 \theta)$ ?
1. -2            2. -1            3. 0            4. 1

**146- 150 are based on the pie chart.**

The pie chart given below shows the percentage distribution of annual expenditure on various items of a company. The annual expenditure of the company is Rs. 72 crores.



146. How much is the expenditure (in Rs crores) on Operations annually?
1. 1.52            2. 7.14            3. 11.52            4. 1.152
147. What is the monthly expenditure (in Rs crores) on Miscellaneous by the company?
1. 14.4            2. 1.44            3. 1.21            4. 1.69
148. If 5% of Miscellaneous is spent on research of nanotubes, then how much is spent (in Rs crores) on research of nanotubes annually?
1. 0.864            2. 0.362            3. 0.544            4. 0.962
149. By what percentage is the total expenditure on Interest and Miscellaneous more than the total expenditure on Tax and Salary?
1. 20            2. 15            3. 8            4. 10
150. Total amount spent on Raw material is 50% of the total amount spent on Interest. If the ratio of amount of expenditure on Rent and Raw material is 1 : 2 respectively, then what will be the amount (in Rs) spent on Rent annually?
1. 28000000            2. 36000000            3. 40000000            4. 32000000

### English Comprehension

151. In the following question, some part of the sentence may have errors. Find out which part of the sentence has an error and select the appropriate option. If a sentence is free from error, select 'No Error'.
- He commanded me (1)/ as if he was (2)/ my husband. (3)/ No Error (4) Options:
1. 1            2. 2            3. 3            4. 4
152. In the following question, some part of the sentence may have errors. Find out which part of the sentence has an error and select the appropriate option. If the sentence is free from error, select 'No error'.
- The English is a very (1)/popular language (2)/ amongst south Indians. (3)/ No error (4)
1. 1            2. 2            3. 3            4. 4
153. In the following question, some part of the sentence may have errors. Find out which part of the sentence has an error and select the appropriate option. If the sentence is free from error, select 'No Error'.
- This container is full with water (1)/ so I can't carry it for a (2)/ long distance at one go. (3)/ No Error (4)
1. 1            2. 2            3. 3            4. 4
154. In the following question, some part of the sentence may have errors. Find out which part of the sentence has an error and select the appropriate option. If the sentence is free from error, select 'No Error'.
- If you will finish your homework I (1)/ will give you (2)/ an ice-cream. (3)/ No Error (4)
1. 1            2. 2            3. 3            4. 4
155. In the following question, some part of the sentence may have errors. Find out which part of the sentence has an error and select the appropriate option. If the sentence is free from error, select 'No Error'.
- Had she not known (1)/ about it she should (2)/ have stayed longer. (3)/ No Error (4)
1. 1            2. 2            3. 3            4. 4
156. In the following question, the sentence given with blank to be filled in with an appropriate word. Select the correct alternative out of the four and indicate it by selecting the appropriate option.
- I do not agree \_\_\_\_\_ my colleagues in this matter.
1. to            2. of            3. with            4. on
157. In the following question, the sentence given with blank to be filled in with an appropriate word. Select the correct alternative out of the four and indicate it by selecting the appropriate option.
- Rita is more beautiful than \_\_\_\_\_ of her sisters.
1. any other            2. any            3. some            4. all
158. In the following question, the sentence given with blank to be filled in with an appropriate word. Select the correct alternative out of the four and indicate it by selecting the appropriate option.
- When my mother entered the house, I \_\_\_\_\_ sleeping.
1. had been            2. should be            3. was            4. would be
159. In the following question, the sentence given with blank to be filled in with an appropriate word. Select the correct alternative out of the four and indicate it by selecting the appropriate option.
- Hearing of her grandmother's illness, she at once started \_\_\_\_\_ Mumbai.
1. for            2. upto            3. to            4. towards
160. In the following question, the sentence given with blank to be filled in with an appropriate word. Select the correct alternative out of the four and indicate it by selecting the appropriate option.
- He \_\_\_\_\_ from the crowd because of his height.
1. stood out            2. stood by            3. stood off            4. stood up
161. In the following question, out of the four alternatives, select the word similar in meaning to the word given.
- Vie
1. compete            2. cheerful            3. conceal            4. confuse
162. In the following question, out of the four alternatives, select the word similar in meaning to the word given.
- Cavort
1. climb            2. crawl            3. jump            4. drag
163. In the following question, out of the four alternatives, select the word similar in meaning to the word given.
- Brittle
1. fragile            2. dry            3. risky            4. demolish
164. In the following question, out of the four alternatives, select the word similar in meaning to the word given.
- Illuminate
1. desirous            2. seizure            3. solitary            4. brighten
165. In the following question, out of the four alternatives, select the word similar in meaning to the word given.
- Embroid
1. curse            2. confuse            3. craggy            4. censure



166. In the following question, out of the four alternatives, select the word opposite in meaning to the word given.  
Crestfallen  
1. authentic                      2. antique  
3. triumphant                    4. discordant
167. In the following question, out of the four alternatives, select the word opposite in meaning to the word given.  
Balmy  
1. obscene    2. hard    3. noble    4. pleasing
168. In the following question, out of the four alternatives, select the word opposite in meaning to the word given.  
Docile  
1. cheerful    2. willful    3. fertile    4. harmless
169. In the following question, out of the four alternatives, select the word opposite in meaning to the word given.  
Slothful  
1. lively    2. sinful    3. lazy    4. unnatural
170. In the following question, out of the four alternatives, select the word opposite in meaning to the word given.  
Furtive  
1. hollow    2. wide    3. straight    4. narrow
171. In the following question, out of the four alternatives, select the alternative which best expresses the meaning of the idiom/phrase. In deep water  
1. to die                              2. in great difficulty  
3. to fail completely              4. to surrender
172. In the following question, out of the four alternatives, select the alternative which best expresses the meaning of the idiom/phrase. In the egg  
1. in an untidy state              2. in a dilemma  
3. in an early stage                4. in bodily form
173. In the following question, out of the four alternatives, select the alternative which best expresses the meaning of the idiom/phrase. Cut in on  
1. acknowledge                  2. interrupt  
3. evade                              4. produce
174. In the following question, out of the four alternatives, select the alternative which best expresses the meaning of the idiom/phrase. Draw a blank  
1. absent minded                  2. to be unsuccessful  
3. come to an end                 4. to fall a victim
175. In the following question, out of the four alternatives, select the alternative which best expresses the meaning of the idiom/phrase. Give up ghost  
1. to feel superior                 2. to overcome one's fear  
3. to give encouragement        4. to die
176. Improve the bracketed part of the sentence. She did not like the phone, (nor I did).  
1. nor I like it                      2. nor I liked it  
3. nor did I                         4. no improvement
177. Improve the bracketed part of the sentence.  
You (will have to) return my Mac book whenever I ask for it.  
1. should                              2. will have  
3. would have to                  4. no improvement
178. Improve the bracketed part of the sentence.  
My father asked me when (would I) have a cup of coffee.  
1. i would                            2. i shall  
3. i will                                4. no improvement
179. Improve the bracketed part of the sentence. Rohan is (as fast as) or perhaps faster than Suresh.  
1. almost as fast                  2. as fast  
3. equally fast                      4. no improvement
180. Improve the bracketed part of the sentence.  
When Rahul was just thirteen he (sat) the entrance examination for senior secondary school.  
Options:  
1. sat in                                2. sat at  
3. sat for                              4. no improvement
181. In the following question, out of the four alternatives, select the alternative which is the best substitute of the phrase. Property inherited from one's father  
1. vale                                 2. patrimony  
3. legacy                              4. trench
182. In the following question, out of the four alternatives, select the alternative which is the best substitute of the phrase. Government by person of highest social order  
1. bureaucracy                    2. plutocracy  
3. democracy                        4. aristocracy
183. In the following question, out of the four alternatives, select the alternative which is the best substitute of the phrase. Study of ancient things like tombs, buried towns  
Options:  
1. paleontology                    2. nomology  
3. archaeology                      4. genealogy
184. In the following question, out of the four alternatives, select the alternative which is the best substitute of the phrase. To banish or turn out of society and fellowship  
1. acrobat    2. diatribe    3. ostracise    4. jurist
185. In the following question, out of the four alternatives, select the alternative which is the best substitute of the phrase. Rebellious or opposing the authority  
1. insurgent                         2. intransigent  
3. indigenous                        4. innuendo
186. In the following question, four words are given out of which one word is incorrectly spelt. Select the incorrectly spelt word.  
1. conscience                        2. continuity  
3. councillor                         4. conceit
187. In the following question, four words are given out of which one word is incorrectly spelt. Select the incorrectly spelt word.  
1. distillation                        2. discusion  
3. dysentery                         4. diesel
188. In the following question, four words are given out of which one word is incorrectly spelt. Select the incorrectly spelt word.  
1. triumph    2. torchure    3. tyrant    4. thesaurus
189. In the following question, four words are given out of which one word is incorrectly spelt. Select the incorrectly spelt word.  
1. mediteranean                  2. miscellaneous  
3. municipality                    4. missionary
190. In the following question, four words are given out of which one word is incorrectly spelt. Select the incorrectly spelt word.  
1. psychiatrist                      2. proclamation  
3. legitimacy                        4. tranquility
- In the following passage some of the words have been left out. Read the passage carefully and select the correct answer for the given blank out of the four alternatives.  
For better or for worse, we are living in a \_\_\_\_\_ which is based physically on western science and technology. This has \_\_\_\_\_ consequences for the scientist. Initially he was an \_\_\_\_\_ force in the unfolding of human \_\_\_\_\_. This he can no longer be. As Neils Bohr has said, scientists must become \_\_\_\_\_ of the fact that they are not merely observers, but also actors on the stage of life.
191. For better or for worse, we are living in a \_\_\_\_\_ which is based physically  
1. world                                2. society  
3. environment                      4. locality



192. This has \_\_\_\_\_ consequences for the scientist.  
 1. inescapable 2. mere 3. sharp 4. evitable
193. Initially he was an \_\_\_\_\_ force.  
 1. accidental 2. incidental 3. initial 4. interesting
194. in the unfolding of human \_\_\_\_\_.  
 1. deeds 2. culture 3. destiny 4. needs
195. scientists must become \_\_\_\_\_ of the fact that they are not merely observers  
 1. active 2. gauge 3. conscious 4. sure

A passage is given with five questions following it. Read the passage carefully and select the best answer to each question out of the given four alternatives.

The size of the workforce in Brazil, the number of kids at home and parents to sustain will obviously have a great impact on the extent of poverty in Brazilian households. In fact, the demographic transition that has been ongoing in Brazil for the past few decades has helped a lot in reducing poverty. Less children were born in poorer families and that's less children that ended up involved in street violence, drugs, gangs and so on. More parents were then able to push their kids to go to school and get an education.

Of course, the situation is still pretty bad in Brazilian slums (favelas), but it's estimated that the demographic transition had an impact equivalent to + 0.5% in GDP growth, which is not bad at all considering that the average GDP growth (per capita) was about 3% per year at the time. And since this transition happened over 30 years, its impact on the economy is equal to around 15% of growth in GDP (over three decades). Overall, the change in the family structure and in Brazilians' lifestyle has had a much greater impact on reducing poverty than the speed of the demographic transition itself. On the

other hand, the transition did have an influence on wages (e.g. supply of labor) and interest rates in a way that worsened poverty in Brazil (less overall income).

196. According to the passage, which of the following doesn't have an impact on the extent of poverty in Brazilian households?  
 1. number of kids at home 2. size of the workforce  
 3. parents 4. nature of job
197. What has helped Brazil in reducing its poverty?  
 1. education of kids 2. demographic transition  
 3. Brazilians Lifestyle 4. initiation of peaceful activities
198. According to the passage, Brazilian children born in poorer families were not involved in which kind of activity so often?  
 1. bullying 2. street violence  
 3. gangs 4. drugs
199. What has impacted on reducing poverty in Brazil than the speed of the demographic transition itself?  
 1. Brazilians lifestyle 2. change in family structure  
 3. awareness among citizens 4. both Brazilians lifestyle and change in family structure
200. What does the term 'favelas' used in the passage refers to?  
 1. street kids 2. slums in Brazil  
 3. interest rates prevailing in Brazil 4. labour supply

### Answer Key

1.	(2)	2.	(3)	3.	(1)	4.	(1)	5.	(1)	6.	(3)	7.	(4)	8.	(4)	9.	(1)	10.	(3)
11.	(1)	12.	(3)	13.	(3)	14.	(1)	15.	(3)	16.	(3)	17.	(2)	18.	(1)	19.	(1)	20.	(1)
21.	(4)	22.	(4)	23.	(4)	24.	(3)	25.	(3)	26.	(2)	27.	(2)	28.	(2)	29.	(4)	30.	(4)
31.	(4)	32.	(3)	33.	(3)	34.	(1)	35.	(4)	36.	(1)	37.	(3)	38.	(1)	39.	(1)	40.	(2)
41.	(3)	42.	(4)	43.	(4)	44.	(3)	45.	(3)	46.	(2)	47.	(4)	48.	(1)	49.	(3)	50.	(2)
51.	(2)	52.	(2)	53.	(1)	54.	(4)	55.	(3)	56.	(2)	57.	(1)	58.	(1)	59.	(2)	60.	(4)
61.	(2)	62.	(2)	63.	(3)	64.	(4)	65.	(1)	66.	(2)	67.	(1)	68.	(3)	69.	(2)	70.	(2)
71.	(3)	72.	(3)	73.	(2)	74.	(1)	75.	(2)	76.	(3)	77.	(3)	78.	(3)	79.	(4)	80.	(1)
81.	(3)	82.	(1)	83.	(2)	84.	(1)	85.	(3)	86.	(1)	87.	(1)	88.	(4)	89.	(1)	90.	(1)
91.	(1)	92.	(1)	93.	(2)	94.	(1)	95.	(4)	96.	(2)	97.	(3)	98.	(1)	99.	(2)	100.	(1)
101.	(4)	102.	(1)	103.	(4)	104.	(1)	105.	(4)	106.	(1)	107.	(3)	108.	(2)	109.	(4)	110.	(3)
111.	(2)	112.	(3)	113.	(2)	114.	(3)	115.	(2)	116.	(4)	117.	(2)	118.	(3)	119.	(4)	120.	(4)
121.	(4)	122.	(3)	123.	(1)	124.	(4)	125.	(2)	126.	(2)	127.	(4)	128.	(2)	129.	(1)	130.	(1)
131.	(1)	132.	(3)	133.	(1)	134.	(2)	135.	(2)	136.	(2)	137.	(3)	138.	(1)	139.	(4)	140.	(1)
141.	(3)	142.	(3)	143.	(4)	144.	(3)	145.	(4)	146.	(3)	147.	(2)	148.	(1)	149.	(4)	150.	(2)
151.	(2)	152.	(1)	153.	(1)	154.	(1)	155.	(2)	156.	(3)	157.	(4)	158.	(3)	159.	(1)	160.	(1)
161.	(1)	162.	(3)	163.	(1)	164.	(4)	165.	(2)	166.	(1)	167.	(2)	168.	(2)	169.	(1)	170.	(3)
171.	(2)	172.	(3)	173.	(2)	174.	(2)	175.	(4)	176.	(3)	177.	(4)	178.	(1)	179.	(2)	180.	(3)
181.	(2)	182.	(4)	183.	(3)	184.	(3)	185.	(1)	186.	(3)	187.	(2)	188.	(2)	189.	(1)	190.	(2)
191.	(2)	192.	(1)	193.	(1)	194.	(3)	195.	(2)	196.	(4)	197.	(2)	198.	(1)	199.	(4)	200.	(2)

### Answers with Explanations

1. **Option (2) is correct.**  
 Bhangra is the folk dance of Punjab and Garba is the folk dance of the Gujarat.  
 Hence, Garba is the correct answer.
2. **Option (3) is correct.**  
 The synonym of Weak is Feeble; similarly, the synonym of Large is Colossal.  
 Hence, Colossal is the correct answer.
3. **Option (1) is correct.**

The pattern is:

I	N	Q	V
+1	+2	+3	+4
J	P	T	Z

Similarly,

H	N	S	G
+1	+2	+3	+4
I	P	V	K

Hence, IPVK is the correct answer.

**4. Option (1) is correct.**

The pattern is:

G	H	I	J
+1	+2	+1	+2
H	J	J	L

Similarly,

N	O	P	Q
+1	+2	+1	+2
O	Q	Q	S

Hence, OQQS is the correct answer.

**5. Option (1) is correct.**

The pattern is 1<sup>st</sup> number<sup>3</sup> = 2<sup>nd</sup> number.

$$6^3 = 616$$

$$\text{Similarly, } 5^3 = 125$$

Hence, 125 is the correct answer.

**6. Option (3) is correct.**

The pattern is 1<sup>st</sup> number<sup>2</sup> = 2<sup>nd</sup> Number.

$$107^2 = 11449$$

$$\text{Similarly, } 106^2 = 11236$$

Hence, 11236 is the correct answer.

**7. Option (4) is correct.**

Walls, Doors and Floor is the interior while foundation is the base of any construction.

Hence, Foundation is the correct answer.

**8. Option (4) is correct.**

We know that Clouds is the source of rain, Pain is the result of injury and Boiling causes evaporation, Freezing is not related to Cold.

Hence, Freezing: Cold is the correct answer.

**9. Option (1) is correct.**

The pattern is:

$$D + U = 4 + 21 = 25$$

$$K + P = 11 + 16 = 27$$

$$J + Q = 10 + 17 = 27$$

$$G + T = 7 + 20 = 27$$

Hence, DU is the correct answer.

**10. Option (3) is correct.**

The pattern is

$$I + 4 = M$$

$$D + 4 = H$$

$$M + 6 = S$$

$$U + 4 = Y$$

Hence, MS is the correct answer.

**11. Option (1) is correct.**

$$121 = 11^2, 196 = 14^2$$

$$\text{So, } 11^2 - 14^2 = 121 - 196 \quad (11 + 14 = 25)$$

$$441 = 21^2, 484 = 22^2$$

$$\text{So, } 21^2 - 22^2 = 441 - 484 \quad (21 + 22 = 43)$$

$$25 = 5^2, 36 = 6^2$$

$$\text{So, } 5^2 - 6^2 = 25 - 36 \quad (5 + 6 = 11)$$

$$169 = 13^2, 196 = 14^2$$

$$\text{So, } 13^2 - 14^2 = 169 - 196 \quad (13 + 14 = 27)$$

Since, option (1) follows different pattern from all the other options,

Hence, 121 - 196 is the correct answer.

**12. Option (3) is correct.**

Except 49 - 96, all other are the reverse numbers.

Hence, 49 - 96 is the correct answer.

**13. Option (3) is correct.**

We know all words are having the 1<sup>st</sup> letter the same, so now we will check the 2<sup>nd</sup> letter which are r, l, r, i. From these letters, i comes before l and r so the 5<sup>th</sup> word Picture will be the 1<sup>st</sup> word. Now, we know l comes after i and

before r so 2<sup>nd</sup> word will be the 2<sup>nd</sup> word itself so from this, option 1 and 2 get eliminated. Now, the 3<sup>rd</sup> letter r is the same in 3 words so we will now check the 4<sup>th</sup> letter of those words which are having r as the 3<sup>rd</sup> word. which are a, e, e. We also know a comes before e so the 1<sup>st</sup> word will be the 3<sup>rd</sup> word. Now, e, e is the same in two words so we will check for other letters which are d, y so d comes before y; hence, 4<sup>th</sup> word will be 4<sup>th</sup> word itself and 3<sup>rd</sup> will become the 5<sup>th</sup> word.

Hence, 52143 is the correct answer.

**14. Option (1) is correct.**

We know all words are having the same 1<sup>st</sup> letter so now we will check the 2<sup>nd</sup> letters which are e, r, r, r, e. From these letters, e comes before r but e is the same in two words; now, we will check the 3<sup>rd</sup> letter of those words which are having e the same letter which are m, n. Now, we know m comes before n so the 1<sup>st</sup> word will be the 1<sup>st</sup> word itself and the 5<sup>th</sup> word will be the 2<sup>nd</sup> word. Now, we will check the 4<sup>th</sup> letter which is having r as 2<sup>nd</sup> letter, viz, a, a, o. We know a comes before o but a appears in two words. Now check the next letters which are i, j again the same. Now check the next letter which is n, n again as it is same. Now the next letters are e, i. We know e comes before i and 2<sup>nd</sup> word will be the 4<sup>th</sup> word. The 4<sup>th</sup> word will be the 5<sup>th</sup> word of the arrangement.

Hence, 15234 is the correct answer.

**15. Option (3) is correct.**

The pattern is:

$$B + 1 C \quad + 1 D \quad + 1 E \quad + 1 F \quad (\text{1<sup>st</sup> letter of series})$$

$$D + 1 E \quad + 1 F \quad + 1 G \quad + 1 H \quad (\text{2<sup>nd</sup> Letter of series})$$

Hence, FH is the correct answer.

**16. Option (3) is correct.**

The pattern is 1<sup>st</sup> letter + 1 = 2<sup>nd</sup> letter of another set of letters and 2<sup>nd</sup> letter - 1 = 2<sup>nd</sup> letter of another set of letters and 3<sup>rd</sup> letter + 2 = 3<sup>rd</sup> letter of another set of numbers.

$$A \quad + 1 \quad B \quad + 1 \quad C \quad + 1 \quad D$$

$$V \quad - 1 \quad U \quad - 1 \quad T \quad - 1 \quad S$$

$$A \quad + 2 \quad C \quad + 2 \quad E \quad + 2 \quad G$$

Hence, DSG is the correct answer.

**17. Option (2) is correct.**

$$7 \times 12 \quad \underline{\quad} \quad (12 \times 1) = 84$$

$$7 \times 6 \left( 12 \times \frac{1}{2} \right) = 42$$

$$7 \times 4 \quad \text{-----} \quad \left( 12 \times \frac{1}{3} \right) = 28$$

$$7 \times 3 \left( 12 \times \frac{1}{4} \right) = 21$$

$$7 \times 2.4 \left( 12 \times \frac{1}{5} \right) = 16.8$$

Hence, 16.8 is the correct answer.

**18. Option (1) is correct.**

The pattern is:

$$14.8 - 2.2 = 12.6$$

$$2.2 + 12.6 = 14.8$$

$$12.6 \times 2 = 25.2 \quad (14.8 + 25.2 = 40)$$

$$25.2 \times 2 = 50.4 \quad (50.4 + 40 = 90.4)$$

$$50.4 \times 2 = 100.8 \quad (90.4 + 100.8 = 191.2)$$

Hence, 191.2 is the correct answer.

**19. Option (1) is correct.**

Raman remembers after 15<sup>th</sup> May but before 18<sup>th</sup> May; it means it must be on either 16<sup>th</sup> May or on 17<sup>th</sup> May.

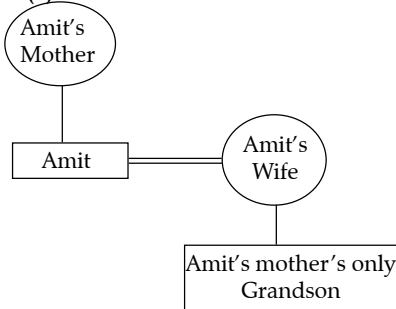
Now, Deep remembers before 21<sup>st</sup> May but after 16<sup>th</sup> May; it means the examination must on 17<sup>th</sup>, 18<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup>.

If we find the common date between these two, then only 17<sup>th</sup> May is common between both of them.  
Hence, 17<sup>th</sup> May is the correct answer.

20. **Option (1) is correct.**

Total students = 42  
Swati's rank from the bottom = 19<sup>th</sup>.  
Now, Purshottam's rank from bottom = 19<sup>th</sup> - 6<sup>th</sup> = 13<sup>th</sup> from the bottom end.  
Now, Purshottam's rank from the top = 43 - 13 = 30.  
Hence, 30<sup>th</sup> is the correct answer.

21. **Option (4) is correct.**



From the above blood relation tree diagram, the lady is Amit's wife.

Hence, wife is the correct answer.

22. **Option (4) is correct.**

To make the word PAYABLE, we need all the letters in it; in the word CAPABILITIES, we don't have the letter Y so we cannot make the word PAYABLE.

Hence, PAYABLE is the correct answer.

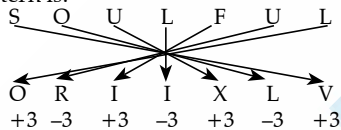
23. **Option (4) is correct.**

To make the word BOSE, we need all the letters. Now in the word CARBONATE, we don't have the letter S so BOSE cannot be formed out of the word CARBONATE.

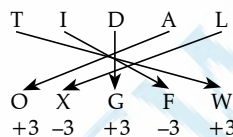
Hence, BOSE is the correct answer.

24. **Option (3) is correct.**

The pattern is:



Similarly,



Hence, OXGFW is the correct answer.

25. **Option (3) is correct.**

The pattern is that a number is directly assigned to the letter.

P	L	A	T	E
3	2	8	7	6
B	L	E	N	D
5	2	6	9	4

Similarly, the code for DENTED will be

D	E	N	T	E	D
4	6	9	7	6	4

Hence, 469764 is the correct answer.

26. **Option (2) is correct.**

Using option 2, we get  $69 \div 3 + 2 < 9 \times 3$   
 $\Rightarrow 23 + 2 < 27$   
 $\Rightarrow 25 < 27$

27. **Option (2) is correct.**

Using option 3, we get  $9 + 3 \times 6 < 8 \times 4$   
 $9 + 18 < 32$   
 $27 < 32$

28. **Option (2) is correct.**

The pattern is  $19 - 5 = 14$   
 $2 - 43 = -41$   
Similarly,  $79 - 9 = 70$

Hence, 70 is the correct answer.

29. **Option (4) is correct.**

The pattern is  $(8 + 9) \times 3 = 51$  and  $(12 + 6) \times 4 = 72$   
Similarly,  $(13 + 11) \times 6 = 144$   
Hence, 144 is the correct answer.

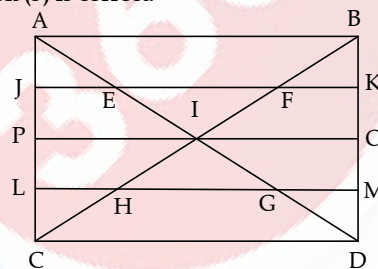
30. **Option (4) is correct.**

The pattern is on taking column wise we get,  
2<sup>nd</sup> column:  $(4 + 5) \times 6 = 54$   
3<sup>rd</sup> column:  $(2 + 1) \times 3 = 9$   
1<sup>st</sup> column:  $(3 + 7) \times 8 = 80$   
Hence, 80 is the correct answer.

31. **Option (4) is correct.**

The pattern is:  
Row 1:  $5 + 1 + 3 + 7 = 16$   
Row 2:  $6 + 2 + 4 + 4 = 16$   
Row 3:  $1 + ? + 2 + 7 = 16$   
 $\Rightarrow x = 16 - 10 \Rightarrow x = 6$   
Hence, the value of ? is 6.

32. **Option (3) is correct.**



We know that if a rectangle has two diagonals, then  $2 \times 4 = 8$  triangles.

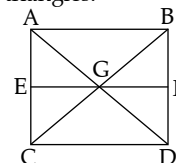
Then, counting random triangles which are below:

AJE, BKF, LHC, GDM, IHG, IEF, EKD, JFC, HBM, AGL, OID, PIC, API, BOI.

Hence, there are total 22 triangles.

33. **Option (3) is correct.**

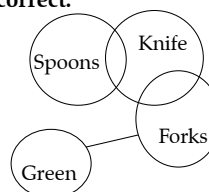
We know that when we have two diagonals in a rectangle, then we have  $2 \times 4 = 8$  triangles. We also know that when we have a perpendicular in a triangle, then we have 3 triangles.



$8 + 6 - 2 = 12$ .

Hence, we have total 12 triangles.

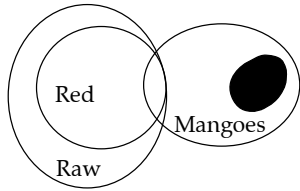
34. **Option (1) is correct.**



From the above Venn diagram only, conclusion IV follows.



35. Option (4) is correct.



From the above Venn diagram, no conclusion follows.

36. Option (1) is correct.

We search the number which is common in both dices which is 9 and then start writing from that number in clockwise direction.

9 5 4  
9 6 3

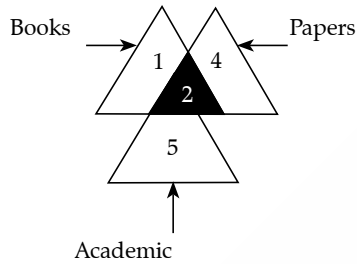
Hence, the opposite of 5 is 6.

37. Option (3) is correct.

From dice position 1 and 3, opposite pairs could be 1-4, 2-5, 6-3. And 4 will not be adjacent to 1.

Hence, 2 and 5 is the correct answer.

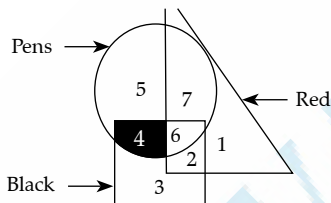
38. Option (1) is correct.



Hence, 2 and 3 represent both books and papers.

39. Option (1) is correct.

The number 4 represents those pens which are black but not red.



Hence, 4 is the correct answer.

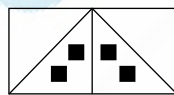
40. Option (2) is correct.

The total number of pages which are either new or white but not both is  $57 + 43 = 100$ .

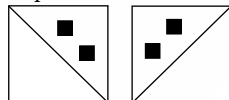
Hence, 100 is correct answer.

41. Option (3) is correct.

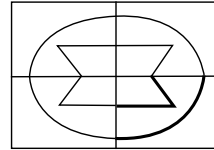
Based on the observations made from the image, we can say that the 1st portion is the mirror image of the 2nd portion as shown in the figure below-



Similarly, the 3rd portion should also be the exact mirror image of the 4th portion as shown in the figure below-

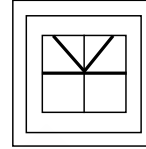


42. Option (4) is correct.



The figure shows how it is embedded.

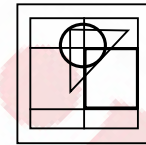
43. Option (4) is correct.



The figure shows how it is embedded.

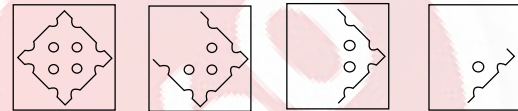
44. Option (3) is correct.

In the given figure, the figure shows how it is embedded.



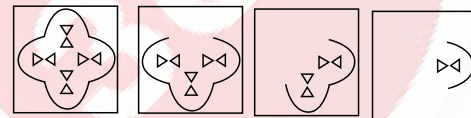
45. Option (3) is correct.

The process of unfolding is shown below.



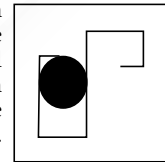
46. Option (2) is correct.

The process of unfolding is shown below:



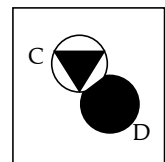
47. Option (4) is correct.

When we place a mirror on the bottom of the line, then things which are at the bottom will be shifted to the top and the things which are at the top position will appear at the bottom. (Note: The position of objects itself will also change).



48. Option (1) is correct.

When we place a mirror on the bottom of the line, then things which are at the bottom will be shifted to the top and the things which are at the top position will appear at the bottom. (Note: The position of objects itself will also change).



49. Option (3) is correct.

The address for HALT is shown below.

Matrix-I					Matrix-II						
	0	1	2	3	4		5	6	7	8	9
0	H	G	T	I	N	5	E	L	X	B	A
1	I	N	H	G	T	6	a	E	L	X	B
2	G	T	I	N	H	7	L	B	E	A	X
3	N	H	G	T	I	8	X	A	B	E	L
4	T	I	N	H	G	9	B	X	A	L	E

02 T 24 H

56 L 78 A

**50. Option (2) is correct.**

The address is shown below.

Matrix-I					Matrix-II						
	0	1	2	3	4		5	6	7	8	9
0	A	R	T	E	K	5	S	N	D	L	I
1	K	A	E	R	T	6	N	L	S	I	D
2	R	T	A	K	E	7	D	I	L	N	S
3	T	E	K	A	R	8	L	S	I	D	N
4	E	K	R	T	A	9	I	D	N	S	

40 (E)
42 (R)
43 (T)

88 (D)
78 (N)

**51. Option (2) is correct.**

Disinvestment is defined as an organization's (or the government's) decision to sell or liquidate an asset or share. A company or government organization usually sells an asset as a strategic move for the company or to raise funds to meet general/specific needs. The concentration of management and decision-making power at the top of an organization's hierarchy is referred to as centralization. Decentralization is a type of economic planning in which decision-making is distributed among various economic agents or localized within manufacturing units.

**52. Option (2) is correct.**

Economic activities in India are broadly classified into primary, secondary, and tertiary sectors. Agriculture, dairy products, mining, fisheries, forestry, and other human activities that convert natural resources into basic products are included in the primary sector. The secondary sector covers all those activities consisting of varying degrees of processing of raw materials. The secondary sector of the economy includes industries such as manufacturing, processing, and construction. The tertiary sector of the economy is concerned with the services providers and exchange of products obtained from the secondary sector.

**53. Option (1) is correct.**

Inflation is defined as a sustained increase in the price level of goods and services in an economy over time. Reflation is a moderate level of controlled inflation in which the amount of money in circulation increases. Stagflation occurs when economic growth is stagnant but price inflation persists. Hyperinflation occurs when prices rise by more than 50% in a month with extreme rare. Disinflation is defined as a decrease in the rate of inflation.

**54. Option (4) is correct.**

Credit Analysis & Research Ltd (CARE), which began operations in 1993, has established itself as India's leading credit rating agency. The company offers a variety of credit ratings to assist corporations in raising capital for their various needs, as well as investors in making informed investment decisions based on credit risk and their risk-return expectations. Credit Analysis & Research Ltd (CARE Ratings) is a full-service rating firm that provides rating and grading services across industries. The Securities and Exchange Board of India (Sebi), the Government of India (GoI), and the Reserve Bank of India (RBI) all recognize the company.

**55. Option (3) is correct.**

Revenue expenditures include the expenses required to meet the ongoing operational costs of running a business, and thus are essentially the same as operating expenses. The debit earned during the normal course of business is referred to as a revenue receipt. Revenue receipts refer to all money earned by the company from its operations. This is a type of recurring profit

generated by repeat transactions with customers, which the company requires to survive. The difference in Revenue expenditure and Revenue receipts is called "Revenue Deficit".

**56. Option (2) is correct.**

The primary function of the state, according to Karl Marx (1818-83), is to repress the lower classes of society in the interests of the ruling class. A stateless society does not have a government and is not governed by a state. Marx believed that capitalism, with its emphasis on profit and private ownership, resulted in social inequality. As a result, his goal was to promote a system that promoted a stateless society in which everyone shared the benefits of labor and the state government controlled all property and wealth. As a result, we can conclude that the primary goal of Marxism is a stateless society.

**57. Option (1) is correct.**

The fundamental principle of political equality underpins democracy. Each adult citizen must have the right to one vote in a democracy, and each vote must have one value. Democracy is a form of government in which elected representatives from the general public form the government. Voting is the right of every adult individual to choose a representative for the government. So the public participates in state governance by voting for a representative to govern. Voting is one way for the general public to participate. The two ways a person can get involved in politics are to vote or to run for office as a representative in elections.

**58. Option (1) is correct.**

In Book V of his "Nicomachean Ethics," Aristotle introduced the concept of distributive justice. His distributive justice entailed the distribution of honors, property, or anything else distributed among community members. His distributive justice concept governed the proportional distribution of common goods.

**59. Option (2) is correct.**

The Vice President of India (currently, Jagdeep Dhankar) serves as the Rajya Sabha's ex-officio Chairman and presides over its sessions. Harivansh Narayan Singh is the Rajya Sabha's Deputy Chairman. In the absence of the Chairman, the Deputy Chairman oversees the day-to-day operations of the House.

**60. Option (4) is correct.**

The upper house of the Indian parliament is known as the Rajya Sabha or the council of the states. Article 80 of the Constitution specifies the maximum number of Rajya Sabha members as 250, with 12 members nominated by the President and 238 representing the states and two union territories. The population of each state is used to determine seat allocation.

**61. Option (2) is correct.**

The state government is led by the Chief Minister. While the governor is the nominal executive of the state government, the chief minister is the actual executive of the government. The true executive is referred to as a "de facto" executive, which means "in fact, whether by right or not." The Chief Minister's appointment details are not mentioned in the Indian Constitution, just as the Prime Minister's are not mentioned in the Constitution. The Governor appoints the Chief Minister, according to Article 164 of the Indian Constitution. However, the Governor cannot appoint anyone at random as Chief Minister; instead, he must follow a provision. The Chief Minister of the state is appointed by the leader of the party that received the most votes in the assembly elections. As a result, we can conclude that the Chief Minister is appointed by the Governor.

- 62. Option (2) is correct.**  
Calcutta High Court has jurisdiction over the Union Territory of Andaman and Nicobar Islands. The Calcutta High Court was India's first high court, and it was established in 1862. It has jurisdiction over West Bengal as well as the Andaman and Nicobar Islands.
- 63. Option (3) is correct.**  
There are five ways to obtain Indian citizenship: Citizenship through Registration Naturalization leads to citizenship. Citizenship through territorial incorporation. Part II of the Indian Constitution (Articles 5–11) deals with Indian citizenship. Article 5: Citizenship at the start of the Constitution; Article 6: Citizenship rights of certain persons who migrated to India from Pakistan. Article 7: Citizenship rights of certain migrants to Pakistan. Article 8: Citizenship rights of persons of Indian origin residing outside India Persons voluntarily acquiring citizenship of a foreign State are not citizens, according to Article 9. Article 10: Survival of citizenship rights Article 11: The right to citizenship shall be regulated by law by the Parliament.
- 64. Option (4) is correct.**  
There are four Vedas in total: the Rig Veda, the Sama Veda, the Yajur Veda, and the Atharva Veda. The youngest of the four Vedas, Atharva Veda, was not present when Vedatrayi was introduced. As a result, Atharva Veda is not included in Vedatrayi. It is also known as 'The Book of Magic and Charms'. It dates from 1000 to 600 BCE. There are 730 hymns, 6000 mantras, and 20 books in it. Atharveda is distinct in that its hymns are not derived from the Rig Veda. This Veda contains hymns that were charms and magic spells meant to be pronounced by the person seeking benefits.
- 65. Option (1) is correct.**  
Sardar Vallabh Bhai Patel is known as the "Bismarck of India" for his efforts in uniting the fragmented parts of a divided India, namely Princely states and British India, into a nation and preventing India from becoming a Balkanized state. Sardar was also known as India's Iron Man. In the state of Gujarat, a 182-meter-high statue was recently erected as his memorial. Sardar Vallabh Bhai Patel ji is the Indian Bismarck. Bismarck used techniques such as persuasion, diplomacy, and so on to unite Germany. Sardar Vallabh Bhai Patel ji used the same techniques to unite 545 princely states in the Indian Union.
- 66. Option (2) is correct.**  
Lothal was famous for its dockyard during the Indus Valley civilization. According to the ASI, it had the world's oldest known dock, which connected the city to an ancient Sabarmati river course on the trade route between Harappan cities in Sindh and the Saurashtra peninsula.
- 67. Option (1) is correct.**  
Ashoka constructed the Sanchi Stupa, a Buddhist complex. It is located in Madhya Pradesh's Raisen District. It is thought to be India's oldest stone structure. It was designed by the Mauryan emperor Ashoka in the 3rd century BCE. It is also designated as a UNESCO World Heritage Site. The Sanchi Stupa motif can be found on the new ₹ 200 note.
- 68. Option (3) is correct.**  
The passage of the Charter Act of 1833 was aided by Lord Macaulay's appointment as India's first law member of the Governor General in Council. From 1834 to 1838, Lord Macaulay was in charge of English education in India.
- 69. Option (2) is correct.**  
The prime meridian is the 0° longitude line that serves as the starting point for measuring distances east and west around Earth. The prime meridian is arbitrary, which means it could be anywhere. The 0° longitude line can be any line of longitude (a meridian). Prime Meridian is located at 0° longitude. The Equator is located at 0° latitude. The Tropic of Cancer is at 23.5° north, and the Tropic of Capricorn is at 23.5° south.
- 70. Option (2) is correct.**  
A narrow strip of land that connects two larger land masses and separates two bodies of water is known as an isthmus. For centuries, isthmuses have served as strategic locations. They are natural sites for ports and canals linking terrestrial and aquatic trade routes. Isthmuses serve as important communication and cultural exchange points, as well as military outposts. The Isthmus of Panama, for example, connects North and South America and separates the Pacific and Atlantic Oceans.
- 71. Option (3) is correct.**  
Native Americans who lived in North America when Europeans arrived were known as Red Indians. Christopher Columbus coined the term "Indian" to refer to the natives of the Americas after mistakenly believing that the Antilles were the islands of the Indian Ocean, known to Europeans as the Indies. Though Columbus' error was quickly recognized, the name stuck, and the native peoples of the Americas were referred to as Indians for centuries.
- 72. Option (3) is correct.**  
Greenwich Mean Time (GMT) is the mean solar time measured at the Royal Observatory in Greenwich, London, at midnight.  
The time zone observed throughout India is known as Indian Standard Time (IST). It does not account for daylight saving time or other seasonal factors. IST is ahead of GMT by 5:30 Hours.
- 73. Option (2) is correct.**  
Harmattan is called doctor wind. Because of its invigorating dryness compared with humid tropical air. Harmattan wind (the doctor) is a dusty, dry wind. The north-easterly or easterly wind blows north of the equator in West Africa. Its influence stretches from just north of the equator in January to nearly the northern tropics in July.
- 74. Option (1) is correct.**  
Analgesics are used to relieve muscle pain. Antibiotics are used to treat bacterial diseases. Externally applied antiseptics kill microbes before they enter the body. Antidotes are used to treat various types of poisoning.
- 75. Option (2) is correct.**  
Hair is a filamentous biomaterial composed primarily of proteins, specifically keratin. The medulla is a loosely packed, disordered region near the center of the hair surrounded by the cortex, which contains the majority of the fiber mass, primarily consisting of keratin proteins and structural lipids. The cuticle, a layer of dead, overlapping cells that form a protective layer around the hair, surrounds the cortex.
- 76. Option (3) is correct.**  
Pulses are dicots because they have two cotyledons (dicot is short for "dicotyledon," and "di" means "two"). Inside the seed coat, there are two seeds. Dicot seeds include legumes (a plant family that includes pulses, beans, peas, and lentils).
- 77. Option (3) is correct.**  
The nucleoplasm is a type of protoplasm composed of thick fluid. It has chromatin fibers made of DNA. It can only be found in the nucleus of eukaryotic cells. Water, dissolved ions, and molecules are found in the nucleoplasm. The nucleoplasm is a highly viscous



liquid that surrounds the chromosomes and other sub-nuclear organelles within the nucleus. The nucleoplasm also contains a network of fibers known as the nuclear matrix.

**78. Option (3) is correct.**

Communicable diseases pass from person to person. A communicable disease is also referred to as infectious and contagious. Malaria is a life-threatening mosquito-borne blood disease caused by a Plasmodium parasite. It is spread to humans via the bite of the Anopheles mosquito. Tuberculosis (TB) is a bacterial infection caused by the bacterium Mycobacterium tuberculosis. The measles virus causes a highly contagious infection known as measles.

**79. Option (4) is correct.**

Chicory powder is made from the root of the Dithorium intybus plant. The root is dried, roasted, and ground into a dark brown powder that is naturally decaffeinated. Chicory's flavor is similar to that of coffee, although it tastes a bit more roasted and has a sweeter aroma.

**80. Option (1) is correct.**

Frequency is defined as the number of occurrences of a repeating event per unit of time in Hertz. Force is defined as any interaction that, when unopposed, changes the motion of an object, and its SI unit is Newton. The resistance of a conductor is a measure of how difficult it is to pass an electric current through it, and its SI unit is Ohm.

**81. Option (3) is correct.**

Calories, kilocalories (kcal), and kilojoules are the units of energy (kJ). A calorie is a unit that is used to measure energy. One calorie (1 kcal) equals 4.18 kilojoules (4.18 kJ). Energy is the ability to perform work.

**82. Option (1) is correct.**

The ability of an optical instrument or type of film to separate or distinguish small or closely adjacent images is referred to as resolving power. A human eye with 20/20 vision is typically considered to have "one arc minute" or "60 arc seconds" of vision. As previously stated, resolving power is the ability of an optical instrument to distinguish two objects that are very close together.

**83. Option (2) is correct.**

An artificial satellite is a man-made object that is launched into space using rockets. It is used in modern communication methods to transfer signals more quickly and easily. Radio waves are used in artificial satellites to communicate. A transmitter generates a radio wave, which is then detected by a receiver. An antenna allows a radio transmitter to send energy into space and a receiver to pick up energy from space. Transmitters and receivers are typically designed to operate over a narrow frequency range.

**84. Option (1) is correct.**

When a receiver broadcasts a signal for acceptance, a single source sends it to multiple recipients on a network. The Internet Assigned Numbers Authority controls and assigns Class D IP addresses to multicasting (IANA). Multicast is a type of communication in which multicast traffic is addressed to a group of network devices. IPv6 multicast traffic is sent to a group, and only members of that group receive it. A video conference is the best example of multicast communication. In a video conference, a user in the group initiates the call, and anyone in that group can participate in the conference.

**85. Option (3) is correct.**

A touchpad is a device that allows you to point (control input positioning) on a computer display screen. It's an alternative to using a mouse. Monitors, also known as Visual Display Units (VDU), are a computer's primary

output device. A microphone is an input device that captures sound and stores it digitally.

**86. Option (1) is correct.**

Because carbon dioxide is heavier than oxygen, it reduces oxygen's contact with the surface and can thus be used as a fire extinguisher. Oxygen It cannot be used as a fire extinguisher because it aids in the burning process. Sulfur dioxide (SO<sub>2</sub>) cannot be used because when burned, it emits toxic sulfur dioxide gas.

**87. Option (1) is correct.**

In a nuclear reactor, coolant is used to remove heat generated by the reactor. It removes heat from electrical generators and the environment. Heavy water, light water, and sodium metal liquid are used as coolants in nuclear reactors. Deuterium oxide D<sub>2</sub>O (heavy water)

**88. Option (4) is correct.**

Osmium is the densest metal found naturally on the planet. Osmium has an atomic number of 76 and is part of group 8 and period 6. It is classified as a transition metal. Osmium is mainly used in manufacturing alloys with Platinum Iridium and other Platinum group elements. In the chemical industry, osmium is used as a catalyst.

**89. Option (1) is correct.**

Sublimation is the process by which a solid changes directly to a gas without first becoming a liquid. Sublimate substances include ammonium chloride, camphor, iodine, naphthalene, and dry ice. Ammonium chloride is converted into ammonia and hydrochloric acid when heated. Sublimation does not occur with common salt (also known as sodium chloride).

**90. Option (1) is correct.**

An artificial ecosystem is one created by humans in which both living and non-living components interact with one another. As an example, consider an aquarium. The aquarium is primarily used as a decorative piece in which the fish, plants, and water interact with one another. An artificial ecosystem fulfills all of the requirements of a natural ecosystem, but it is created and managed by humans. It is designed to resemble a natural ecosystem, but it is frequently less complex and has very low genetic diversity. Some examples of artificial ecosystems include orchards, farmlands, gardens, and man-made reservoirs. To make the artificial ecosystem a sustainable environment, humans must slouch each factor.

**91. Option (1) is correct.**

Mercury is a toxic heavy metal that circulates in various forms through the atmosphere, water, and soil in various parts of the world. It is an essential component of CFLs, allowing a bulb to be an efficient light source. When CFLs break or are improperly disposed of at the end of their useful lives, small amounts of mercury are released into the environment, making CFL lamps one of the sources of mercury pollution.

**92. Option (1) is correct.**

Dodo is a flightless bird that was endemic to the island of Mauritius, east of Madagascar in the Indian Ocean comes under the category of "extinct species", species comes under this category when there are no more individuals of that species alive anywhere in the world.

**93. Option (2) is correct.**

In 2016, the Ministry of Civil Aviation launched Ude Desh Ka Aam Naagrik (UDAN) as a Regional Connectivity Scheme (RCS). The first UDAN flight under the 'Regional Connectivity Scheme' between Shimla and Hyderabad took off. The Ministry of Civil Aviation flagged off six routes, expanding aerial connectivity in North-East India, ahead of UDAN Day (October 21<sup>st</sup>).

**94. Option (1) is correct.**

A motor is a device that converts electrical energy into mechanical energy. Michael Faraday invented it in 1821. The electric generator was invented by Michael Faraday. He also invented the first electric motor. He invented the generator by discovering the principle of electromagnetic induction, which states that when a metal conductor is moved through a magnetic field, electricity is produced.

**95. Option (4) is correct.**

Pyeongchang, South Korea, hosted the Olympic Winter Games 2018. Its mascot was Soohorang (white tiger). Norway won the most medals, with 14 gold, 14 silver, and 11 bronze. Shiva Keshavan is India's first flag bearer (Luge). India had no medals in these Olympics.

**96. Option (2) is correct.**

The Great Pyramid of Giza is the oldest and largest of the Giza pyramid complex's three pyramids. It is found in Egypt. The Great Wall of China was constructed to protect Chinese states and empires from raids and invasions by various nomadic groups of the Eurasian Steppe, and it is located in China. The Colosseum is an oval amphitheater in the center of the city of Rome, Italy. Chichen Itza is a large pre-Columbian city in Mexico built by the Maya people during the Terminal Classic period.

**97. Option (3) is correct.**

Yoshinori Ohsumi was awarded the Nobel Prize in Physiology or Medicine in 2016. Yoshinori Ohsumi is a Japanese cell biologist who specializes in autophagy, the process by which cells degrade and recycle their components. Ohsumi is a professor at the Institute of Creative Science at the Tokyo Academy of Technology. He was awarded the Kyoto Prize for Fundamental Sciences in 2012, the Nobel Prize in Physiology or Medicine in 2016, and the Breakthrough Prize in Life Sciences in 2017 for his discovery of autophagy pathways. In 2016, he was awarded the Nobel Prize in Physiology or Medicine "for his discovery of pathways for autophagy."

**98. Option (1) is correct.**

On April 11, 2017, Prime Minister Narendra Modi released the book 'Matoshree,' written by Lok Sabha Speaker Sumitra Mahajan, in New Delhi. The book 'Matoshree' is about the legendary Devi Ahilyabai Holker, who ruled the Holkar Empire in the Malwa region from 1767 to 1795. Ahilyabai Holkar was a capable ruler and organizer who was revered during her lifetime and revered after her death. She is remembered and worshipped by people for her exemplary governance, sense of justice and fairness.

**99. Option (2) is correct.**

On April 28, 2017, India and Cyprus signed four agreements: The first agreement is a cultural, educational, and scientific cooperation executive program for the years 2017 to 2020. The second agreement is a work plan for the 2017-2018 agricultural cooperation program. The third agreement is related to merchant shipping cooperation, and the fourth agreement is related to increasing air services between the two countries.

**100. Option (1) is correct.**

India built the Farraka barrage in 1975 to divert water from the Ganges River system, which has been a source of contention between India and Bangladesh. Bangladesh is heavily reliant on the flow of the Ganges, so the construction of this barrage had a significant impact on them. Although the Ganges Water Treaty has limited capacity to meet both India's and Bangladesh's current needs.

**101. Option (4) is correct.**

$$\begin{aligned} \therefore P &= \frac{\sqrt{7} - \sqrt{6}}{\sqrt{7} + \sqrt{6}} \\ P + \frac{1}{P} &= \frac{\sqrt{7} - \sqrt{6}}{\sqrt{7} + \sqrt{6}} + \frac{\sqrt{7} + \sqrt{6}}{\sqrt{7} - \sqrt{6}} \\ &= \frac{(\sqrt{7} - \sqrt{6})^2 + (\sqrt{7} + \sqrt{6})^2}{(\sqrt{7} + \sqrt{6})(\sqrt{7} - \sqrt{6})} \\ &\quad \left[ \begin{array}{l} \text{using : } (a - b)(a + b) = a^2 - b^2 \\ (a + b)^2 = a^2 + b^2 + 2ab \\ (a - b)^2 = a^2 + b^2 - 2ab \end{array} \right] \\ &= \frac{7 + 6 - 2\sqrt{7}\sqrt{6} + 7 + 6 + 2\sqrt{7}\sqrt{6}}{7 - 6} = 26 \end{aligned}$$

**102. Option (1) is correct.**

$$\begin{aligned} 3^{200} &= (3^2)^{100} = 9^{100} \\ 2^{300} &= (2^3)^{100} = 8^{100} \\ 7^{100} & \end{aligned}$$

Clearly  $9^{100}$  i.e.  $3^{200}$  is largest among them.

**103. Option (4) is correct.**

$$\begin{aligned} 3^2 + 7^2 + 11^2 + 13^2 + 17^2 - 1^2 - 5^2 - 9^2 - 11^2 - 15^2 \\ = 3^2 - 1^2 + 7^2 - 5^2 + 11^2 - 9^2 + 13^2 + 11^2 + 17^2 - 15^2 \\ [\text{Use: } a^2 - b^2 = (a - b)(a + b)] \\ = (3 - 1)(3 + 1) + (7 - 5)(7 + 5) + (11 - 9)(11 + 9) + (13 - 11)(13 + 11) + (17 - 15)(17 + 15) \\ = 8 + 24 + 40 + 48 + 64 = 184 \end{aligned}$$

**104. Option (1) is correct.**

$$\begin{aligned} &\frac{(0.7)^3 - (0.4)^3}{(0.7)^2 + 0.7 \times 0.4 + (0.4)^2} \\ &= \frac{(0.7 - 0.4) - [(0.7)^2 + 0.7 \times 0.4 + (0.4)^2]}{(0.7)^2 + 0.7 \times 0.4 + (0.4)^2} \\ &= 0.7 - 0.4 = 0.3 \end{aligned}$$

Formula used-  $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

**105. Option (4) is correct.**

Positive factors of 40 are

1, 2, 4, 5, 8, 10, 20 and 40.

There are 8 positive factors of 40.

**106. Option (1) is correct.**

Let A takes "x" days to finish the work.

$\therefore$  A is 20% more efficient than B.

$\Rightarrow$  B takes 20% more time than A to finish the work.

$$\Rightarrow \frac{120}{100}x = 12$$

$$x = \frac{12 \times 100}{120} = 10$$

So, A takes 10 days to finish the task.

**107. Option (3) is correct.**

Let A takes "x" days to finish the task done.

$$2 \text{ days work of A and B} = \frac{2}{10} = \frac{1}{5}$$

$$\text{Remaining work to complete by B} = 1 - \frac{1}{5} = \frac{4}{5}$$

Numbers of days for B to finish the work

$$= \frac{12}{4/5} = 15$$

According to question

$$\frac{1}{x} + \frac{1}{15} = \frac{1}{10}$$

$$\Rightarrow \frac{1}{x} = \frac{1}{10} - \frac{1}{15} = \frac{3-2}{30} = \frac{1}{30}$$

$$\Rightarrow x = 30$$

So, A takes 30 days to complete the task.

108. **Option (2) is correct.**

$$\text{Net discounts} = \left( a + b - \frac{ab}{100} \right) \%$$

Where  $a$  &  $b$  are two successive discounts.

$\therefore$  Net discount for two successive discounts of 50%

$$= \left[ 50 + 50 - \frac{50 \times 50}{100} \right] \%$$

$$= [100 - 25] \% = 75 \%$$

109. **Option (4) is correct.**

Selling price of article = ₹ 5330

Discount = 18%

$$\therefore \text{Marked price} = \frac{S.P. \times 100}{(100 - \text{discount}\%)}$$

$$= \frac{5330 \times 100}{100 - 18} = \frac{5330 \times 100}{82} = ₹ 6500$$

110. **Option (3) is correct.**

Let total investment by all three = 12 units

(LCM of 3 & 4)

$$\text{Raman's investment} = \frac{1}{4} \times 12 = 3 \text{ units}$$

$$\text{Rohit's investment} = \frac{1}{3} \times 12 = 4 \text{ units}$$

Raja's investment = 12 - 3 - 4 = 5 units.

Ratio of profit distribution will be equal to ratio of their investments.

$\therefore$  Ratio of profit = 3 : 4 : 5

111. **Option (2) is correct.**

$$a - b : b - c : c - d = 1 : 2 : 3$$

$$\text{Let } a - b = k \quad \dots(i)$$

$$b - c = 2k \quad \dots(ii)$$

$$c - d = 3k \quad \dots(iii)$$

$$\Rightarrow a - b + b - c = 3k \quad \text{(Adding (i) \& (ii))}$$

$$a - c = 3k \quad \dots(iv)$$

Subtract (iii) from (iv)

$$a - c - c + d = 3k - 3k$$

$$\Rightarrow a + d - 2c = 0$$

$$\Rightarrow a + d = 2c$$

$$\Rightarrow \frac{a+d}{c} = 2 = \frac{2}{1} = 2 : 1$$

112. **Option (3) is correct.**

$\therefore$  Sum of the terms = Average  $\times$  No. of terms

$$\therefore R + P = \text{Sum of ages of Rustom \& Preetam} = 2 \times 39 = 78 \text{ yrs}$$

$$P + G = \text{Sum of ages of preetam \& Geetam} = 2 \times 28 = 56 \text{ yrs}$$

$$G + R = \text{Sum of ages of Geetam \& Rustom} = 2 \times 34 = 68 \text{ yrs}$$

On adding all three equations

$$2(R + P + G) = 78 + 56 + 68$$

$$R + P + G = 101$$

$$\text{Age of youngest} = R + P + G - (R + P)$$

$$G = 101 - 78 = 23$$

So, Geetam is youngest among them.

His age after 10 years = 23 + 10 = 33 years

113. **Option (2) is correct.**

$$\therefore \text{Average} = \frac{\text{Sum of } n \text{ observations}}{n}$$

Average age of 6 members = 25 years

Sum of ages of 6 members = 6  $\times$  25 = 150 years

Youngest member is 15 years old.

$\therefore$  Sum of ages of family 15 years ago = 150 - 6  $\times$  15 = 60 years

Also, there were 5 members in family at that time.

$$\text{So, 15 years ago average age of family} = \frac{60}{5} = 12 \text{ years.}$$

114. **Option (3) is correct.**

Let cost price of article = ₹ 100

$\therefore$  Profit on article = ₹ 230

Selling price of article = ₹ 330

Cost price is increased by 50%

$$\text{New cost price} = 100 + 100 \times \frac{50}{100} = ₹ 150$$

New profit = 330 - 150 = ₹ 180

$$\text{New profit \%} = \frac{180}{150} \times 100 = 120 \%$$

115. **Option (2) is correct.**

Total cost price = 4000 + 4000 = ₹ 8000

$$\text{Total selling price} = 1.125 \times 4000 + 0.8 \times 4000$$

$$= 4500 + 3200 = ₹ 7700$$

$$\therefore \text{Overall Loss \%} = \frac{8000 - 7700}{8000} \times 100 = 3.75 \%$$

116. **Option (4) is correct.**

Given that  $y = 300$  and  $x = 30\%$  more than  $y$

$$\therefore x = \frac{130}{100} \times 300 = 390$$

Also,  $x$  is 25% less than  $z$

$$\Rightarrow z = \frac{390 \times 100}{100 - 25} = \frac{390 \times 100}{75} = 520$$

117. **Option (2) is correct.**

$$\text{Depreciated amount} = \text{Present amount} \left[ 1 - \frac{r}{100} \right]^n$$

$r$  : rate of depreciation

$n$  : number of periods (here it is years)

According to question,

$$36450 = \text{Present value} \left[ 1 - \frac{10}{100} \right]^3$$

$$\Rightarrow \text{Present value} = \frac{36450}{(0.9)^3} = 50000$$

The present value of motor cycle = ₹ 50000

118. **Option (3) is correct.**

$$\text{Speed of first boat} = 36 \text{ km/hr} = 36 \times \frac{5}{18} \text{ m/s} = 10 \text{ m/s}$$

$$\text{Speed of second boat} = 54 \text{ km/hr} = 54 \times \frac{5}{18} = 15 \text{ m/s}$$

Relative speed of boats when they travel towards each other = 10 + 15 = 25 m/s

$$\text{Distance between them one second before they collide}$$

$$= \frac{25}{1} = 25 \text{ m}$$

119. **Option (4) is correct.**

Let the usual speed of car =  $x$  km/hr

$$\therefore \text{Time taken by car for 126 km} = \frac{126}{x}$$

If cars decreases its speed by 6 km/hr then it will take 3 min more



According to question

$$\frac{126}{x-6} - \frac{126}{x} = \frac{3}{60} \quad \left[ \because 3 \text{ min} = \frac{3}{60} \text{ hr} \right]$$

$$\Rightarrow \frac{126x - 126x + 756}{x^2 - 6x} = \frac{1}{20}$$

$$\Rightarrow x^2 - 6x - 15120 = 0$$

$$\Rightarrow x^2 - 126x + 120x - 15120 = 0$$

$$\Rightarrow (x + 120)(x - 126) = 0$$

$$\Rightarrow x = -120$$

$\therefore$  Speed cannot be negative  
 $\therefore x - 126 = 0 \Rightarrow x = 126 \text{ km/hr}$

**120. Option (4) is correct.**

Let the sum of money = ₹  $x$   
 and rate of compound interest =  $r\%$

$$\therefore A = P \left[ 1 + \frac{r}{100} \right]^n$$

$A \rightarrow$  Amount  $r \rightarrow$  rate of interest  
 $P \rightarrow$  Principal amount  $n \rightarrow$  number of years

$\therefore$  Sum becomes 3 times in 6 years

$$\Rightarrow 3x = x \left[ 1 + \frac{r}{100} \right]^6$$

$$\Rightarrow 3 = \left[ 1 + \frac{r}{100} \right]^6 \quad \dots(i)$$

Let sum becomes 81 times in  $n$  years

$$\therefore 81x = x \left[ 1 + \frac{r}{100} \right]^n$$

$$\Rightarrow 81 = \left[ 1 + \frac{r}{100} \right]^n \Rightarrow (3)^4 = \left[ 1 + \frac{r}{100} \right]^n$$

From equation (i)

$$\left\{ \left[ 1 + \frac{r}{100} \right]^6 \right\}^4 = \left( 1 + \frac{r}{100} \right)^n$$

$$\Rightarrow \left( 1 + \frac{r}{100} \right)^{24} = \left( 1 + \frac{r}{100} \right)^n \Rightarrow n = 24$$

So, sum will be 81 times in 24 years.

**Shortcut Method**

Given: Amount becomes 3 times in 6 years.  
 We know that in compound interest, amount increases like GP in constant interval. i.e.,  
 $P, 3P, 9P, 27P, 81P$  etc.  
 So, time taken to become 81 times =  $4 \times 6 = 24$  years.

**121. Option (4) is correct.**

$$\text{S.I.} = P \left[ \frac{RT}{100} \right]$$

where,  $P \rightarrow$  Principal amount

$R \rightarrow$  rate of S.I.

$T \rightarrow$  Time period

According to question,

$$\text{S.I.} = ? \quad P = 5400 \quad T = 5 \text{ years} \quad R = 12\%$$

$$\Rightarrow \text{S.I.} = \frac{5400 \times 12 \times 5}{100} = ₹ 3240$$

**122. Option (3) is correct.**

Total number of boys using three apps in month of March =  $680 + 470 + 300 = 1450$

**123. Option (1) is correct.**

Number of boys using whatsapp in February = 750

Number of boys using Facebook in February = 500

$$\Rightarrow \text{Required \%} = \frac{750 - 500}{500} \times 100 = \frac{250}{5} = 50\%$$

**124. Option (4) is correct.**

Number of boys using Facebook in January = 600  
 Number of boys using Facebook in February = 500  
 Decrease in numbers =  $600 - 500 = 100$

$$\therefore \text{Percentage decrease} = \frac{100}{600} \times 100 = \frac{100}{6} = 16.66\%$$

**125. Option (2) is correct.**

Number of boys using Whatsapp in March = 680  
 Number of boys using Facebook in February = 500

$$\text{Required \%} = \frac{680}{500} \times 100 = 136\%$$

**126. Option (2) is correct.**

Let radius of base of cone =  $r$  cm

$\therefore$  its circumference =  $2\pi r$

Now,  $2\pi r = 132$

$$\Rightarrow 2 \times \frac{22}{7} r = 132$$

$$\Rightarrow r = 21 \text{ cm}$$

Height of cone,  $h = 72$  cm

Now slant height,  $l = \sqrt{h^2 + r^2}$

$$= \sqrt{72^2 + 21^2} = 75 \text{ cm}$$

Total surface area of cone =  $\pi r(r + l)$

$$= \frac{22}{7} \times 21(21 + 75)$$

$$= 66 \times 96 = 6336 \text{ cm}^2$$

**127. Option (4) is correct.**

Radius of sphere,  $R = 14$  cm

$$\text{Volume of sphere} = \frac{4}{3} \pi R^3$$

$$\text{Radius of cone, } r = \frac{14}{2} = 7 \text{ cm}$$

Let height of cone =  $h$  cm

According to question,

$$\frac{4}{3} \pi \times 14 \times 14 \times 14 = \frac{1}{3} \pi \times 7 \times 7 \times h$$

$$\Rightarrow 4 \times 2 \times 2 \times 14 = h = 224 \text{ cm}$$

**128. Option (2) is correct.**

Radius of wheel,  $r = 21$  cm

Distance travelled by wheel in 1 revolution

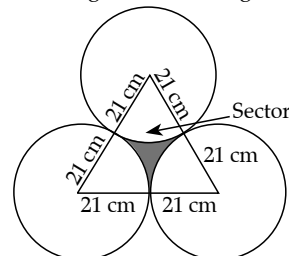
$$= 2\pi r \text{ cm}$$

Distance travelled in 10 revolution

$$= 10 \times 2 \times \frac{22}{7} \times 21 = 1320 \text{ cm}$$

**129. Option (1) is correct.**

Circle will be arranged in following manner.



The radii of circle form an equilateral triangle of side,  $a = 21 \times 2 = 42$  cm

Area enclosed by them = Area of equilateral triangle - Area of 3 sectors triangle

∴ Angles of equilateral Δ = Angle of sectors = 60°

$$\begin{aligned} \text{Required area} &= \frac{\sqrt{3}}{4} a^2 - 3 \times \frac{60^\circ}{360^\circ} \pi r^2 \\ &= \frac{\sqrt{3}}{4} \times 42 \times 42 - \frac{1}{2} \times \frac{22}{7} \times 21 \times 21 \\ &= (441\sqrt{3} - 693) \text{ cm}^2 \end{aligned}$$

Formula used :

$$\text{Area of equilateral triangle of side "a" = } \frac{\sqrt{3}}{4} a^2$$

$$\text{Area of sector} = \frac{Q}{360^\circ} \pi r^2$$

130. Option (1) is correct.

Diagonal of square of side  $a = a\sqrt{2}$

Perimeter of square of a side  $a = 4a$

$$\begin{aligned} \therefore 4a &= 80 \text{ cm} \quad (\because \text{Perimeter} = 80 \text{ cm}) \\ \Rightarrow a &= 20 \text{ cm} \end{aligned}$$

So, diagonal of square =  $20\sqrt{2}$  cm

131. Option (1) is correct.

$$\because x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$$

Now given that,  $(x + y + z) = 11$

$$\text{and } \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$$

$$\Rightarrow \frac{yz + zx + xy}{xyz} = 0 \Rightarrow xy + yz + zx = 0$$

put all these values in above formula

$$\begin{aligned} x^3 + y^3 + z^3 - 3xyz &= 11[x^2 + y^2 + z^2 - xy - yz - zx] \\ &= 11[x^2 + y^2 + z^2 + 2xy + 2yz + 2zx + 3xy - 3yz - 3zx] \\ &= 11(x + y + z)^2 - 3(xy + yz + zx) \\ &= 11[11^2 - 3 \times 0] = 11 \times 11 \times 11 = 1331 \\ \therefore (x + y + z)^2 &= x^2 + y^2 + z^2 + 2xy + 2yz + 2zx \end{aligned}$$

132. Option (3) is correct.

We know that:  $a^2 - b^2 = (a - b)(a + b)$

$$= a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$\begin{aligned} &\left[ \frac{(1 + x^3)}{(x^2 - 1)} \div \frac{(x^2 + 1 - x)}{(x + 1)} \right] \times (x - 1) \\ &= \left[ \frac{(1 + x^3)}{(x^2 - 1)} \times \frac{(x + 1)}{x^2 + 1 - x} \right] \times (x - 1) \\ &= \frac{(1 + x)(x^2 + 1 - x) \times (x + 1)(x - 1)}{(x + 1)(x - 1)(x^2 + 1 - x)} = (1 + x) \end{aligned}$$

133. Option (1) is correct.

$$\begin{aligned} \frac{x + \sqrt{x^2 - 1}}{x - \sqrt{x^2 - 1}} + \frac{x - \sqrt{x^2 - 1}}{x + \sqrt{x^2 - 1}} &= 62 \\ \Rightarrow \frac{(x + \sqrt{x^2 - 1})^2}{(x - \sqrt{x^2 - 1})(x + \sqrt{x^2 - 1})} + \frac{(x - \sqrt{x^2 - 1})^2}{(x + \sqrt{x^2 - 1})(x - \sqrt{x^2 - 1})} &= 62 \\ \Rightarrow \frac{x^2 + x^2 - 1 + 2x\sqrt{x^2 - 1} + x^2}{x^2 - (x^2 - 1)} &= 62 \\ \Rightarrow 4x^2 - 2 &= 62 \end{aligned}$$

$$\begin{aligned} \Rightarrow 4x^2 &= 64 \\ \Rightarrow x^2 &= 16 \\ \Rightarrow x &= \pm 4 \\ \text{So, } x &= -4 \end{aligned}$$

[∵  $x < 0$ ]

134. Option (2) is correct.

$$\begin{aligned} x^2 - 3x + 1 &= 0 \\ \Rightarrow x^2 + 1 &= 3x \\ \Rightarrow x + \frac{1}{x} &= 3 \quad [\text{On dividing equation by } x] \end{aligned}$$

Squaring both sides

$$\begin{aligned} \Rightarrow \left(x + \frac{1}{x}\right)^2 &= 3^2 \\ \Rightarrow x^2 + \frac{1}{x^2} + 2 \cdot x \cdot \frac{1}{x} &= 9 \\ \Rightarrow x^2 + \frac{1}{x^2} + 2 &= 9 \\ \Rightarrow x^2 + \frac{1}{x^2} &= 7 \end{aligned}$$

135. Option (2) is correct.

Given that

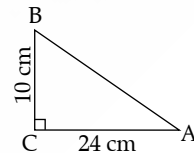
$$\begin{aligned} x^4 + \frac{1}{x^4} = 98 &\Rightarrow (x^2)^2 + \frac{1}{(x^2)^2} + 2x^2 \cdot \frac{1}{x^2} = 98 + 2 \\ \Rightarrow \left(x^2 + \frac{1}{x^2}\right)^2 &= 100 \end{aligned}$$

Take square root of both sides,

$$\begin{aligned} \Rightarrow x^2 + \frac{1}{x^2} &= 10 \\ \Rightarrow x^2 + \frac{1}{x^2} - 2 \cdot x \cdot \frac{1}{x} &= 10 - 2 \Rightarrow \left(x - \frac{1}{x}\right)^2 = 8 \\ \Rightarrow x - \frac{1}{x} &= \sqrt{8} \quad [\text{by taking square root}] \\ \Rightarrow x - \frac{1}{x} &= 2\sqrt{2} \end{aligned}$$

136. Option (2) is correct.

As per the given, figure will be



By using pythagoras theorem

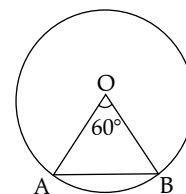
$$\begin{aligned} AB &= \sqrt{AC^2 + BC^2} \\ &= \sqrt{24^2 + 10^2} \\ &= \sqrt{576 + 100} = \sqrt{676} = 26 \text{ cm} \end{aligned}$$

In a right angle triangle, diameter of circumcircle is hypotenuse of triangle.

$$\therefore \text{Radius of circum circle, } r = \frac{26}{2} = 13 \text{ cm}$$

137. Option (3) is correct.

Since chord of circle subtends 60° at centre.



AB is chord and  $\angle AOB = 60^\circ$

$\therefore AO = OB$  (radii)  
 $\Rightarrow \angle OAB = \angle OBA$  [Angle opposite to equal side]  
 $\Rightarrow \angle OAB = \angle OBA = 60^\circ$   
 $\therefore \triangle AOB$  is equilateral triangle.  
 So, radius of circle =  $OA = OB = 7$  cm

**138. Option (1) is correct.**

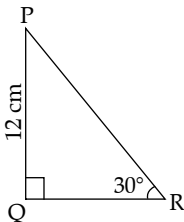
Given,  $PQ = 12$  cm,  $\angle PRQ = 30^\circ$  &  $\angle Q = 90^\circ$

In  $\triangle PQR$

$$\tan 30^\circ = \frac{PQ}{QR}$$

$$\frac{1}{\sqrt{3}} = \frac{12}{QR}$$

$$QR = 12\sqrt{3}$$



**139. Option (4) is correct.**

Given that isosceles  $\triangle ABE$  is right angled at  $B$  and  $BE = AB$

$$\therefore \text{Area of } \triangle ABE = \frac{1}{2} AB \times BE$$

$$\Rightarrow 72 = \frac{1}{2} AB \times AB$$

$$\Rightarrow 144 = AB^2$$

$$\Rightarrow AB = \sqrt{144} = 12 \text{ cm}$$

Also,  $AB = 2AD$

$$\therefore AD = \frac{AB}{2} = \frac{12}{2} = 6 \text{ cm}$$

Now,  $BC = BE + EC = 12 + 6 = 18$  cm

( $\because$  ADCE is a parallelogram)

$$\text{Area of trapezium ABCD} = \frac{1}{2} (\text{Sum of parallel sides}) \times$$

(distance between them)

$$= \frac{1}{2} \times (6 + 18) \times 12$$

$$= 24 \times 6 = 144 \text{ cm}^2$$

**140. Option (1) is correct.**

Let us assume that  $DB = y$

$$\therefore AB = y + 40$$

$$OB = y + 20$$

$$\therefore \triangle OBP \sim \triangle ABC$$

$$\Rightarrow \frac{AB}{AC} = \frac{OB}{OP} \quad [\text{C.P.S.T}]$$

$$\Rightarrow \frac{y + 40}{36} = \frac{y + 20}{20} \Rightarrow y = 5 \text{ cm}$$

Also,  $\triangle DBE \sim \triangle ABC$

$$\frac{DB}{DE} = \frac{AB}{AC} \quad [\text{C.P.S.T}]$$

$$\Rightarrow \frac{5}{DE} = \frac{5 + 40}{36} \Rightarrow DE = 4 \text{ cm}$$

**141. Option (3) is correct.**

Given,  $4 \sin^2 \theta - 3 = 0$

$$\Rightarrow \sin^2 \theta = \frac{3}{4}$$

$$\Rightarrow \sin \theta = \frac{\sqrt{3}}{2}$$

$$\Rightarrow \theta = 60^\circ \quad \left[ \sin 60^\circ = \frac{\sqrt{3}}{2} \right]$$

$$\cot^2 \theta + \tan^2 \theta = \cot^2 60^\circ + \tan^2 60^\circ$$

$$= \left( \frac{1}{\sqrt{3}} \right)^2 + (\sqrt{3})^2 = \frac{1}{3} + 3 = \frac{10}{3}$$

**142. Option (3) is correct.**

$$\frac{\cos \theta}{1 + \sin \theta} + \frac{\cos \theta}{1 - \sin \theta} = 4$$

$$\Rightarrow \frac{\cos \theta (1 - \sin \theta) + \cos \theta (1 + \sin \theta)}{(1 + \sin \theta)(1 - \sin \theta)} = 4$$

$$\Rightarrow \frac{\cos \theta - \cos \theta \sin \theta + \cos \theta + \cos \theta \sin \theta}{1 - \sin^2 \theta} = 4$$

$$\Rightarrow \frac{2 \cos \theta}{\cos^2 \theta} = 4 \quad [\because \sin^2 \theta + \cos^2 \theta = 1]$$

$$\Rightarrow \frac{2}{\cos \theta} = 4$$

$$\Rightarrow \cos \theta = \frac{1}{2} = \cos 60^\circ \Rightarrow \theta = 60^\circ$$

**143. Option (4) is correct.**

$$\frac{1}{\sin \theta + \operatorname{cosec} \theta} = \frac{1}{\sin 90^\circ + \operatorname{cosec} 90^\circ} \quad [\text{on putting } \theta = 90^\circ]$$

$$= \frac{1}{1 + 1} = \frac{1}{2}$$

$$\Rightarrow \theta = 90^\circ$$

$$\sin^{100} \theta + \operatorname{cosec}^{100} \theta = (\sin 90^\circ)^{100} + (\operatorname{cosec} 90^\circ)^{100}$$

$$= 1^{100} + 1^{100} = 1 + 1 = 2$$

**144. Option (3) is correct.**

$$\tan (90^\circ - \theta) = \cot \theta$$

$$\cot (90^\circ - \theta) = \tan \theta$$

$$\tan \theta \cdot \cot \theta = 1$$

$$\tan 45^\circ = 1$$

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$= \frac{\tan^2 25^\circ}{\operatorname{cosec}^2 65^\circ} + \frac{\cot^2 25^\circ}{\sec^2 65^\circ} + 2 \tan 20^\circ \tan 45^\circ \tan 70^\circ$$

$$= \frac{\tan^2 (90^\circ - 65^\circ)}{\operatorname{cosec}^2 65^\circ} + \frac{\cot^2 (90^\circ - 65^\circ)}{\sec^2 65^\circ}$$

$$- 2 \tan (90^\circ - 70^\circ) \times 1 \times |x| \tan 70^\circ$$

$$= \frac{\cot^2 65^\circ}{\operatorname{cosec}^2 65^\circ} + \frac{\tan^2 65^\circ}{\sec^2 65^\circ} + 2 \cot 70^\circ \tan 70^\circ$$

$$= \frac{\cot^2 65^\circ / \sin^2 65^\circ}{1/\sin^2 65^\circ} + \frac{\sin^2 65^\circ / \cos^2 65^\circ}{1/\cos^2 65^\circ} + 2$$

$$= \cos^2 65^\circ + \sin^2 65^\circ + 2$$

$$= 1 + 2 = 3$$

**145. Option (4) is correct.**

$$\operatorname{cosec} \theta + \operatorname{cosec}^2 \theta = 1$$

$$\Rightarrow \operatorname{cosec} \theta = 1 - \operatorname{cosec}^2 \theta = -\cot^2 \theta$$

$$[\because -\cot^2 \theta + \operatorname{cosec} \theta = 1]$$

$$\cot^{12} \theta - 3 \cot^{10} \theta + 3 \cot^8 \theta - \cot^6 \theta$$

$$= (\cot^2 \theta)^6 - \cot^6 \theta - 3[\cot^{10} \theta - \cot^8 \theta]$$

$$= (\operatorname{cosec} \theta)^6 - \cot^6 \theta - 3 \cot^8 \theta [\cot^2 \theta - 1]$$

$$= \operatorname{cosec}^6 \theta - \cot^6 \theta - 3 \cot^8 \theta [\operatorname{cosec}^2 \theta - 2]$$

$$= \operatorname{cosec}^6 \theta - \cot^6 \theta - 3 \operatorname{cosec}^2 \theta \cot^2 \theta$$

$$(\operatorname{cosec}^2 \theta - \cot^2 \theta)$$

$$= (\operatorname{cosec}^2 \theta - \cot^2 \theta)^3 = 1^3 = 1$$



**146. Option (3) is correct.**

Total expenditure = ₹ 72 crore  
 Expenditure on operations = 16% of 72 crore  
 $= \frac{16}{100} \times 72 \text{ crore} = ₹11.52 \text{ crore}$

**147. Option (2) is correct.**

Annual expenditure on Miscellaneous  
 $= \frac{24}{100} \times 72 = ₹17.28 \text{ crore}$   
 $\therefore$  Monthly expenditure on Miscellaneous  
 $= \frac{17.28}{12} = ₹1.44 \text{ crore}$

**148. Option (1) is correct.**

Annual expenditure on Miscellaneous  
 $= ₹ \frac{24}{100} \times 72 \text{ crore} = ₹17.28 \text{ crore}$   
 5% of this is spent on nanotubes  
 Expenditure on the nanotubes =  $\frac{5}{100} \times 17.28 \text{ crore}$   
 $= ₹0.864 \text{ crore}$

**149. Option (4) is correct.**

Expenditure on salary & tax = (15 + 25)%  
 Expenditure on interest & Misce = (24 + 20)%  
 Required percentage =  $\frac{44 - 40}{40} \times 100 = 10\%$

**150. Option (2) is correct.**

Total amount spent on interest  
 $= \frac{20}{100} \times 720000000 = ₹144000000$   
 Total amount spent on raw material  
 $= \frac{50}{100} \times 144000000 = ₹72000000$   
 Ratio of expenditure on rent & raw material = 1 : 2  
 $\Rightarrow$  Expenditure on rent =  $\frac{1}{2} \times 72000000 = ₹36000000$

**151. Option (2) is correct.**

The sentence has an error in the usage of the verb. The sentence is conditional. In conditional sentences, we never use "was", we always use "were" for all the subjects. So, change the verb "was" to "were".

**152. Option (1) is correct.**

The sentence has an error in the usage of articles. We never use an article before the name of any language. Thus, "the" before English should be removed.

**153. Option (1) is correct.**

The error lies in the first part of the sentence. 'Full with' is an incorrect phrasal verb. Therefore, in the given sentence, we can use either 'full of' or 'filled with'.

**154. Option (1) is correct.**

The usage of 'will' in the first part of the sentence is incorrect. In a conditional sentence where there is future speculation, the structure of the sentence is: If clause is in simple present tense and the other clause is in simple future tense. Thus, the error is in the first part of the sentence.

**155. Option (2) is correct.**

The error is in the second part of the sentence, as the modal verb 'would' must replace 'should'. We should give advice and suggestions. We use could as the past form of can and to make requests. We use 'would' to talk about unlikely situations and to make a polite offer.

**156. Option (3) is correct.**

We 'agree with' someone or something, 'agree to' a demand or to do something, and 'agree on' the price of something. The case in question is that of the colleagues; 'with' is the appropriate preposition.

**157. Option (4) is correct.**

In the sentence, we are using comparative degree in place of superlative degree. 'All' fits the blank perfectly as it compares the beauty of Rita and all the other sisters taken together. 'Any other' would have been correct if the sentence would have read: Rita is more beautiful than any other girl (in her family). 'Any' would be incorrect as it does not agree with the plural number of 'sisters'.

**158. Option (3) is correct.**

The inclusion of "when" in the sentence shows that one action was ongoing while another action occurred in the past. This is known as the past continuous tense. So, the phrase "was sleeping" is accurate.

**159. Option (1) is correct.**

'Start for' denotes the commencement of a journey. Option 1 is the best fit because the context of the sentence fits with its meaning.

**160. Option (1) is correct.**

This question tests a student's understanding of phrases and idioms. The meanings of given phrases are:

Stand out : easily noticeable  
 Stand by : support or remain loyal to  
 Stand-off : move or keep away  
 Stand up : survive the investigation.

The phrasal verb "stands out" conveys an appropriate meaning in the given context, as 'his' height (tall) made him distinguishable in the crowd.

**161. Option (1) is correct.**

This question tests a student's vocabulary. 'Vie' means to compete or contest. Example: "The athletes were vying for a place in the British team".

**162. Option (3) is correct.**

This question tests a student's vocabulary. 'Cavort' means to jump or dance around excitedly. Example: "The players cavorted about the pitch".

**163. Option (1) is correct.**

This question tests a student's vocabulary. 'Brittle' means hard but liable to break easily, breakable, or fragile. Example: "Her bones became fragile and brittle".

**164. Option (4) is correct.**

This question tests a student's vocabulary. 'Illuminate' means 'to light up or brighten'. Example: "A flash of lightning illuminated the house". Hence, the correct answer is option (4). Seizure means capture. Solitary means lonely. Desirous means governed by desire.

**165. Option (2) is correct.**

This question tests a student's vocabulary. 'Embroid' means to bring into a state of confusion or disorder. Example: She became embroiled in a dispute between two women she hardly knew". Hence, the correct answer is option (2). Craggy is rough or uneven. Censure means to express severe disapproval.

**166. Option (1) is correct.**

This question tests a student's vocabulary. 'Crestfallen' means sad or disappointed. 'Triumphant', which means victorious or successful. The antonym of crestfallen is triumphant. Hence, the correct answer is option (1). Authentic means genuine, original. An antique is an object that has a high value because of its age and quality. Discordant means contradictory, opposite.

- 167. Option (2) is correct.**  
This question tests a student's vocabulary. 'Balmy' means mind or gentle. Obscene means disgusting according to accepted standards of morality and decency. Hard is the antonym of balmy.
- 168. Option (2) is correct.**  
This question tests a student's vocabulary. 'Docile' refers to someone who is ready to accept control of someone else; they are submissive. 'Willful' means having or showing a stubborn and determined intention to do as one wants, regardless of the consequences. The antonym of docile is willful.
- 169. Option (1) is correct.**  
This question tests a student's vocabulary. 'Slothful' means lazy. Example: "Fatigue made him slothful". Lively is the antonym of slothful.
- 170. Option (3) is correct.**  
This question tests a student's vocabulary. 'Furtive' means done in a quiet and secretive way. Example: "They spent a furtive day together". 'Straight' means 'direct', which is the antonym of furtive.
- 171. Option (2) is correct.**  
This question tests a student's understanding of phrases and idioms. The idiom 'in deep water' means 'in trouble or difficulty'. Example: Peter found himself in deep water with the bank when he couldn't make his loan payment.
- 172. Option (3) is correct.**  
This question tests a student's understanding of phrases and idioms. 'In the egg' means at an early stage.
- 173. Option (2) is correct.**  
This question tests a student's understanding of phrases and idioms. 'Cut in on' means to interrupt somebody when they are speaking. Example: The intrusive kid persistently interrupted the heated conversation between the two friends.
- 174. Option (2) is correct.**  
This question tests a student's understanding of phrases and idioms. "To draw a blank" means to fail or be unsuccessful. Example: "The search drew a blank".
- 175. Option (4) is correct.**  
This question tests a student's understanding of phrases and idioms. Give up the ghost means to stop working, or to die. Example: Based on how the nurses are talking, it sounds like Great Uncle Edmund is going to give up the ghost sooner than later.
- 176. Option (3) is correct.**  
The given sentence implies that neither the speaker nor the subject of the statement loved the phone. Hence, the correct answer is She did not like the phone nor did I.
- 177. Option (4) is correct.**  
The given sentence is correct and does not need any correction.
- 178. Option (1) is correct.**  
According to the rules to change direct speech into indirect speech, one of them states that a helping verb should be used after the subject. The given sentence is in indirect speech and can be written in direct speech as: My father said to me, 'When will I have a cup of coffee?' The indirect form of the statement is: My father asked me when I would have a cup of coffee.
- 179. Option (2) is correct.**  
When drawing a comparison, the term "as fast as" is used, and the second topic should come right after it. However, since only the portion included in brackets needs to be changed in the provided statement, "as fast" should be used in place of "as fast as."
- 180. Option (3) is correct.**  
'To sit' for an exam' means to appear for an exam. Given the context of the sentence, option 3 is the best fit.
- 181. Option (2) is correct.**  
This question tests a student's vocabulary. The property inherited from one's father is known as 'patrimony'. Vale means a valley. A legacy is something left or handed down by a predecessor. A trench is a long, narrow ditch.
- 182. Option (4) is correct.**  
This question tests a student's vocabulary. The highest class in certain societies, typically comprising people of noble birth holding hereditary titles and offices, is called the aristocracy. A system of government in which most of the important decisions are taken by state officials rather than by elected representatives is called bureaucracy. A government run by wealthy people is called a plutocracy. A system of government by the whole population or all the eligible members of a state, typically through elected representatives, is called democracy.
- 183. Option (3) is correct.**  
This question tests a student's vocabulary. The study of ancient things like tombs, buried towns is known as 'archaeology'. The branch of science concerned with fossil animals and plants is called palaeontology. The branch of science and philosophy concerned with the laws or principles governing the operation of the mind is known as nomology.
- 184. Option (3) is correct.**  
This question tests a student's vocabulary. 'Ostracise' means to exclude from a society or group. Hence, the correct answer is option (3). An acrobat is a gymnast. A diatribe is a forceful and bitter verbal attack against someone or something. A jurist is a lawyer or a judge.
- 185. Option (1) is correct.**  
This question tests a student's vocabulary. A person who is rebellious or who opposes authority is known as an "insurgent." Intransigent means refusing to change your opinions or behaviour. Indigenous means native to a place. Innuendo is a suggestion, hint.
- 186. Option (3) is correct.**  
This question tests a student's vocabulary. The incorrectly spelled word is "councillor". The correct spelling is 'counsellor'. Hence, the correct answer is option (3). Conceit means excessive pride in oneself. Conscience means a person's moral sense of right and wrong, viewed as acting as a guide to one's behaviour.
- 187. Option (2) is correct.**  
This question tests a student's vocabulary. The incorrectly spelled word is 'discusion'. The correct spelling is discussion.
- 188. Option (2) is correct.**  
This question tests a student's vocabulary. The incorrectly spelled word is 'torchure'. It should be torture.
- 189. Option (1) is correct.**  
This question tests a student's vocabulary. The incorrectly spelled word is 'mediteranean'. The correct spelling is Mediterranean.
- 190. Option (2) is correct.**  
This question tests a student's vocabulary. The incorrectly spelled word is 'proclamation'. The correct spelling is proclamation.
- 191. Option (2) is correct.**  
The blank requires a word that can express a community where people live. The best word for this from the given option is society.

**192. Option (1) is correct.**

The second statement in the passage explains the effects of the fact that our civilization is built on western science and technology has its impact on scientists. The phrase "sharp consequences" is untrue. The word "inescapable" is appropriate because it expresses the idea that scientists cannot escape the impact of western science and technology on society.

**193. Option (1) is correct.**

The blank needs to highlight the contradiction, as indicated in the usage of 'initially' (trending from the start) and the statement 'scientists must become aware of the fact that they are not merely observers, but also actors on the stage of life.' This implies that earlier they were involved accidentally.

**194. Option (3) is correct.**

Although scientists cannot be considered the driving force behind the development of human civilization, in the context at hand, they might be considered the architects of human destiny.

**195. Option (2) is correct.**

As per the passage, Neils Bohr says that scientists should act in the theatre of life rather than merely being observers. They must thus be conscious of this truth or aware of it.

**196. Option (4) is correct.**

Refer to the line from the passage: 'The size of the workforce in Brazil, the number of kids at home and parents to sustain will obviously have a great impact on the extent of poverty in Brazilian households.' We can deduce that the nature of a job doesn't have an impact on the extent of poverty in Brazilian households.

**197. Option (2) is correct.**

According to the passage, 'the demographic transition that has been ongoing in Brazil for the past few decades has helped a lot in reducing poverty'.

**198. Option (1) is correct.**

Refer to the line from the passage: "Less children were born in poorer families, and that's less children that ended up involved in street violence, drugs, gangs, and so on." So, we can say that the Brazilian children born into poorer families were involved in so many things, but they were not involved in 'bullying'.

**199. Option (4) is correct.**

Refer to the line from the passage: "Overall, the change in the family structure and in Brazilians' lifestyle has had a much greater impact on reducing poverty than the speed of the demographic transition itself."

**200. Option (2) is correct.**

From the last paragraph's first line, we can deduce that 'Favelas' has been used in the passage to refer to slums in Brazil.

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