Sainik School
Entrance Exam (Class IX)

SOLVED PAPER 2021

Time : 3 Hr **Max. Marks : 400**

Instructions

1. This question paper contains 150 questions and divided into following five sections.
   Section I Mathematics (50 Questions); **Section II** English (25 Questions); **Section III** General Science (25 Questions) and **Section IV** Social Science (25 Questions) and **Section V** Intelligence (25 Questions).
2. In **Section I** Mathematics each question carries 4 marks and in **Section II** English, **Section III** General Science, **Section IV** Social Studies and **Section V** Intelligence each question carries 2 marks.
3. The candidate is expected to attempt all questions.

Section I Mathematics

1. The smallest natural number by which 1296 must be divided to get a perfect cube is
(a) 16 (b) 6
(c) 60 (d) 26

2. 72% of 25 students are good in Mathematics. How many are not good in Mathematics?
(a) 18 (b) 7
(c) 15 (d) 9

3. Data collected in a survey shows that 40% of the buyers are interested in buying a particular brand of toothpaste. The central angle (in degrees) of the sector of the pie-chart representing this information is
(a) 120 (b) 150
(c) 144 (d) 40

4. The monthly salary of a person is ₹ 15000. The central angle of the sector representing his expenses in food and house rent on a pie chart is 60°. The amount he spends on food and house rent is
(a) ₹ 5000 (b) ₹ 2500
(c) ₹ 6000 (d) ₹ 9000

5. The mid value of a class interval is called its
(a) class limit (b) class mark
(c) width (d) range

6. If the mode of a distribution is 12 and the mean is 3, then the median is
(a) 8 (b) 36
(c) 4 (d) 6

7. The square root of 0.00000121 is
(a) 0.011 (b) 0.00011
(c) 0.0011 (d) 0.11

8. Which least number should be subtracted from 108245 so as to get a perfect square?
(a) 3 (b) 4
(c) 5 (d) 6

9. Find the one's digit of the cube root of 6859.
(a) 2 (b) 3
(c) 9 (d) 1

10. A sum amounts to ₹ 4410 after two years at 5% compound interest per annum. What is the principal?
(a) ₹ 3000 (b) ₹ 4100
(c) ₹ 4000 (d) ₹ 4200

11. What will you get when you subtract $3x-4y-7z$ from the sum of $x-3y+2z$ and $-4x+9y-11z$?
(a) $-6x+10y-2z$ (b) $6x+10y-2z$
(c) $-6x-10y-2z$ (d) $-6x+10y+2z$

12. Find the remainder when $5x^2 - 4x + 3$ is divided by $(x - 2)$.
(a) 14 (b) 15
(c) 18 (d) 12

13. If $x - \frac{1}{x} = 3$, then the value of $x^4 + \frac{1}{x^4}$ is
(a) 194 (b) 119
(c) 114 (d) 116

14. The area of the square having diagonal of length 'd' is given by
(a) $\frac{d}{2}$ (b) $\frac{d^2}{2}$ (c) $\frac{d^2}{4}$ (d) $2d$

15. The perimeter of a circle having area 154 cm^2 is
(a) 22 cm (b) 44 cm
(c) 88 cm (d) 66 cm

16. Find the area of a rhombus having perimeter 80 cm and one diagonal 24 cm.
(a) 354 cm^2 (b) 364 cm^2
(c) 384 cm^2 (d) 480 cm^2

17. I purchased 1 dozen pencils at the rate of 5 paise per pencil. For how much should I sell a pencil to make 20% profit?
(a) 4 paise (b) 10 paise
(c) 6 paise (d) 8 paise

18. What is the ratio of the volume of a cylinder and that of a cone on the same base and of the same height?
(a) 1 : 2 (b) 1 : 4
(c) 4 : 3 (d) 3 : 1

19. If the height and the radius of a cone are doubled, the volume of the cone becomes
(a) 2 times (b) 4 times
(c) 6 times (d) 8 times

20. The total surface area of the hemisphere of volume 19404 cm^2 is
(a) 4158 cm^2 (b) 2772 cm^2
(c) 5544 cm^2 (d) 4258 cm^2

21. The value of $125^{-\frac{1}{3}}$ is
(a) $\frac{1}{3}$ (b) $\frac{1}{5}$ (c) 3 (d) 5

22. The value of $(64^{\frac{2}{3}})^{\frac{1}{2}}$ is
(a) 5 (b) 4 (c) 3 (d) 8

23. What is the value of $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$?
(a) $\frac{1}{29}$ (b) $\frac{1}{9}$ (c) $\frac{1}{5}$ (d) 29

24. The additive identity for integers is
(a) 0 (b) 1
(c) –1 (d) does not exist

25. Associative property of multiplication of integers
(a) exists (b) does not exist
(c) holds without 0 (d) None of these

26. If ABC is an equilateral triangle of side a, then its altitude is equal to
(a) $\frac{\sqrt{3}}{4}a$ (b) $\frac{\sqrt{3}}{2}a$
(c) $\sqrt{3}a$ (d) $\frac{\sqrt{3}}{5}a$

27. If $a + b + c = 5$ and $ab + bc + ca = 10$, then $a^3 + b^3 + c^3 - 3abc$ is
(a) –25 (b) 25
(c) –50 (d) –75

28. If $\frac{a}{b} + \frac{b}{a} = 2$, then $a^3 - b^3 =$
(a) 1 (b) –1 (c) 0 (d) 2

29. Factorisation of $3\sqrt{3}x^3 - 8$ is
(a) $(\sqrt{3}x - 2)(3x^2 + 2\sqrt{3}x + 4)$
(b) $(\sqrt{3}x + 2)(3x^2 + 2\sqrt{3}x + 4)$
(c) $(\sqrt{3}x - 2)(3x^2 + 2\sqrt{3}x - 8)$
(d) $(\sqrt{3}x - 2)(3x^2 - 2\sqrt{3}x + 4)$

30. What is the number of possible outcomes in throwing two dice simultaneously?
(a) 6 (b) 12 (c) 36 (d) 4

31. Three coins are tossed simultaneously. The probability of getting at most one head is
(a) $\frac{1}{2}$ (b) $\frac{3}{4}$
(c) $\frac{2}{3}$ (d) 1

32. There is food provision for 100 men for 30 days. If the number of men is reduced to 80, then the number of days the food could last for is
(a) 28 (b) 35 (c) $37\frac{1}{2}$ (d) 37

33. A vertical pole 14m high casts a shadow of 10m. What will be the height of a tree that casts a shadow of 15m under similar conditions?
(a) 15m (b) 20m
(c) 21m (d) 24m

34. If 15 workers can build a wall in 48 h, how many workers will be required to do the same work in 30 h?
(a) 15 (b) 14 (c) 24 (d) 30

35. If a transversal intersects two parallel lines, then the consecutive interior angles on the same side of the transversal are
(a) complementary (b) supplementary
(c) equal (d) None of these

36. At what distance does the point (12, 5) lie from the origin?
(a) 17 (b) 7 (c) 13 (d) 60

37. A can do a work in 25 days and B can do the same work in 20 days. If they work together for 5 days and then A leaves, in how many days can B finish the remaining work?
(a) 10 (b) 11 (c) 12 (d) 14

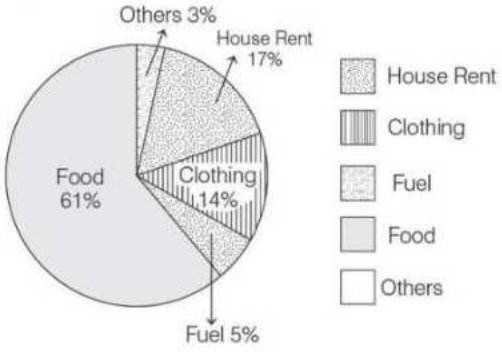
38. The difference of a two-digit number and the number obtained by reversing the digits is always a multiple of
(a) 11 (b) 9 (c) 7 (d) 10

39. In a triangle, if two of the angles are complementary, then the measure of the third angle is
(a) 40° (b) 45° (c) 75° (d) 90°

40. If the exterior angle of a triangle is 60° and the interior opposite angles are in the ratio 1 : 3, then the angles of the triangle are
(a) 15°, 45°, 110° (b) 120°, 10°, 50°
(c) 120°, 45°, 15° (d) 60°, 90°, 30°

41. Line l is perpendicular to line m and line m is perpendicular to line n. Then, the lines l and n are
(a) parallel to each other
(b) perpendicular to each other
(c) intersecting
(d) None of the above

42. From the pie-chart, the shares of central angle for food and fuel, respectively are
Expenses



(a) 210°, 20° (b) 219.6°, 18°
(c) 209.6°, 20° (d) 209.6°, 18°

43. What is alternate name of a pie-chart?
(a) Pictograph (b) Histograph
(c) Circle chart (d) None of these

44. The lengths of the diagonals of a rhombus are 16 cm and 12 cm respectively. Find the length of each of its sides.
(a) 30 cm (b) 10 cm
(c) 20 cm (d) 28 cm

45. If the mean of the following data is 8, then find the value of x.

$$2, 4, 8, 6, x, 5$$

(a) 17 (b) 23
(c) 48 (d) 25

46. The value of $1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{9}}}$ is
(a) $\frac{29}{19}$ (b) $\frac{10}{19}$
(c) $\frac{29}{10}$ (d) $\frac{10}{9}$

47. Find the sum of $3.\overline{2}$ and $5.\overline{4}$.
(a) $\frac{78}{3}$ (b) $\frac{58}{3}$
(c) $\frac{58}{9}$ (d) $\frac{78}{9}$

48. What should be added to $-\frac{7}{3}$ to get $\frac{3}{7}$?
(a) $\frac{21}{58}$ (b) $\frac{58}{21}$
(c) $\frac{47}{21}$ (d) $\frac{50}{21}$

49. The difference between two whole numbers is 66. The ratio of the two numbers is 5 : 2. The two numbers are
(a) 60 and 6
(b) 100 and 35
(c) 110 and 44
(d) 99 and 33

50. If angle A and angle C are two opposite angles of a parallelogram, then
(a) angle A > angle C
(b) angle A = angle C
(c) angle A < angle C
(d) None of the above

Section II English

Diriections (Q. Nos. 51-53) *Read the following passage and answer the following questions by choosing the most appropriate option.*

Marie Curie

Marie Curie grew up in Warsaw, Poland where she was born on November 7, 1867. Her parents were both teachers. The child of two teachers, Marie, was taught to read and write early in life. She was a very bright child and did well in school. She had a sharp memory and worked hard on her studies.

As Marie grew older, her family came upon tough times. Poland was under the control of Russia at that time. People were not even allowed to read or write anything in the Polish language.

Her father lost his job because he was in favour of Polish rule. Marie lost her elder sister and mother to typhus and tuberculosis respectively.

After graduating from high school, Marie wanted to attend a university, but this wasn't something that young women did in Poland during the years covering the period 1800-1900. The university was for men. However, there was a famous university in Paris, France called the Sorbonne that women could attend. Marie did not have the money to go there but agreed to work to help pay for her sister Bronislawa to go to school in France, if she would help Marie after she graduated. It took six years, but, after Bronislawa graduated and became a doctor, Marie moved to France and entered the Sorbonne. Marie arrived in France in 1891. Marie lived the life of a poor college student, but she loved every minute of it. She was learning so much. After three years she earned her degree in Physics.

51. Which of the following statements about the passage is not true?
(a) Marie's elder sister died of tuberculosis and mother of typhus.
(b) Marie's father was a patriotic man.
(c) Marie passed out of the University of Surbonne.
(d) The Polish universities discriminated against girls.

52. Marie thoroughly enjoyed the university years
(a) while her sister worked hard to pay the fees.
(b) although she did not want to study medicine.
(c) despite living on meagre funds.
(d) but was denied the university degree.

53. A lot of emphasis was laid on Marie's education because
(a) Marie was the sole earning member of the family.
(b) Marie was born into a family of teachers.
(c) education of girls was very important in Poland.
(d) she was the only member of the family who could read

54. The room was filled by the wizard's shrieks of fiendish laughter. Select the correct antonym of the underlined word.
(a) cunning (b) vicious (c) loud (d) pleasant

55. I am doing hardwork to get to the college of my choice. Identify the incorrect part of the sentence.
(a) I am (b) doing hardwork
(c) to get to (d) the college of my choice

56. She speaks ..... all of us when she says that we are grateful for your kindness. Choose the most appropriate preposition.
(a) about (b) to (c) for (d) of

57. Between his cat and his dog, his cat is ..... more loyal of the two. Choose the correct answer.
(a) a (b) an
(c) the (d) No article

58. After the school was dismissed, she said with **pretended** casualness that she wanted to go and meet the new teacher. Identify the type of verb.
(a) Intransitive verb (b) Participle
(c) Transitive verb (d) Infinitive

59. You ..... an accident if you go on driving like that. Choose the most appropriate option.
(a) should have (b) will have
(c) have had (d) are having

60. "Would you like some tea or coffee?" the assistant asked me. Choose the correct reported form of the sentence.
(a) The assistant asked me whether I would like some tea or coffee
(b) The assistant asked me whether would I like some tea or coffee
(c) The assistant asked me would I like some tea or coffee
(d) The assistant asked me if I would like some tea or coffee

61. Choose the correct spelling.
(a) Benevolent (b) Benovalent
(c) Benovolent (d) Benovelent

62. The correct synonym of the word Zenith is
(a) Infinite (b) Bottom (c) Pinnacle (d) Medium

63. He acted ..... at the dinner table.
(a) seldom (b) lately (c) clumsily (d) hardly

64. The price of this mobile phone is higher than yours. Choose the edited form of the underlined words from the options given.
(a) are higher than yours
(b) is higher than you
(c) is higher than yourself
(d) is higher than that of yours

65. The young teacher was brimming with confidence. Identify the adjective in this sentence.
(a) young (b) teacher
(c) was brimming (d) confidence

66. I need to check ..... I have brought my umbrella. Choose the correct conjunction.
(a) provided (b) whether (c) lest (d) until

67. She has now organised her documents in properly labelled files.
(Change to passive voice)
(a) Her documents were now being organised in properly labelled files.
(b) She had organised her documents then in properly labelled files.
(c) Her documents have now been organised in properly labelled files.
(d) Her documents had been organised then in properly labelled files.

68. It is late and ..... to get any sleep, I must go.
(a) if I am (b) unless I am going
(c) if I am got (d) should I

69. Weather forecasts aren't very reliable and .....
(a) nor should be (b) not ought to be
(c) nor will (d) never will be

70. The Princess was very generous. Everyone liked her for her ..... innocence. Choose the most appropriate word.
(a) childish (b) childhood
(c) childlike (d) child

71. Neither of the girls ..... to collect their certificates. Choose the correct answer.
(a) have come (b) has come
(c) are coming (d) has came

72. Rearrange the following words/phrases to make a meaningful sentence. Choose the correct sequence.
into the water / everyone crowded / to see /
(A) (B) (C)
jump / around / him
(D) (E) (F)
(a) ABCDEF (b) ABCFDE
(c) BEFCDA (d) BECFDA

73. Rearrange the following words/phrases to make a meaningful sentence. Choose the correct sequence.
cold / a / it was / beautiful / day
(A) (B) (C) (D) (E)
(a) CBDAE (b) DCBAE
(c) CBEDA (d) CDABE

74. Answer by choosing the most appropriate option.
"To tie yourself in knots" means
(a) to get into trouble
(b) to get confused
(c) to lie
(d) to get stuck between strangers

75. Someone has lit the fire. Choose the correct passive form of this sentence.
(a) You are requested to light the fire by someone.
(b) The fire has been lit by someone.
(c) The fire had been lit by someone.
(d) The fire was lit by someone.

Section III General Science

76. The larva of frog changes its form by a sudden and drastic process called
(a) Embryogenesis (b) Hatching
(c) Layering (d) Metamorphosis

77. Cloning is similar to which of the following modes of reproduction?
(a) Sexual reproduction (b) Cyst formation
(c) Asexual reproduction (d) Both (a) and (c)

78. Which of the following correctly represents the value for the normal atmospheric pressure?
(a) 75.3 Kilopascals (b) 76 mm of mercury
(c) 101325 Pascals (d) 76 of mercury

79. Loudness of sound is proportional to
(a) Square of the amplitude (b) Amplitude
(c) Square of frequency (d) Frequency

80. A man stands 10m in front of a large plane mirror. How far must he walk before he is 5m away from his image?
(a) 5 m (b) 7.5 m
(c) 10 m (d) 12.5 m

81. Which of the following metals is used in electroplating to make metal objects appear shining on car surfaces?
(a) Iron (b) Copper
(c) Chromium (d) Aluminium

82. What are the two gases mainly responsible for acid rain?
(a) Sulphur dioxide and Nitrogen dioxide
(b) Carbon dioxide and Sulphur dioxide
(c) Nitrogen dioxide and Carbon dioxide
(d) Carbon dioxide and CFC

83. A set of terms pertaining to reproduction are given below. Choose the set that has an incorrect combination.
(a) Sperm, testis sperm duct, penis
(b) Menstruation, egg, oviduct, uterus
(c) Sperm, oviduct, egg, uterus
(d) Ovulation, egg, oviduct, uterus

84. The process of zinc lamination (coating) on iron is called
(a) Ionization (b) Electrolysis
(c) Galvanisation (d) None of these

85. Conditions for good electroplating are
(a) High current density
(b) Low temperature
(c) High concentration of metal in electrolyte
(d) All of the above

86. Electroplating is the application of
(a) Hydrolysis (b) Electrolysis
(c) Crystallization (d) Recrystallization

87. An earthquake measuring 6 on the richter scale is more powerful than another magnitude 4 by
(a) 3/2 times (b) 100 times
(c) 2/3 times (d) 10 times

88. Rabi crops are
(a) sown in winter and harvested in summer
(b) sown during rainy season and harvested in winter
(c) sown in summer and harvested in winter
(d) sown in rainy season and harvested in summer

89. The process of conversion of sugar into alcohol is called
(a) Fixation (b) Moulding
(c) Fermentation (d) Degradation

90. Identify the correctly matched pair from the following
(a) Sunderban-Rhino (b) Ranthambore-Lion
(c) Gir-Lion (d) Kaziranga-Sea Turtle

91. 'Water harvesting' means
(a) Collection of water from rivers
(b) Harvesting of water from tubewells
(c) Collection of rainwater in storage tanks
(d) Collecting water from oceans

92. A person suffering from ..... should always cover his mouth and nose with a handkerchief while sneezing.
(a) common cold (b) cancer
(c) asthma (d) malaria

93. Which of these traps air the most?
(a) Nylon (b) Cotton
(c) Wool (d) Polyester

94. Which non-metal is highly reactive and is used in making matchsticks?
(a) Phosphorus (b) Sulphur
(c) Carbon (d) None of these

95. What is the product formed when a metal reacts with water?
(a) Metal oxide (b) Metal hydroxide
(c) Salt (d) Acid

96. Which of the following pairs of organelles does not contain DNA?
(a) Mitochondria and Lysosomes
(b) Chloroplast and Vacuoles
(c) Lysosomes and Vacuoles
(d) Nuclear envelope and Mitochondria

97. Which of the following features helps in distinguishing a plant cell from an animal cell?
(a) Cell wall (b) Cell membrane
(c) Mitochondria (d) Nucleus

98. Naphthalene balls used to repel moths and insects are derived from
(a) Petroleum (b) Sugar
(c) Coal tar (d) LPG

99. The slow process of conversion of dead vegetation into coal is called
(a) decomposition (b) evolution
(c) carbonification (d) carbonisation

100. Which amongst the following is a petroleum product which can be used for metalling of roads?
(a) Coke (b) Bitumen
(c) Coal tar (d) Coal

Section IV Social Science

101. Which of the following was termed as devilish and tyrannical by Gandhiji and Jinnah?
(a) Ilbert Bill
(b) Jallianwala Bagh Massacre
(c) Rowlatt Act
(d) Government of India Act, 1921

102. The Supreme Court of India has laid down specific requirements and procedures that the police and other agencies have to follow for the arrest, detention and interrogation of any person. These guidelines are also known as
(a) M.M. Basu guidelines
(b) D.K. Basu guidelines
(c) Procedural guidelines
(d) Rules of procedure for arrest guidelines

103. Name the Indian revolutionary who threw a bomb in the Central Legislative Assembly on 8th April, 1929.
(a) Subhash Chandra Bose
(b) Bal Gangadhar Tilak
(c) Bhagat Singh
(d) Chandrashekhar Azad

104. Who is the founder of the Khudai Khidmatgars, a powerful non-violent movement among the Pathans?
(a) Khan Abdul Ghaffar Khan
(b) Mohammed Ali Jinnah
(c) Maulana Azad
(d) None of the above

105. What is the meaning of the Japanese term Tsunami?
(a) Ocean wave (b) Tidal wave
(c) Current wave (d) Harbour wave

106. Air pressure ..... as the height increases.
(a) increases
(b) decreases
(c) first increases and then decreases
(d) remains constant

107. Viticulture is the cultivation of
(a) Grapes (b) Fish
(c) Silkworms (d) Apples

108. Where did Gandhiji launch the Mill-Workers' Strike of 1918?
(a) South Africa
(b) Kheda
(c) Andaman and Nicobar Islands
(d) Delhi

109. Who were the European artists appointed by Muhammad Ali Khan of Arcot?
(a) Tilly Kettle and George Willison
(b) Francis Hayman and William Daniell
(c) Thomas Daniell and William Daniell
(d) Joham Zoffany and Tilly Kettle

110. The temperate grasslands of South Africa are called the .....
(a) Velds (b) Downs
(c) Prairies (d) Pampas

111. Thinnest layer of the Earth is .....
(a) Crust (b) Mantle
(c) Core (d) None of these

112. Which of the following is an example of non-metallic mineral?
(a) Bauxite (b) Manganese
(c) Lead (d) Mica

113. The emperor who ascended the throne at 13 years of age was .....
(a) Shah Jahan (b) Akbar
(c) Humayun (d) Jehangir

114. The number of seats reserved for Scheduled Tribes in the Lok Sabha is
(a) 35 (b) 37
(c) 79 (d) 47

115. What is referred to as the supreme law of land?
(a) Parliament (b) President
(c) Constitution (d) Assembly

116. The breaking up and decaying of exposed rocks by temperature changes, frost action, plants, animals and human activity is called
(a) Climate change (b) Breaking
(c) Weathering (d) Decay

117. A motion of no-confidence against the government can be introduced in the
(a) Rajya Sabha (b) Lok Sabha
(c) Both (a) and (b) (d) Neither (a) nor (b)

118. Ministry of Human Resource Development was created in
(a) 1951 (b) 1953
(c) 1985 (d) 1987

119. Dikus are
(a) outsiders
(b) insiders
(c) children
(d) senior citizens

120. 29th March, 1857 is a significant date because
(a) Mangal Pandey was hanged to death.
(b) Mangal Pandey was sent to prison.
(c) Mangal Pandey fled prison.
(d) Mangal Pandey killed his officers.

121. Which of the following is not categorised under the Himalayan earthquakes?
(a) Uttarkashi earthquake
(b) Kangra earthquake
(c) Bhuj earthquake
(d) Delhi earthquake

122. ..... a great scholar of Sanskrit, felt that Hinduism was oppressive towards women.
(a) Sri Narayan Guru
(b) Raja Ram Mohan Roy
(c) M.G. Ranade
(d) Pandita Ramabai

123. Burning of fossil fuels
(a) Causes global warming
(b) Reduces global warming
(c) Releases oxygen
(d) None of the above

124. Which incident in the history of the Indian Freedom Movement made Tagore angry and made him renounce his knighthood?
(a) Partition of Bengal
(b) Jallianwala Bagh Massacre
(c) Simon Commission
(d) Morley-Minto reforms

125. Which of the following is a Fundamental Right?
(a) Right to Work
(b) Right to Freedom of Religion
(c) Right to Property
(d) Right to Protection of Forest and Wildlife

Section V Intelligence

126. In a list, if Shikha is 15th from the upper end and 17th from the lower end, then find the total number of people in the list.
(a) 41 (b) 33 (c) 31 (d) 32

127. Find the fourth proportional of 4, 5 and 16.
(a) 25 (b) 16
(c) 30 (d) 20

128. Pitch is related to 'Cricket', in the same way as 'Arena' is related to
(a) Tennis (b) Gymnastics
(c) Badminton (d) Wrestling

129. The time in the clock is quarter past twelve. If the hour hand points to the East, which is the direction opposite to the minute hand?
(a) South-West (b) South
(c) West (d) North

130. Five boys A, B, C, D and E are sitting in a row. A is to the right of B and E is to the left of B but to the right of C. A is to the left of D. Who is second from the left end?
(a) B (b) E
(c) A (d) C

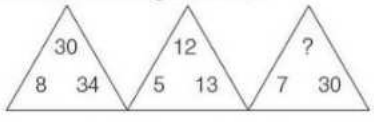
131. A word has been given, followed by four other words, one of which can be formed by using the letters from the given word PREPARATION.
Find the word.
(a) PAMPER (b) REPEAT
(c) PARTITION (d) PARROT

132. What is the angle between the hour hand and the minute hand when it is 5:10 pm?
(a) 150° (b) 120° (c) 115° (d) 95°

133. From his house, Ramesh goes 15km to North. Then he turns West and covers 20 km. Then he turns South and covers 5 km. Finally he turns East and covers 30 km. Looking from his house, in which direction is he standing?
(a) North-West (b) North-East
(c) South-East (d) South-West

134. Five friends are standing in a row. Amar is taller than Sameer. Prabhat is taller than Umesh but not as tall as Sameer. Ashok is shorter than Umesh. Who among them is the shortest?
(a) Ashok (b) Umesh
(c) Sameer (d) Amar

135. Insert the missing number.



(a) 11 (b) 27 (c) 19 (d) 22

136. Choose the alternative that best represents a relationship similar to the one expressed in the original pair.
F : 216 : : L : ?
(a) 1728 (b) 1700
(c) 1600 (d) 1723

137. In a certain code 'TERMINAL' is written as 'NSFUMBOU' and 'TOWERS' is written as 'XPUTSF.' How is 'MATE' written in the same code?
(a) FUBN (b) UFNB (c) BNFU (d) BNDS

138. Arrange the following words as per order in the dictionary
1. Quilt 2. Quite 3. Queen 4. Queue
(a) 1, 4, 2, 3 (b) 4, 3, 1, 2
(c) 2, 3, 4, 1 (d) 3, 4, 1, 2

139. Find the odd one that does not belong to the group.
(a) KOMN (b) DWFU (c) EVHS (d) HSKP

140. Complete the series:
3, 10, 101,?
(a) 10101 (b) 10201 (c) 10202 (d) 11012

141. Select the related word from the given alternatives.
Hirakud : Mahanadi : : Tehri Dam : ?
(a) Damodar (b) Bhagirathi
(c) Yamuna (d) Sone

142. In the following question, select the missing number from the given series.

25	144	60
81	225	135
49	289	?

(a) 119 (b) 120 (c) 170 (d) 190

143. Fill with a suitable word.
Quarantined : Separated : : Radical : ?
(a) Unfriendly (b) Bad
(c) Fundamental (d) Dreary

144. Choose the letter group that represents a relationship similar to the one expressed the original pair of letter groups.
UNDERSTAND : DASENNTRDU : :
RETIREMENT : ?
(a) TEEIENMRTR (b) TNEMERITER
(c) EMENTRETIR (d) ERITEREMTN

145. P is the brother of Q and R, S is R's mother. T is P's father. Which of the following statements cannot be definitely true?
(a) T is Q's father (b) S is P's mother
(c) P is S's son (d) Q is T's son

146. Choose the correct option in place of question mark (?) to complete the given series 21, 25, 33, 49, 81, ?
(a) 145 (b) 132 (c) 113 (d) 101

147. 'Tiger' is related to 'Cub', in the same way as 'Elephant' is related to .....
(a) Chick (b) Hatchling
(c) Joey (d) Calf

148. If in the year 2012, January 1st is Sunday then which day is the Indian Republic Day in the year 2012?
(a) Saturday (b) Monday
(c) Thursday (d) Friday

149. What comes next in the series
7, 14, 42, 168, ?
(a) 1008 (b) 840 (c) 504 (d) 672

150. Michael is 14th from the left end in a row of 40 boys. What is his position (rank) from the right end?
(a) 21st (b) 24th
(c) 25th (d) 27th

Answers

1	(b)	2	(b)	3	(c)	4	(b)	5	(b)	6	(d)	7	(c)	8	(b)	9	(c)	10	(c)
11	(a)	12	(b)	13	(b)	14	(b)	15	(b)	16	(c)	17	(c)	18	(d)	19	(d)	20	(a)
21	(b)	22	(b)	23	(d)	24	(d)	25	(a)	26	(b)	27	(a)	28	(c)	29	(a)	30	(c)
31	(a)	32	(c)	33	(c)	34	(c)	35	(b)	36	(c)	37	(b)	38	(b)	39	(d)	40	(c)
41	(a)	42	(b)	43	(a)	44	(b)	45	(b)	46	(a)	47	(d)	48	(b)	49	(c)	50	(b)
51	(a)	52	(c)	53	(b)	54	(d)	55	(b)	56	(c)	57	(d)	58	(b)	59	(b)	60	(d)
61	(a)	62	(c)	63	(c)	64	(d)	65	(a)	66	(b)	67	(b)	68	(a)	69	(d)	70	(c)
71	(a)	72	(d)	73	(a)	74	(b)	75	(c)	76	(d)	77	(c)	78	(c)	79	(a)	80	(b)
81	(c)	82	(a)	83	(c)	84	(c)	85	(d)	86	(c)	87	(b)	88	(a)	89	(c)	90	(c)
91	(c)	92	(a)	93	(c)	94	(a)	95	(a)	96	(c)	97	(a)	98	(c)	99	(d)	100	(c)
101	(c)	102	(b)	103	(c)	104	(a)	105	(d)	106	(b)	107	(a)	108	()	109	(a)	110	(a)
111	(a)	112	(d)	113	(b)	114	(d)	115	(c)	116	(c)	117	(b)	118	(c)	119	(a)	120	(d)
121	(c)	122	(d)	123	(a)	124	(b)	125	(b)	126	(c)	127	(d)	128	(d)	129	(d)	130	(b)
131	(d)	132	(d)	133	(b)	134	(a)	135	(c)	136	(a)	137	(c)	138	(d)	139	(d)	140	(c)
141	(b)	142	(a)	143	(c)	144	(a)	145	(d)	146	(a)	147	(d)	148	(c)	149	(b)	150	(d)

Hints & Solutions

1. (b) $1296 = \underbrace{2 \times 2 \times 2 \times 2} \times \underbrace{3 \times 3 \times 3} \times 3$

$\therefore$ 1296 must be divided by $3 \times 2 = 6$ to get a perfect cube number.

2. (b) Number of students not good in Mathematics $= 25 - \frac{72}{100} \times 25$

$= 25 - 18$

$= 7$

3. (c) The central angle of $40\% = \frac{40}{100} \times 360^\circ$

$= 144^\circ$

4. (b) Total monthly salary = ₹ 15000

Central angle for food and house rent = 60°

$\therefore$ Amount spent on food and house rent

$= \frac{60^\circ}{360^\circ} \times 15000$

= ₹ 2500

5. (b) The midvalue of class interval is called class mark.

6. (d) Mode = 12, Mean = 3

$\because$ Mode = 3 Median − 2 Mean

$12 = 3 \times \text{Median} - 2 \times 3$

3 Median = 18

$\text{Median} = \frac{18}{3} = 6$

7. (c) $\sqrt{0.00000121} = \sqrt{\frac{121}{100000000}}$

$= \frac{11}{10000}$

$= 0.0011$

8. (b) We know that, $(329)^2 = 108241$

So, the least number which must be subtracted from 108245 to get a perfect square is, $108245 - 108241 = 04$

9. (c) Cube root of $6859 = \sqrt[3]{6859}$

$= 19$

Hence, unit's digit of 19 is 9.

10. (c) Amount (A) = ₹ 4410

Rate of interest (R) = 5% per annum

Let the principal be ₹ P.

Time (T) = 2 yr

We know that,

$$A = P\left(1 + \frac{R}{100}\right)^T$$

$$4410 = P\left(1 + \frac{5}{100}\right)^2$$

$$4410 = P\left(\frac{21}{20}\right)^2$$

$$P = \frac{4410 \times 20 \times 20}{21 \times 21} \Rightarrow P = ₹4000$$

11. (a) Required value

$= (x - 3y + 2z) + (-4x + 9y - 11z) - (3x - 4y - 7z)$

$= x - 3y + 2z - 4x + 9y - 11z - 3x + 4y + 7z$

$= -6x + 10y - 2z$

12. (b) $x - 2 = 0 \Rightarrow x = 2$

$P(x) = 5x^2 - 4x + 3$

Therefore, by remainder theorem,

$P(2) = 5(2)^2 - 4(2) + 3$

$= 20 - 8 + 3 = 20 - 5 = 15$

13. (b) We know that, $(a - b)^2 = a^2 + b^2 - 2ab$

Given, $x - \frac{1}{x} = 3$

Squaring both sides,

$$x^2 + \frac{1}{x^2} - 2 = 9$$

$$x^2 + \frac{1}{x^2} = 11$$

Now, we know that $(a + b)^2 = a^2 + b^2 + 2ab$

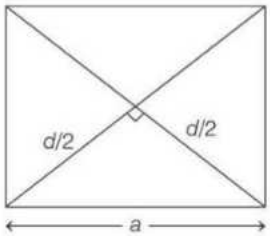
Squaring both sides,

$$x^4 + \frac{1}{x^4} + 2 = 121$$

$$x^4 + \frac{1}{x^4} = 121 - 2$$

$$x^4 + \frac{1}{x^4} = 119$$

14. (b)



By Pythagoras theorem,

Side of square, $a = \sqrt{\left(\frac{d}{2}\right)^2 + \left(\frac{d}{2}\right)^2}$

$$a = \sqrt{2}\,\frac{d}{2}$$

$$a = \frac{d}{\sqrt{2}}$$

$\therefore$ Area of square $= a^2 = \left(\frac{d}{\sqrt{2}}\right)^2 = \frac{d^2}{2}$

15. (b) Let 'r' be the radius of circle.

Area of circle = 154

$$\pi r^2 = 154$$

$$r^2 = \frac{154 \times 7}{22}$$

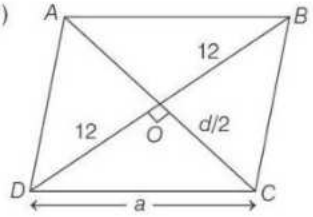
$$r^2 = 7 \times 7$$

$$r = 7\text{ cm}$$

Perimeter of circle $= 2\pi r$

$$= 2 \times \frac{22}{7} \times 7 = 44\text{ cm}$$

16. (c)



Let 'a' be the side of Rhombus and 'd' be the other diagonal AC,

$$BD = 24\text{ cm}$$

$$DO = DB = \frac{BD}{2} = \frac{24}{2} = 12\text{ cm}$$

Perimeter = 80 cm

$$4a = 80$$

$$a = \frac{80}{4} = 20\text{ cm}$$

Now, in ΔDOC,

by Pythagoras theorem,

$$a^2 = (12)^2 + \left(\frac{d}{2}\right)^2$$

$$(20)^2 = (12)^2 + \left(\frac{d}{2}\right)^2$$

$$\left(\frac{d}{2}\right)^2 = 400 - 144 \Rightarrow \left(\frac{d}{2}\right)^2 = 256$$

$$\frac{d}{2} = 16 \Rightarrow d = 32\text{ cm}$$

Area of Rhombus $= \frac{1}{2} \times$ product of diagonals

$$= \frac{1}{2} \times 24 \times 32$$

$$= 384\text{ cm}^2$$

17. (c) CP of 1 pencil = 5 paise

Profit (P) = 20%

SP of pencil to make 20% profit $= \text{CP} \times \frac{(100 + P)}{100}$

$$= 5 \times \frac{120}{100}$$

$$= 6\text{ paise}$$

18. (d) Let the radius and height of both the cylinder and cone be 'r' and 'h' respectively.

$$\frac{\text{Volume of cylinder}}{\text{Volume of cone}} = \frac{\pi r^2 h}{\frac{1}{3}\pi r^2 h} = \frac{3}{1} = 3:1$$

19. (d) Let 'r' be the radius and 'h' be the height of cone then,

Volume of cone $(V_1) = \frac{1}{3}\pi r^2 h$ ...(i)

Now, if radius and height are doubled, then new radius and new height will be '$2r$' and '$2h$' respectively.

New volume of cone $= \frac{1}{3}\pi\,(2r)^2(2h)$

$$(V_2) = \frac{1}{3}\pi \times 8 \times r^2 \times h$$

$$V_2 = 8\left(\frac{1}{3}\pi r^2 h\right)$$

$$V_2 = 8 \times V_1 \quad \text{[from Eq. (i)]}$$

Hence, the new volume becomes 8 times the old volume.

20. (a) Let 'r' be the radius of the hemisphere.

$\therefore$ Volume $= 19404$

$$\Rightarrow \quad \frac{2}{3}\pi r^3 = 19404$$

$$\Rightarrow \quad r^3 = \frac{19404 \times 7 \times 3}{2 \times 22} \Rightarrow r^3 = 9261$$

$$\Rightarrow \quad r = \sqrt[3]{9261} \Rightarrow r = 21$$

Now,

Surface area of hemisphere $= 3\pi r^2$

$$= 3 \times \frac{22}{7} \times (21)^2$$

$$= 4158 \text{ cm}^2$$

21. (b) $125^{-1/3} = \left(\frac{1}{125}\right)^{1/3} \qquad \left[\because a^{-m} = \frac{1}{a^m}\right]$

$$= \left(\frac{1}{5 \times 5 \times 5}\right)^{1/3} = \frac{1}{(5^3)^{1/3}} = \frac{1}{5}$$

22. (b) $(64^{2/3})^{1/2}$

$$= (64)^{\frac{2}{3} \times \frac{1}{2}} \qquad [\because (a^m)^n = a^{mn}]$$

$$= (64)^{1/3}$$

$$= (4 \times 4 \times 4)^{1/3} = (4)^{3 \times \frac{1}{3}} = 4$$

23. (d) $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$

$$= (2)^2 + (3)^2 + (4)^2 \qquad \left[\because a^{-m} = \left(\frac{1}{a}\right)^m\right]$$

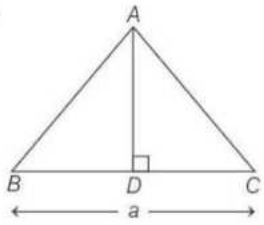
$$= 4 + 9 + 16$$

$$= 29$$

24. (d) The additive identity for integers does not exist.

25. (a) Associative property of multiplication of integers exists.

26. (b)



ΔABC is an equilateral with each side a.

$$\therefore \qquad BC = a,\ DC = \frac{a}{2}$$

Now, in ΔADC

Altitude, $AD = \sqrt{AC^2 - CD^2}$

$$AD = \sqrt{a^2 - \left(\frac{a}{2}\right)^2}$$

$$AD = \sqrt{a^2 - \frac{a^2}{4}}$$

$$AD = \sqrt{\frac{3a^2}{4}}$$

$$AD = \frac{\sqrt{3}a}{2}$$

27. (a) $a + b + c = 5$

$$\Rightarrow \quad (a + b + c)^2 = 25$$

$$\Rightarrow \quad a^2 + b^2 + c^2 + 2(ab + bc + ac) = 25$$

$$\Rightarrow \quad a^2 + b^2 + c^2 + 2 \times 10 = 25$$

$$\Rightarrow \quad a^2 + b^2 + c^2 = 25 - 20 = 5$$

We know that,

$$a^3 + b^3 + c^3 - 3abc$$

$$= (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$$

$$= 5 \times [(a^2 + b^2 + c^2) - (ab + bc + ca)]$$

$$= 5 \times (5 - 10)$$

$$= 5 \times (-5) = -25$$

28. (c) $\frac{a}{b} + \frac{b}{a} = 2$

$$\frac{a^2 + b^2}{ab} = 2$$

$$a^2 + b^2 - 2ab = 0$$

$$(a - b)^2 = 0$$

$$a = b \qquad \ldots(i)$$

Now, $a^3 - b^3 = a^3 - a^3$ [from Eq. (i)]

$$= 0$$

29. (a) $3\sqrt{3}\,x^3 - 8 = (\sqrt{3}x)^3 - 2^3$

We know that, $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$$\therefore \qquad (\sqrt{3}\,x)^3 - (2)^3 = (\sqrt{3}x - 2)$$

$$[(\sqrt{3}x)^2 + \sqrt{3}x \times 2 + 2^2]$$

$$= (\sqrt{3}x - 2)(3x^2 + 2\sqrt{3}x + 4)$$

30. (c) There are total 36 outcomes on throwing two dice simultaneously.

31. (a) Total outcomes = 8

$(HHH, HHT, HTH, HTT, THH, THT, TTH, TTT)$

Atmost one head = 4 (HTT, THT, TTH, TTT)

Required probability $= \frac{4}{8} = \frac{1}{2}$

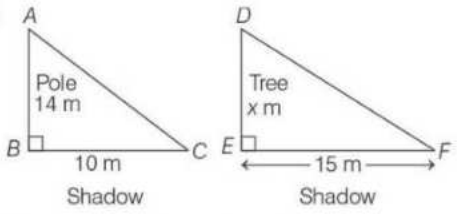
32. (c) Let the required number of days be x.

Now, $M_1D_1 = M_2D_2$

$100 \times 30 = 80 \times x$

$$x = \frac{100 \times 30}{80} \Rightarrow x = 37\frac{1}{2} \text{ days}$$

33. (c)



We know that, $\Delta ABC \sim \Delta DEF$

$$\therefore \quad \frac{AB}{DE} = \frac{BC}{EF} \Rightarrow \frac{14}{x} = \frac{10}{15} \Rightarrow x = \frac{14 \times 15}{10}$$

$x = 21$ m

$\therefore$ The height of tree $(x) = 21$ m

34. (c) $M_1 = 15$ workers, $D_1 = 48$ h

$M_2 = ?$, $D_2 = 30$ h

We know that,

$$M_1D_1 = M_2D_2$$

$$15 \times 48 = M_2 \times 30$$

$$M_2 = \frac{48 \times 15}{30}$$

$$M_2 = 24 \text{ workers}$$

Hence, total 24 workers are required to do the same work in 30 h.

35. (b) The consecutive interior angles on the same side of transversal is always supplementary.

36. (c) Origin = (0, 0), point = (12, 5)

$\therefore$ The required distance $= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

$$= \sqrt{(0-12)^2 + (0-5)^2}$$

$$= \sqrt{(-12)^2 + (-5)^2}$$

$$= \sqrt{144 + 25} = \sqrt{169}$$

$= 13$ units

37. (b) Total 5 days work of A and $B = 5\left(\frac{1}{25} + \frac{1}{20}\right)$

$$= 5\left(\frac{4+5}{100}\right) = \frac{9}{20}$$

Remaining work $= 1 - \frac{9}{20} = \frac{11}{20}$

Time taken by B to finish the remaining work

$$= \frac{\left(\frac{11}{20}\right)}{\left(\frac{1}{20}\right)} = 11 \text{ days}$$

38. (b) Let the two digit number $= 10x + y$

Number obtained by reversing the digit

$= 10y + x$

Difference $= (10x + y) - (10y + x)$

$= 10x + y - 10y - x$

$= 9x - 9y = 9(x - y)$

$\therefore$ The difference is always a multiple of 9.

39. (d) Measure of third angle

$= 180° -$ (sum of other two angles)

$= 180° - 90° = 90°$

40. (c) Let the interior opposite angles be x and $3x$.

We know that, in a triangle,

Exterior angle = Sum of interior opposite angles

$$60° = x + 3x$$

$$4x = 60°$$

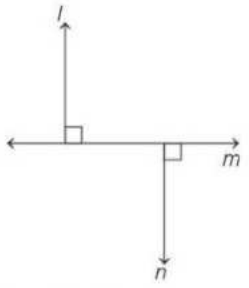
$$x = 15°$$

$\therefore$ The angles of triangle are, $x = 15°$

$$3x = 45°$$

and $180° - (15° + 45°) = 120°$

41. (a)



If $l \perp m$ and $n \perp m$,

then, $l \| n$

Lines l and n are parallel to each other.

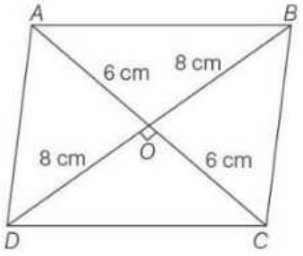
42. (b) Share (central angle) of food $= \frac{61}{100} \times 360°$

$= 219.6°$

Share (central angle) of fuel $= \frac{5}{100} \times 360° = 18°$

43. (c) The alternate name of pie chart is circle chart.

44. (b)



$\therefore ABCD$ is a Rhombus

$\therefore OD = \frac{BP}{2} = \frac{16}{2} = 8\,\text{cm}$

and $OC = \frac{AC}{2} = \frac{12}{2} = 6\,\text{cm}$

In right ΔDOC

$$DC = \sqrt{8^2 + 6^2}$$
$$DC = \sqrt{64 + 36}$$
$$DC = \sqrt{100}$$
$$DC = 10\,\text{cm}$$

Hence, the side of Rhombus is 10 cm.

45. (b) $\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}}$

$$8 = \frac{2 + 4 + 8 + 6 + x + 5}{6}$$
$$25 + x = 48$$
$$x = 48 - 25$$
$$x = 23$$

46. (a) $1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{9}}} = 1 + \frac{1}{1 + \frac{1}{\left(\frac{10}{9}\right)}}$

$$= 1 + \frac{1}{\left(1 + \frac{9}{10}\right)} = 1 + \frac{1}{\left(\frac{19}{10}\right)}$$
$$= 1 + \frac{10}{19} = \frac{29}{19}$$

47. (d) Let, $x = 3.\overline{2}$ ...(i)

$$10x = 32.\overline{2} \quad \text{...(ii)}$$

Subtracting Eq. (i) from Eq. (ii),

$$9x = 29$$
$$x = \frac{29}{9}$$

Let, $y = 5.\overline{4}$ ...(iii)

$$10y = 54.\overline{4} \quad \text{...(iv)}$$

Subtracting Eq. (iii) from Eq. (iv),

$$9y = 49$$
$$y = \frac{49}{9}$$

Now, $3.\overline{2} + 5.\overline{4} = \frac{29}{9} + \frac{49}{9} = \frac{78}{9}$

48. (b) Let x must be added to $-\frac{7}{3}$ to get $\frac{3}{7}$, then

$$\frac{-7}{3} + x = \frac{3}{7}$$
$$x = \frac{3}{7} + \frac{7}{3}$$
$$x = \frac{9 + 49}{21}$$
$$x = \frac{58}{21}$$

49. (c) Let the two numbers be $5x$ and $2x$ respectively, then

$$5x - 2x = 66$$
$$3x = 66$$
$$\Rightarrow \quad x = 22$$

$\therefore$ The two numbers are, $5x = 5 \times 22 = 110$

$$2x = 2 \times 22 = 44$$

50. (b) We know that opposite angles of parallelogram are always equal.

$\therefore$ Angle A = Angle C

51. (a) In the given passage, it is stated that Marie's elder sister died of typhus and her mother died of tuberculosis. Hence, option (a) is the only statement that is not true according to the passage.

52. (c) As per the passage, even though Maries lived in poverty, she enjoyed her university years. Hence, option (c) is correct.

53. (b)As Marie was a child of two teachers, she was taught to read and write very early. This shows that a lot of emphasis was given on her education. Hence, option (b) is the correct answer.

54. (d) The word 'fiendish' means 'extremely cruel or unpleasant.' From the given options, 'pleasant' is its antonym.

55. (b) Option (b) 'doing hardwork' contains an error. To make it grammatically correct and contextually meaningful, replace it with 'working hard'.

56. (c) Preposition 'for' makes the sentence grammatically correct and contextually meaningful.

57. (d) In comparative adjectives, no article is used.

58. (b) The word 'Pretended' is the past participle form of the verb.

59. (b) Option (b) 'will have' will make the sentence grammatically correct and contextually meaningful.

60. (d) Option (d) is the grammatically correct and contextually meaningful indirect speech of the given direct speech.

61. (a) Option (a) gives the correctly spelt word.

62. (c) The word 'Zenith' means 'highest point'. From the given options, 'Pinnacle' meaning 'the highest or culminating point' is its correct synonym.

63. (c) Option (c) containing the adjective of manners makes the sentence grammatically correct and contextually meaningful.

64. (d) To make the underlined part grammatically correct and contextually meaningful, replace it with the phrase given in option (d).

65. (a) As the word 'young' describes the teacher, it is an adjective.

66. (b) Option (b) will make the sentence grammatically correct and contextually meaningful.

67. (b) Option (b) is the grammatically correct and contextually meaningful passive voice of the given active voice.

68. (a) Option (a) will make the sentence grammatically correct and contextually meaningful.

69. (d) Option (d) will make the sentence grammatically correct and contextually meaningful.

70. (c) Option (c) will make the sentence grammatically correct and contextually meaningful.

71. (a) Option (a) will make the sentence grammatically correct and contextually meaningful.

72. (d) Option (d) forms a grammatically correct and contextually meaningful sentence.

73. (a) Option (a) forms a grammatically correct and contextually meaningful sentence.

74. (b) The phrase 'to tie yourself in knots' means 'to get very confused and anxious'.

75. (c) Option (c) is the grammatically correct and contextually meaningful passive voice of the given active voice.

76. (d) The larva of frog i.e. tadpole changes its physical form by a sudden and drastic process known as metamorphosis. During metamorphosis, tadpole will develop back legs first then front legs. While the tadpole's tail shrinks and its body becomes less rounded. They also develop lungs and eardrums. Four this metamorphosis of tadpole into frog iodine is essential and this process takes 14 weeks to complete.

77. (c) Cloning is similar to asexual mode of reproduction. In asexual mode of reproduction, single parent produces two or more progenies which are genetically similar to parent and its other sibling progenies. These progenies are called clone of each-other and their parent. Similarly, cloning is the process of producing individuals with identical or virtually identical DNA, either naturally or artificially. Thus, in cloning both parent and child have same DNA.

78. (c) The value of normal atmosphere pressure is 101.325 KPa or 101325 Pa. Atmospheric pressure is measured by barometer. At sea level, the barometer will read a value of standard or normal atmospheric pressure which is equal to the pressure exerted by 760 mm tall column of mercury.

79. (a) Loudness of sound is proportional to the square of the amplitude. The loudness of sound depends on the amplitude of the sound wave, if the amplitude of the sound wave is large, then the sound is said to be loud. It is expressed in decibel (db).

80. (b) Initially the distance between the man and mirror =10 m

Now the distance between man and image

$= 10 + 10 = 20$ m

Distance between the man and his image is 5m

When the man is 2.5 m always from the mirror.

Therefore, he has to walk = 10 m − 2.5 m

= 7.5 m toward the mirror

81. (c) Chromium is used in electroplating to make metal objects appear shining on car surfaces Electroplating is the coating of a metal with another metal. It is used to make cheap metals look expensive or a mundane metal to look more shining.

82. (a) Sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) are the two gases that react with water and oxygen and other gases to form more acidic pollutants, known as acid rain.

83. (c) Sperm, testis, sperm duct,penis, etc. are either product or organs related to a male reproductive system, while menstruation, ovulation, egg, oviduct, uterus, etc. are either process, product or organs related to female reproductive system. Thus, option (c) is incorrect combination.

84. (c) Galvanisation is a process of protecting iron or steel from rusting by coating them with a thin layer of zinc. Thus, the process of zinc lamination (coating) or iron is called galvanisation.

85. (d) Conditions for good electroplating are high current density, low temperature, and high concentration of metal in electrolyte.

Hence, option (d) is correct.

86. (b) Electroplating is a process that uses electric current to reduce dissolved metal ions by the use of electrolysis, to obtain the dissolved metal ions at the the other electrode mostly in the form of a uniform coating.

87. (b) The richter scale is base 10 logarithmic scale meaning that each order of magnitude is 10 times more intensive than the last one. Hence, the option (b) is correct.

88. (a) Rabi crops are sown at the start of winter season in October-November and are harvested at the end of the winter and start of the summer (during spring) in March–April, e.g. Rice, mustard, gram, etc.

89. (c) Fermentation is a biological process, which converts sugar into alcohol and carbon dioxide as byproducts. Alcoholic fermentation is considered an anaerobic process.

90. (c) Gir National Park, Gujarat is famous for the last habitat of Asiatic lion in India.

Sunderban National Park, West Bangal is famous for its royal Bangal tigers.

Kaziranga National Park, Assam is the home of one horned Indian rhinos. Ranthambore, National Park, Rajasthan is popular for tiger conservation.

91. (c) Water harvesting means collecting unused water for our daily purposes and using it after appropriate manners, i.e. collection of rain water in storage tanks which prevent its run-off. It is a very useful water conservation method in areas where water availability is low.

92. (a) A person suffering from common cold should always cover his mouth and nose with a handkerchief, while sneezing to prevent its further spread or transmission to other healthy person. This viral disease is transmitted by air droplets.

93. (c) Wool traps the most air. The effect of this is that clothes made up of wool act as insulating medium because air is an insulator and as a result, these clothes trap the heat given out by the body.

94. (a) Phosphorus is highly reactive and is used in making matchsticks. It is easily ignited by the heat of friction against a rough surface.

95. (a) Metals react with water and produce a metal oxide and hydrogen gas. Metal oxides that are soluble in water dissolve in it to further form metal hydroxide.

96. (c) In cell, except nucleus, mitochondria and plastids (chloroplast) all cell organelles lack DNA. Thus, option (c) is correct as lysosomes and vacuoles do not have their own DNA.

97. (a) Cell wall helps in distinguishing a plant cell from an animal cell as it is only present in plant cells. In plant cell, cell wall is the outer most protective and dead layer made up of cellulose, pectin, hemicellulose, lignin, etc.

98. (c) Naphthalene balls used to repel moths and insects is derived from coal tar. It is the product obtained from the destructive distillation of coal.

99. (d) The slow process of conversion of dead vegetation into coal is called carbonisation. It is a process by which solid residues with increasing content of the element carbon are formed from organic material usually by Pyrolysis in an inert atmosphere. Which are released during sneeze of infected person.

100. (c) Coal tar is the petroleum product. It is used in metallic of roads. Coal tar is a thick dark liquid which is a byproduct of the production of coke and coal gas from coal.

101. (c) Rowlatt Act was termed as devilish and tyrannical by Gandhiji and Jinnah. The Anarchical and Revolutionary Crimes Act of 1919, popularly known as Rowlatt Act, was passed to incarcerate the Indians without trial. The main purpose of this act was to curb the growing nationalist upsurge in the country. Gandhi and Jinnah felt that the government had no right to restrict the basic freedoms of the people. Therefore, they criticised it as devilish and tyrannical. Ilbert Bill (introduced-9th February, 1883) concerned the Jurisdiction of Magistrates or sessions judge to try changes against British subjects if they were themselves not European. Jallianwala Bagh Massacre took place on 13th April, 1919 in which at least 379 to 1000 people were killed.

Government of India Act, also known as Montage-Chelmsford reforms came into force in 1921.

102. (b) D.K. Basu guidelines are the specific requirements and procedure laid down by the Supreme Court of India for the police and other agencies to follow during arrest, detention and interrogation of person. Some of the guidelines include

(a) The police officials, who carry out the arrest or interrogation should wear clear, accurate and visible identification and name tags with their designations.

(b) A memo of arrest should be prepared at the time of arrest and should also include the time and date of arrest.

(c) The person arrested, detained or being interrogated has a right to inform a relative, friend or well-wisher.

103. (c) On 8th April, 1929, Bhagat Singh along with freedom fighter Batukeshwar Dutt, hurled two bombs inside the central legislative assembly in New Delhi. The aim behind the bombing was not to cause harm but protest against the passing of two repressive bills, the public safety bill and trade dispute bill. Bhagat Singh was an Indian revolutionary who was executed at the tender age of 23. Subhash Chandra Bose was an Indian revolutionary who founded forward block.

Bal Gangadhar Tilak, an Indian activist, was called by British authorities "the father of Indian unrest".

Chandra Shekhar Azad, an Indian revolutionary, founded Hindustan Socialist Republican Army (HSRA).

104. (a) Khudai Khidmatgar (Servants of God), also known as Red Shirts, was a pashtun non-violent resistance movement against the British Raj. It was founded by Khan Abdul Gaffar Khan, also known as Bacha Khan, Badshah Khan or Sarhadi Gandhi. This movement was mainly based in North-West frontier Province (now in Khyber Pakhtunkhwa). Khan Abdul Gaffar Khan was also awarded 'Bharat Ratna' in 1987.

Mohammad Ali Jinnah, the leader of All India Muslim League, was the founder of Pakistan.

Maulana Azad was a freedom fighter and the first Minister of Education in Independent India.

105. (d) The term 'Tsunami' is a Japanese term which means 'Harbour wave'. It is a series of waves in a water body caused by the displacement of a large volume of water, generally in an Ocean or a large lakes. It can be generated by earthquakes, volcanic eruptions, underwater explosions above or below the water.

106. (b) Air pressure decreases as the height of a surface above ground level increases. It is because as the height increase.

(a) the number of air molecules decreases

(b) the weight of the air decreases

(c) gravitational force decrease

Air pressure is the pressure within the atmosphere of Earth. It is measured in barometer.

107. (a) Viticulture is the cultivation and harvesting of grapes. It is the branch of the science of horticulture.

The cultivation of fish is called pisciculture.

The cultivation of silk is called soriculture.

The cultivation of apple comes under horticulture.

108. (*) Gandhiji launched the Mill worker's strike of 1918 in Ahmedabad. The mill owners and workers were in conflict on the question of plague bonus. The Mill owners wanted to withdraw the bonus whole while the workers demanded a 50% wage hike. The Mill owners wanted to give only 20% wage hike.Gandhiji used the weapon of Hunger strike. The result was that the workers got a 35% wage increase.

109. (a) Muhammad Ali Khan of Arcot appointed Tilly Kettle and George Willison. Tilly kettle (1735-1786) was a portrait painter and the first prominent English portrait painter to operate in India. George Willison (Scottish) was a portrait painter and spent an extended period at the court of Nawab of Arcot.

Muhammad Ali Khan (reign 1749-1795) was the Nawab of Arcot and an ally of the British East India Company. He was granted the titles like "Siraj-ud-daula", "Dilawar Jang" etc. by imperial firman on 5th April, 1750.

110. (a) The temperate grasslands of South Africa are called velds. Velds are rolling plateau with varying heights ranging from 600 m to 1100 m. It is bound by the Drakensburg mountains on the East, to its West lies the Kalahari desert. On the North-eastern part, "high velds" are located that attain the height of more than 1600 m, in some places.

Temperate grasslands in North America is called 'Prairies'. Temperate grasslands in South America is called "Pampas". Temperate grasslands in Australia is called 'Downs'.

111. (a) Thinnest layer of the Earth is crust. Its depth varies from 0-80 km. Earth can be divided into the crust, upper mantle, lower mantle, outer core and inner core. In Earth's crust silicon and aluminium are found in abundance.

The depth of Earth's mantle varies from 80 to 2890 km. It is the thicket layer of Earth. In Earth's mantle, silicon and magnesium are found.

The depth of core varies from 2890-6370 km. It is the innermost layer of Earth. Nickel and ferrous are found at this layer.

112. (d) Mica is an example of non-metallic metal. Mica group include 37 phyllosilicate minerals. Micas are used in variety of products ranging from drywalls, paints, roofing and shingles, electronics etc.

Bauxite is an ore from which, metal Aluminium is extracted. Manganese and lead are metals.

113 (b) Akbar ascended the throne on 14th February, 1556, when he was of just 13 years of age. He was the third Mughal Emperor (reign 1556-1605) and was the most successful ruler.

Humayun (reign 1530-1556) was the second Mughal ruler and father of Akbar.

Jehangir (reign 1605-1627) was the fourth Mughal ruler and son of Akbar.

Shah jahan (reign 1628-1658) was the fifth Mughal ruler and mostly known for the construction of Taj Mahal in Agra.

114. (d) The number of seats reserved for scheduled tribes in the Lok Sabha is 47. Currently, the Lok Sabha has 543 seats.Out of it, 47 seats are reserved for scheduled tribes and 84 seats are reserved for scheduled castes. Lok Sabha, also known as House of People, is the lower house of the Parliament and its members are elected by an adult universal suffrage for five years or dissolved by the President. Scheduled tribes are officially designated groups of people in India and comprise of 8.6% of total population of India.

115. (c) Constitution of India is referred to as the Supreme Law of land. In Minerva Mill case V/s. Union of India, the court held that "the people of the country, the organs of the government, legislature, executive and judiciary are all bound by the Constitution, which is paramount law of the land and nobody is above or beyond the Constitution". Supermacy of the Constitution is the basic structure of Constitution. Our Constitution is a written Constitution which was ratified on 26th November, 1949 and came into force on 26th January, 1950.

116. (c) The breaking up and delaying of exposed rocks by temperature changes, frost action, plants, animals and human activity is called weathering. There are three types of weathering -Physical, chemical and biological. Water, acids, salt, plants, animals and changes in temperature are all agents of weathering and erosion.

117. (b) A motion of non-confidence can be introduced only in Lok Sabha. The motion is admitted for discussion when a minimum of 50 members of the house support the motion. If the motion carries, the house debates and votes in the motion. If a majority of members of the house vote in favour of the motion, the motion is passed and the government is bound to vocate the office.

118. (c) Ministry of Human Resource Development was created in 1985 by the Rajiv Gandhi Government. Prior to 1985 it was known as Ministry of Education. In 2020, with the public announcement of newly drafted "National Education Policy 2020", Ministry of Human Resources Development was renamed back to Ministry of Education. Now it has been divided into two departments. Department of School of Education and literacy and Department of Higher Education.

119. (a) The word 'Dikus' means outsiders. Tribals used this term for outsiders. These outsiders consist of traders, moneylenders, missionaries, landlords and the Britishers. 'Dikus' mode the tribal people depend on them, thereby causing them a lot of misery and suffering.

120. (d) On 29th March, 1857, Mangal Pandey, a soldier in the 34th infantry battallion, Barrackpore (Calcutta), revolted against the Britishers and killed his official. He was angered by the recent actions of East India Company, like introducing the Enfield rifles to the soldiers. He was later arrested and was hanged on 8th April, 1857. This event sowed the seed for 1857 revolt which is called by some people as the first war of independence.

121. (c) Bhuj Earthquake is not categorised under the Himalayan Earthquake. It is because Bhuj is located in Gujarat which does not come under Himalayan range. Himalaya is a mountain range in South and East Asia separating the plains of India subcontinent from Tibetan plateau. Uttarakashi Earthquake, Kangra earthquake and Delhi earthquake come in the category of Himalayan earthquakes as there is the influence of Himalayan earthquake in these regions.

122. (d) Pandita Ramabai, a great scholar of Sanskrit felt that Hinduism was oppressive towards women. She also wrote book about the lives of upper caste Hindu women. Pandita Ramabai (1858-1922) was a social reformer and a female rights activist. She was the first Indian woman to be awarded the titles of 'Pandita' as a Sanskrit scholar and 'Saraswati' by the faculty of the university of Calcutta. She founded a widow's home at Poona to provide shelter to widows. Narayan Guru was a social reformer who led a reform movement against the injustice in the caste-ridden society of Kerala.

Raja Ram Mohan Roy was a social reformer who founded Brahma Samaj in 1828.

MG Ranade, a social reformer and one of the founding member of Prarthana Samaj.

123. (a) When fossil fuels are burnt, they release a large amount of carbon dioxide a greenhouse gas, into the air. These greenhouse gases trap heat in our atmosphere, causing global warming.

124. (b) Jallianwala Bagh massacre made Tagore angry and made him renounce his knighthood. The massacre took place Amritsar on 13th April, 1919 when the crowd in Jallianwala Bagh was fired upon by British Indian Army. Tagore wrote a letter to the Viceroy of India after the incident to renounce the British honorary title on 31st May, 1919.

Rabindra Nath Tagore, first Nobel prize winner from India, was awarded knighthood in 1915 by the Britishers. Partition of Bengal took place on 16th October, 1905 Simon Commission came to India in 1928. Morley-Minto reforms is also known as Government of India Act, 1909.

125. (b) Right to freedom of Religion is a fundamental right. Article 25 to 28 deals with the right to religion. Fundamental rights are enshrined in Part III (Articles, 12-35) of our Constitution.There are six fundamental rights. It is applicable universally to all citizens, irrespection of race, religion, caste, sex, place of birth etc.

Article 41 of our Constitution provides for right to work. Article 48 A of our Constitution provides for protection of forest and wildlife.

126. (c) Total number of people in the list

= Place from upper end

+ Place from lower end − 1

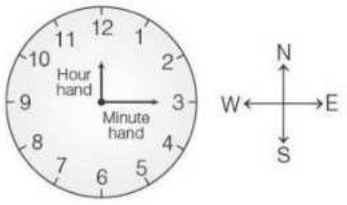
$= (15 + 17) - 1 = 31$

127. (d) Let the fourth proportion be x, then

$$\frac{4}{5} = \frac{16}{x} \Rightarrow x = \frac{5 \times 16}{4} \Rightarrow x = 20$$

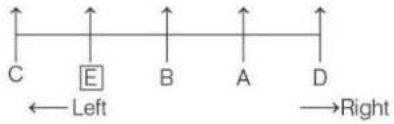
128. (d) As cricket is played on pitch, similarly, wrestling is done on Arena.

129. (d)



If hour hand points towards East, then minute hand points towards South and direction opposite to South is North.

130. (b) According to the question, the arrangement is as follows,



Hence, E is second from the left end.

131. (d) Word 'PARROT' can be formed by using the letters of the given word 'PREPARATION'.

132. (d) Given, Time = 5 : 10 pm

Here, $H = 5$

and $M = 10$

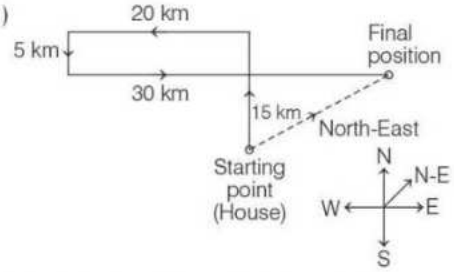
$\therefore$ Required Angle $= (30 \times H) - \left(\frac{11}{2} \times M\right)$

$= (30 \times 5) - \left(\frac{11}{2} \times 10\right)$

$= 150° - 55° = 95°$

Hence, angle between the hour hand and the minute hand when it is 5:10 pm is 95°.

133. (b)



Looking from his house, he is standing in North-East direction.

134. (a) According to the information given in the question, the arrangement of persons, according to height is

Amar > Sameer > Prabhat > Umesh > Ashok.

Hence, the shortest person is Ashok.

135. (c) As in first triangle $8^2 = 64$ and $30 + 34 = 64$

In second triangle $5^2 = 25$ and $12 + 13 = 25$

Hence, in third triangle

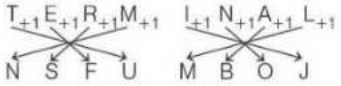
$? = 7^2 - 30$

$= 49 - 30 = 19$

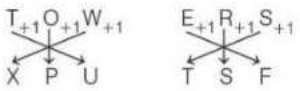
136. (a) As, $F \Rightarrow 6^3 = 216$

Similarly, $L \Rightarrow (12)^3 = \boxed{1728}$

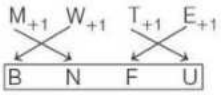
137. (c) As,



and



Similarly,



$\therefore$ MATE $\Rightarrow$ BNFU

138. (d) The arrangement of words according to dictionary is

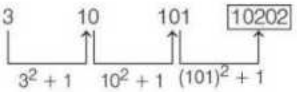
Queen $\rightarrow$ Queue $\rightarrow$ Quilt $\rightarrow$ Quite

(3) (4) (1) (2)

$\Rightarrow$ 3, 4, 1, 2

139. (d) Except HSKP, all other letter combinations has one vowel in it.

140. (c)



$\therefore ? = 10202$

141. (b) As, Hirakud is on the river Mahanadi.
Similarly, Tehri Dam is on the river Bhagirathi.

142. (a) In first row,

$$\sqrt{25} \times \sqrt{144} = 5 \times 12 = 60$$

In second row,

$$\sqrt{81} \times \sqrt{225} = 9 \times 15 = 135$$

Similarly in third row,

$$\sqrt{49} \times \sqrt{289} = 7 \times 17 = \boxed{119}$$

143. (c) As quarantined and separated are same in meaning.
Similarly, Radical and fundamental are same in meaning.

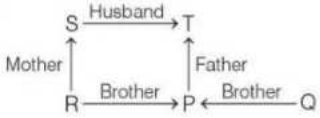
144. (a) As

①②③④⑤⑥⑦⑧⑨⑩ ③⑧⑥④②⑨⑦⑤⑩①
UNDERSTAND $\Rightarrow$ DASENNTRDU

Similarly,

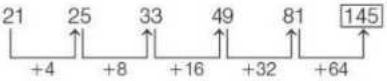
①②③④⑤⑥⑦⑧⑨⑩ ③⑧⑥④②⑨⑦⑤⑩①
RETIREMENT $\Rightarrow$ TEEIENMRTR

145. (d)



Since, the gender of Q is not clear from the statement, Hence, Q is T's son cannot be definitely true.

146. (a)

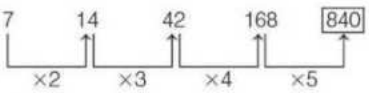


$\therefore ? = 145$

147. (d) As, cub is the young one of tiger, similarly calf is the young one of elephant.

148. (c) If 1st January is Sunday,
then 8th January, 15th January, 22nd January and 29th January will be Sunday.
$\therefore$ 26th January = Sunday − 3 = Thursday

149. (b)



$\therefore ? = 840$

150. (d) Position of Michael from the right end
= Total boys − Position from the left end + 1
= (40 − 14) + 1 = 27 th