

ALL INDIA SAINIK SCHOOL ENTRANCE EXAM (AISSEE)

SOLVED PAPER-2022

Note :-

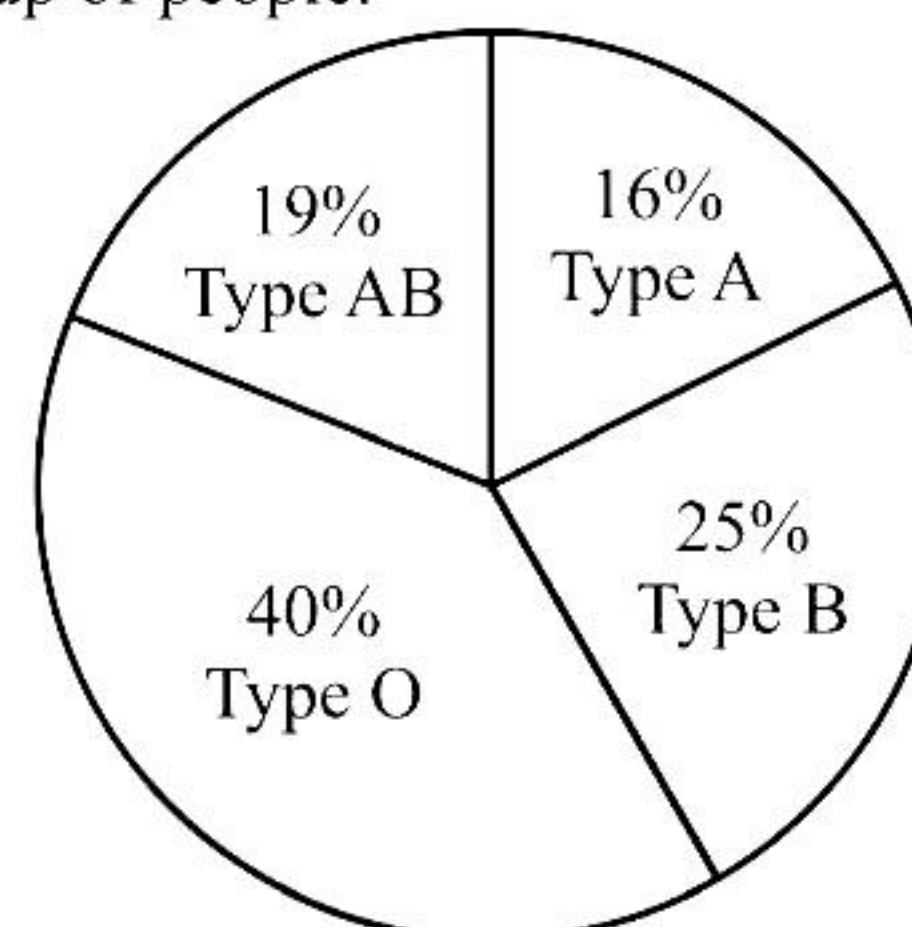
- This Question Paper Booklet contains five Sections. Section "A" Mathematics contains 50 questions of 4 marks each. Section "B" English, Section "C" General Science, Section "D" Social Studies and Section "E" Intelligence contain 25 questions each of 2 mark per question. In all, the paper consists of 150 questions for a total of 400 marks. Answer all questions.
- The test is of 3 hours (180 minutes) duration.

SECTION-A: MATHEMATICS

- A wrist watch with MRP ₹ 5000 is available in two showrooms at different offers. First one is offering additional 40% off after a discount of 50% on MRP. Second is offering 80% discount on MRP ₹ 5000. The difference in two selling prices is
 (a) ₹ 400 (b) ₹ 500
 (c) ₹ 1000 (d) ₹ 1500
- Which of the following is not a random experiment?
 (a) Tossing a coin
 (b) Rolling a dice
 (c) Choosing a card from a deck of 52 cards
 (d) Throwing a stone from a roof of a building
- In the number $A4b$, A is the smallest two digit perfect cube and A 's unit place digit exceeds b by 3. Then the sum of the number and its cube roots is
 (a) 2713 (b) 2754
 (c) 2750 (d) 2758
- Which of the following can be another name of a cylinder?
 (a) A triangular prism
 (b) A rectangular prism
 (c) A pentagonal prism
 (d) A circular prism
- Which of the following rational numbers is greater than p , if $p = \frac{5}{7}$?
 (a) $\frac{1}{p-1}$ (b) $\frac{1+p}{p}$
 (c) $\frac{p}{p-1}$ (d) $\frac{p-1}{p+1}$
- A contractor can complete a certain piece of work, with certain number of men, in 9 days. But 6 of them remained absent from the very first day, so the rest could finish the work in 15 days. How many men were originally employed?
 (a) 12 (b) 15
 (c) 18 (d) 24
- Which of the following can give the result as the square of a natural number ' n '?

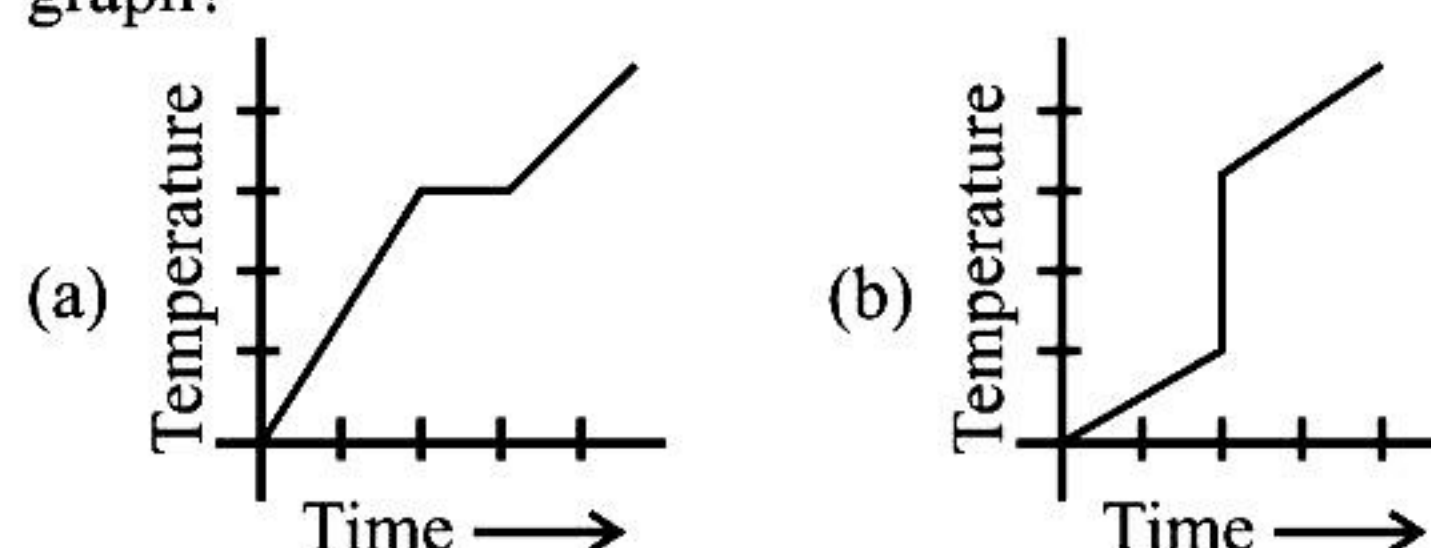
- Sum of the squares of first n natural numbers.
- Sum of the first n natural numbers.
- Sum of the first $(n - 1)$ natural numbers.
- Sum of the first ' n ' odd natural numbers.

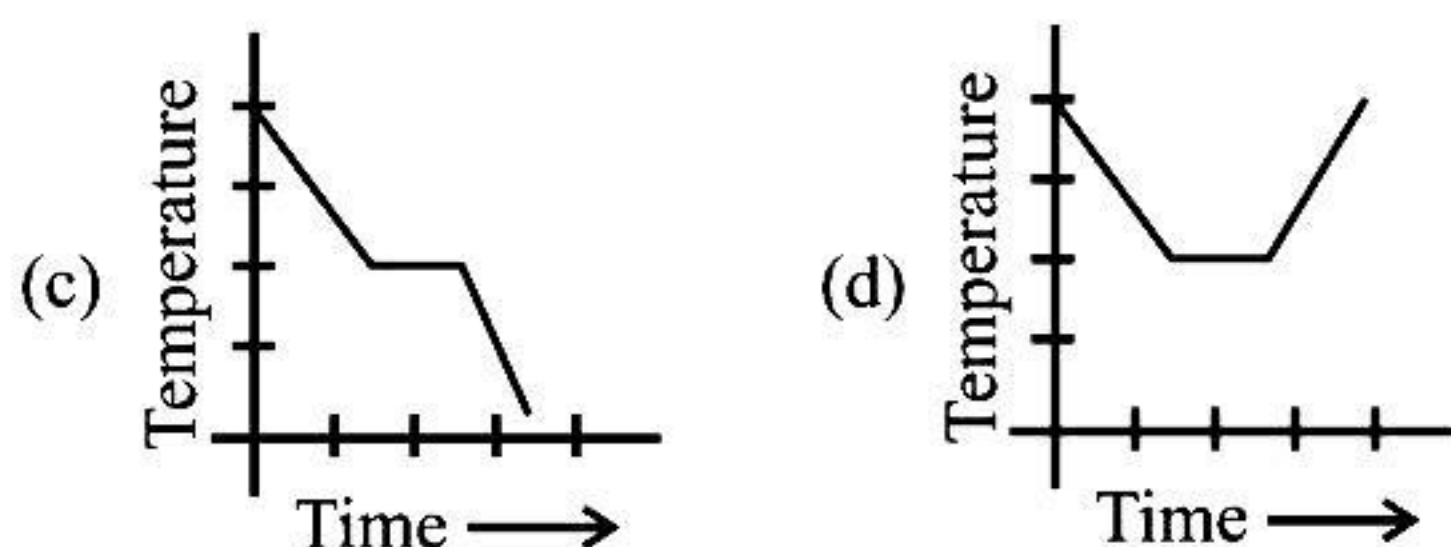
- The pie chart below shows the percentages of blood types for a group of people.



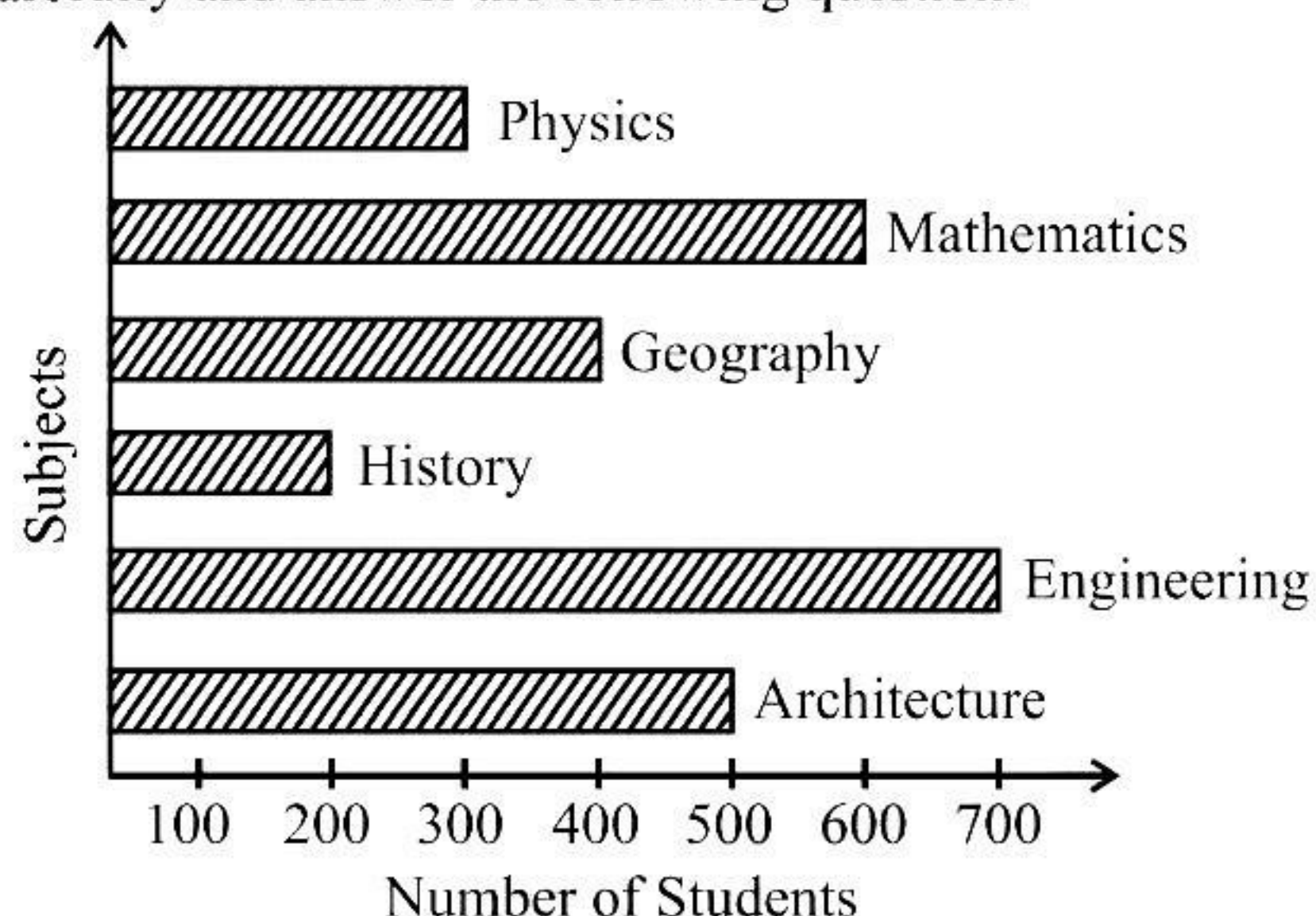
If total number of people with blood types A or B is 82, then the number of people with blood types AB or O is

- 100 (b) 80
 - 108 (d) 118
- The number of sides of a regular polygon with interior angle 162° will be
 (a) 18 (b) 20
 (c) 25 (d) 24
 - The standard form for 0.000064 is
 (a) 64×10^4 (b) 64×10^{-4}
 (c) 6.4×10^5 (d) 6.4×10^{-5}
 - A person standing on a railway platform, another that a train took 21 seconds to completely cross the platform which is 84 m long and it took 9 seconds in crossing him. The speed of the train is
 (a) 25.2 km/hr (b) 32.4 km/hr
 (c) 50.4 km/hr (d) 75.64 km/hr
 - Which of the following graphs cannot be a time temperature graph?





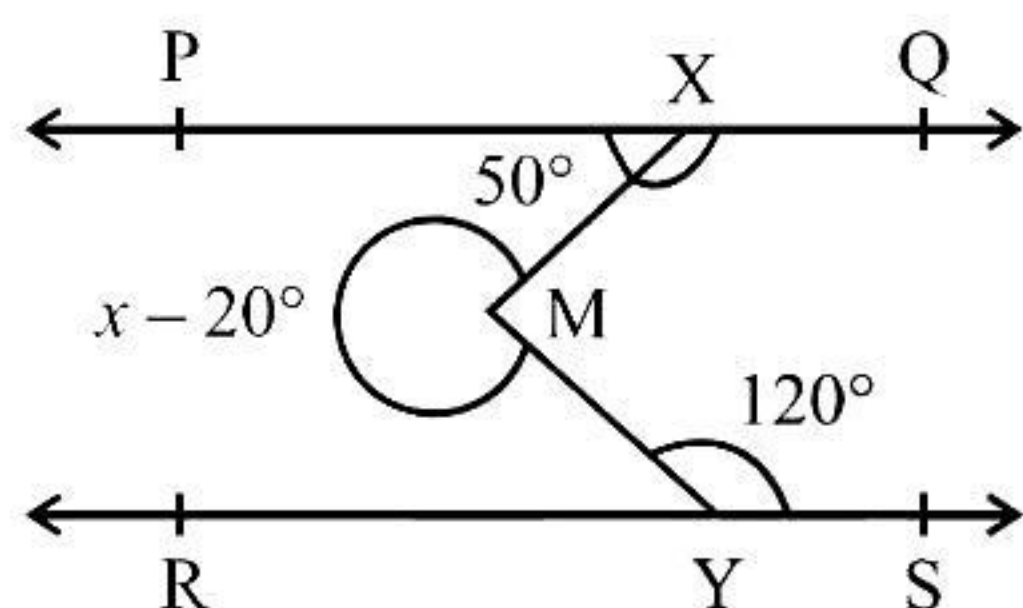
13. The following bar graph shows the number of students studying various subjects in a college. Study the bar graph carefully and answer the following question.



The ratio of the number of students studying History to that of the students studying Architecture is :

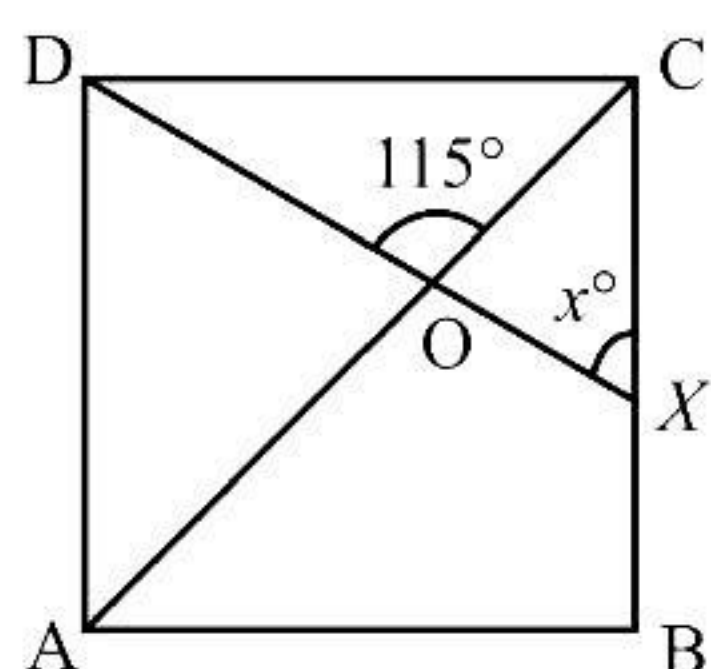
- (a) 1 : 2 (b) 3 : 4
(c) 2 : 7 (d) 2 : 5
14. The sum of three consecutive multiples of 7 is 357. The smallest multiple is
(a) 112 (b) 126
(c) 119 (d) 116
15. The coordinates of a point on the y-axis which is at perpendicular distance of 4 units in the positive direction from origin are :
(a) (0, 0) (b) (0, -4)
(c) (4, -4) (d) (0, 4)
16. If the side of a chess board is smaller than its perimeter by 42 cm, then find the area of the chess board.
(a) 100 cm² (b) 144 cm²
(c) 196 cm² (d) 180 cm²
17. Two right circular cones of equal curved surface area have their slant heights in the ratio of 3 : 5. Find the ratio of their respective radii.
(a) 5 : 3 (b) 5 : 7
(c) 8 : 3 (d) 3 : 5
18. If $(3a + 4b) = 16$ and $ab = 4$, then find the value of $(9a^2 + 16b^2)$.
(a) 160 (b) 100
(c) 120 (d) 140
19. If $\sqrt{1 + \frac{27}{169}} = 1 + \frac{x}{13}$ then x equals
(a) 1 (b) 3
(c) 5 (d) 7
20. Number of cuboids with dimensions 8 cm × 15 cm × 20 cm stacked together to form a cube is
(a) 100 (b) 90
(c) 80 (d) 60
21. If x, y and z are positive real numbers and a, b and c are rational numbers, then the value of $\frac{1}{1+x^{b-a}+x^{c-a}} + \frac{1}{1+x^{a-b}+x^{c-b}} + \frac{1}{1+x^{b-c}+x^{a-c}}$ is
(a) 1 (b) xabc
(c) 0 (d) x
22. Shally buys some chocolates at the rate of ₹ 10 per chocolate. She also buys an equal number of candies at the rate of ₹ 5 per candy. She makes 20% profit on chocolates and 8% profit on candies. At the end of the day, all chocolates and candies are sold out and her profit is ₹240. The number of chocolates she had purchased is
(a) 100 (b) 90
(c) 150 (d) 200
23. If $2x + 2x + 2x = 192$, then the value of x is
(a) 2 (b) 6
(c) 5 (d) 3
24. The sum of $0.\bar{3}$ and $0.\bar{2}$ is
(a) 5/99 (b) 5/9
(c) 5/10 (d) 5/100
25. Select the INCORRECT statement.
(a) Every rectangle is a parallelogram.
(b) A quadrilateral can be drawn if all four sides and one angle is known.
(c) Triangle is a polygon whose sum of exterior angles is double the sum of interior angles.
(d) If diagonals of a quadrilateral are equal, it must be a square.
26. How many coins, 1.4 cm to diameter and 0.4 cm thick, are melted to form a right circular cylinder of height 16 m and diameter 3.5 cm?
(a) 200 (b) 150
(c) 250 (d) 300
27. Which of the following cannot be true for a polyhedron? (where F = number of faces, V = number of vertices, E = number of edges)
(a) $V = 4, F = 4, E = 6$ (b) $V = 6, F = 8, E = 12$
(c) $V = 20, F = 12, E = 30$ (d) $V = 4, F = 6, E = 6$
28. If a square with each side 'a' is joined from opposite side to form a cylinder, then area of each circular end (ignoring units) is
(a) a^2 (b) $a^2/4\pi$
(c) a^2/π (d) $a^2/4$
29. A well with 10 m inside diameter is dug 14 m deep. Earth taken out of it is spread all around it to make an embankment of height $4\frac{2}{3}$ m. The width of the embankment is

- (a) 5 m (b) 4 m
(c) 4.3 m (d) 6 m
30. The sum of additive inverse and multiplicative inverse of $\frac{2}{9}$ is
(a) $\frac{9}{2}$ (b) $\frac{2}{9}$
(c) $\frac{18}{77}$ (d) $\frac{77}{18}$
31. When two unbiased dice are rolled together, the probability of getting both same outcomes is :
(a) 0 (b) $\frac{1}{36}$
(c) $\frac{5}{36}$ (d) $\frac{6}{36}$
32. If HCF and LCM of two terms a and b are x and y respectively and $a + b = x + y$, then $x^2 + y^2 = ?$
(a) $a^2 - b^2$ (b) $2a^2 + b^2$
(c) $a^2 + b^2$ (d) $a^2 + 2b^2$
33. Divya purchased 11 books for ₹ 10 and sold all books at 10 for ₹ 11. Her profit/loss percent is
(a) 10% (b) 11%
(c) 21% (d) 100%
34. In the given figure, $PQ \parallel RS$, $\angle PXM = 50^\circ$ and $\angle MYS = 120^\circ$, find the value of x if reflex $\angle XMY$ is $x - 20^\circ$.



- (a) 190° (b) 270°
(c) 280° (d) 250°
35. A cistern has two inlets A and B which can fill it in 12 minutes and 15 minutes respectively. An outlet C can empty the full cistern in 10 minutes. If all the three pipes are opened together in the empty cistern, then the time taken to fill the cistern completely is :
(a) 20 minutes (b) 10 minutes
(c) 15 minutes (d) 5 minutes
36. Two complementary angles are in the ratio 13 : 5, then the angles respectively are :
(a) $13^\circ, 5^\circ$ (b) $125^\circ, 55^\circ$
(c) $65^\circ, 25^\circ$ (d) $65^\circ, 35^\circ$
37. The mean of 1, 3, 4, 5, 7 and 10 is m . The observation 3, 2, 4, 2, 3, 3 and p have mean $(m - 2)$ and median q . Find q .
(a) 2 (b) 3
(c) 4 (d) 3.5
38. There are 42 students in a class. Out of these, $\frac{3}{4}$ of the boys and $\frac{2}{3}$ of the girls come to school by bus. The total number of boys and girls of the same class who come to school by bus is 30. How many boys are there in the class.
(a) 20 (b) 24
(c) 26 (d) 16

39. Which of the following is true?
(a) $0.09 > \frac{7}{8}$
(b) $6\% < 0.09$
(c) $8.0 \times 10^{-3} > 6\%$
(d) $\frac{7}{8} < 9 \times 10^{-3}$
40. Out of the following numbers which one is known as Hardy-Ramanujan Number?
(a) 1297 (b) 1729
(c) 1927 (d) 7219
41. A card is drawn at random from a well shuffled deck of 52 cards. The probability that it is neither a heart nor a red king is
(a) $\frac{37}{52}$ (b) $\frac{19}{26}$
(c) $\frac{19}{52}$ (d) $\frac{26}{52}$
42. One of the factors of $x^2 + \frac{1}{x^2} + 2 - 2x - \frac{2}{x}$ is
(a) $x - \frac{1}{x}$ (b) $x + \frac{1}{x} - 1$
(c) $x + \frac{1}{x}$ (d) $x^2 + \frac{1}{x^2}$
43. Radha invested ₹ 1600 on compound interest for 2 years. She received ₹ 1764 after the specified period. Find the rate of interest per annum.
(a) 7% (b) 6%
(c) 5% (d) 4%
44. X is a two-digit number. Y is the number obtained on reversing the digits of X . Which of the following is true?
(a) $X + Y$ is divisible by 10.
(b) $X - Y$ is divisible by 6.
(c) $X - Y$ is divisible by 9.
(d) $X + Y$ is divisible by 8.
45. The angles of a quadrilateral are in the ratio 6 : 7 : 8 : 9, then which of the following can be concluded?
(a) Exactly two angles are obtuse
(b) Two pairs of angles are supplementary.
(c) Both (1) and (2)
(d) One of these angles is a right angle.
46. The number of non-perfect square numbers between $(698)^2$ and $(699)^2$ is
(a) 1397 (b) 1398
(c) 1395 (d) 1396
47. Three sides of a triangular field are of lengths 15 m, 20 m and 25 m. Find the cost of sowing seeds in the field at the rate of ₹ 5 per sq. m.
(a) ₹ 600 (b) ₹ 150
(c) ₹ 750 (d) ₹ 450
48. In the given figure, $ABCD$ is a square. A line segment DX cuts the side BC at X and the diagonal AC at O such that $\angle COD = 115^\circ$ and $\angle OXC = x^\circ$.



The value of x is

- (a) 40 (b) 70
(c) 80 (d) 85

49. If $\begin{array}{r} 1 \ y \\ + x \ y \\ \hline z \ 6 \end{array}$

where z and y are single-digit number such that $z - y = 3$, then the value of y and z respectively are :

- (a) 3, 6 (b) 6, 9
(c) 5, 4 (d) 4, 5

50. If $2^x = 3^y = 6^z$ then $z =$

- (a) $\frac{x+y}{xy}$ (b) $\frac{xy}{x+y}$
(c) $2xy$ (d) x/y

SECTION-B : ENGLISH

DIRECTIONS : Read the poem given below.

A Minor Bird

I have wished a bird would fly away,
And not sing by me house all day,
Have clapped my bands at him from the door
When it seemed as if I could bear no more.

The fault mind partly have been in me.
The bird was not to blame for his key.
And of course there must be something wrong
In wanting to silence any song.

— Robert Frost

On the basis of your understanding of the poem, answer the following questions.

51. Choose the quote that best captures the central idea of the poem.
(a) "A bird doesn't sing because it has an answer. It sings because it has a song."
(b) "Like a bird singing in the rain, let grateful memories survive in times of sorrow". — R.L. Stervenson
(c) "People are not disturbed by things but by the view they take of them? — Epictetus.
(d) "People who are innately funny are innately disturbed."
— Keenen Ivory Wayans.
52. The use of the word 'minor' bird in the title shows
(a) the size of the bird was small
(b) significance with which man regards nature

- (c) the bird was under age
(d) bird's existence in nature is of less significance.

53. Which of the following statements is NOT TRUE for the poem?

- (a) The poem is written in First person and a narrative style.
(b) The poem ends with a philosophical idea that acceptance of Nature and its elements is a must.
(c) The poem gives a message that insignificant things leave a deep impact on one's soul.
(d) The poem is rich in imagery.

54. The rhyme scheme of the poem is

- (a) abab (b) aabb
(c) abca (d) abbb

55. Which of the following emotions are expressed in the first stanza?

- (a) excitement (b) arrogance
(c) irritation (d) elation

DIRECTIONS : Choose the correct options to fill in the blanks.

56. The boy said to them, "Let me work now."

The boy requested them _____

- (a) to let him work now (b) to let him work then
(c) if he could work then (d) let me work now

57. I have seen _____ of his work to know that he is ready for a promotion.

- (a) few (b) a few
(c) several (d) enough

58. Each of the suspected men _____ arrested.

- (a) was (b) were
(c) have (d) had

59. Only one of the boys _____ not done the homework.

- (a) can (b) could
(c) has (d) have

60. Some of these facts _____ incorrcet.

- (a) is (b) are
(c) has been (d) had been

61. A lot of people want to become successful entrepreneurs, but only _____ make the grade.

- (a) few (b) not much
(c) very little (d) any

62. At this time tomorrow, we _____ our project details to our teacher.

- (a) will have presenting (b) have been presenting
(c) shall be presenting (d) had been presenting

63. "Don't waste your money", she said.

She told the boys _____

- (a) don't waste your money
(b) not to waste any money
(c) to not waste their money
(d) not to waste their money

64. Everybody _____ keen to participate in the Nukkad Natak.
 (a) is (b) are
 (c) were (d) has
65. You _____ consult the Thesaurus if you need synonyms for those words.
 (a) had to (b) need to
 (c) used to (d) might
66. Which of the following is an imperative sentence?
 (a) May God bless you, my friend!
 (b) They were not invited to the party.
 (c) Open the windows.
 (d) Creativity is allowing yourself to make mistakes.
67. Ramesh knocked at the door thrice but no one answered. The word 'but' is used in the sentence as used
 (a) preposition (b) conjunction
 (c) verb (d) adverb
68. Identify the predicate in the following sentence.
 He thinks that he has finished the course.
 (a) He
 (b) thinks
 (c) that he has finished the course
 (d) thinks that he has finished the course
70. Which of the following sentence is in simple past tense?
 (a) The baby broke the glass.
 (b) The baby breaked the glass.
 (c) They baby has broken the glass.
 (d) The baby had borken the glass.
71. Choose the option that has the right rearrangement of the following words to make a meaningful sentence.
 planning poor rise urban give may pollution to noise
 (a) Poor planing may give rise to urban noise pollution.
 (b) Urban noise pollution may give rise to poor pollution.
 (c) Poor urban planning may give rise to noise pollution.
 (d) Noise pollution may give rise to poor urban planning.
72. Analogy is a comparison between one thing and another, typically for the purpose of explanation or clarification. Which of the following is the correct analogy?
 (a) Composer is to music as flowers are to poem.
 (b) Paw is to dog as hoof is to horse.
 (c) Branch is to tree as day is to hour.
 (d) Inside is to house as pale is to bright.
73. Choose the option that has the right rearrangement of the following words to make a meaningful sentence.
 pollution health noise both affects behaviour and
 (a) Health affects both behaviour and pollution.
 (b) Behaviour affects health and noise pollution.
 (c) Pollution affects both behaviour, noise and health.
 (d) Noise pollution affects both behaviour and health.
74. In which of the following sentence does the verb agree with its subjects?

- (a) What time does the news starts?
 (b) What time does the news start?
 (c) What time do the news start?
 (d) What time do the news starts?

75. Which of the given options has the words in an alphabetical order?
 (a) Peruvian, Parisian, Portuguese, Prussian, Polish, Paraguayan
 (b) Parisian, Paraguayan, Peruvian, Portuguese, Polish, Prussian
 (c) Paraguayan, Parisian, Peruvian, Polish, Portuguese, Prussian
 (d) Peruvian, Polish, Portuguese, Paraguayan, Parisian, Prussian

SECTION-C: GENERAL SCIENCE

76. A cell converts
 (a) Electrical energy into chemical energy
 (b) Chemical energy into electrical energy
 (c) Magnetic energy into electrical energy
 (d) Electrical energy into mechanical energy
77. Read the following statements carefully and identify X, Y and Z respectively.
 (i) X is stored under kerosene.
 (ii) Y catches fire on exposure and stored in water.
 (iii) Z reacts with water slowly.
 (a) Na, Mg, Cu (b) Na, P, Fe
 (c) Cu, Zn, K (d) Zn, Cu, Na
78. The full form of LED is
 (a) Light emitting diode (b) Light emission diode
 (c) Layer emission diode (d) Layer electron device
79. The loudness of sound depends on its
 (a) Amplitude (b) Time period
 (c) Frequency (d) Speed
80. Which of the following on reshuffling gives the term that refers to the process of sowing seeds manually by sprinkling them on soil by hand?
 (a) Inigtil (b) glnopuihg
 (c) atnbrdocaigs (d) ngiownwin
81. When an object moves closer to a concave lens, the image formed by it shifts
 (a) Away from the lens
 (b) First away and then towards the lens
 (c) Towards the lens
 (d) First towards and then away from the lens
82. Which of the following is a mismatched pair?
 (a) Ovaries – Oestrogen
 (b) Testes – Testosterone
 (c) Pancreas – Calcitonin
 (d) Adrenal glands – Corticosteroids

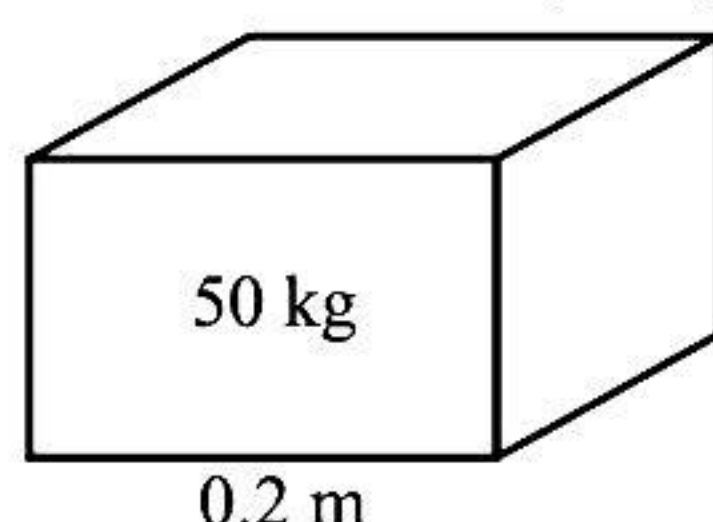
83. Which type of organisms, live in the body of animals and digest wood cellulose converting it to soluble carbohydrates ?

- (a) Algae (b) Fungi
(c) Protozoa (d) Nematoda

84. Metals are generally hard. Which of the following metals is an exception and can be cut with the knife.

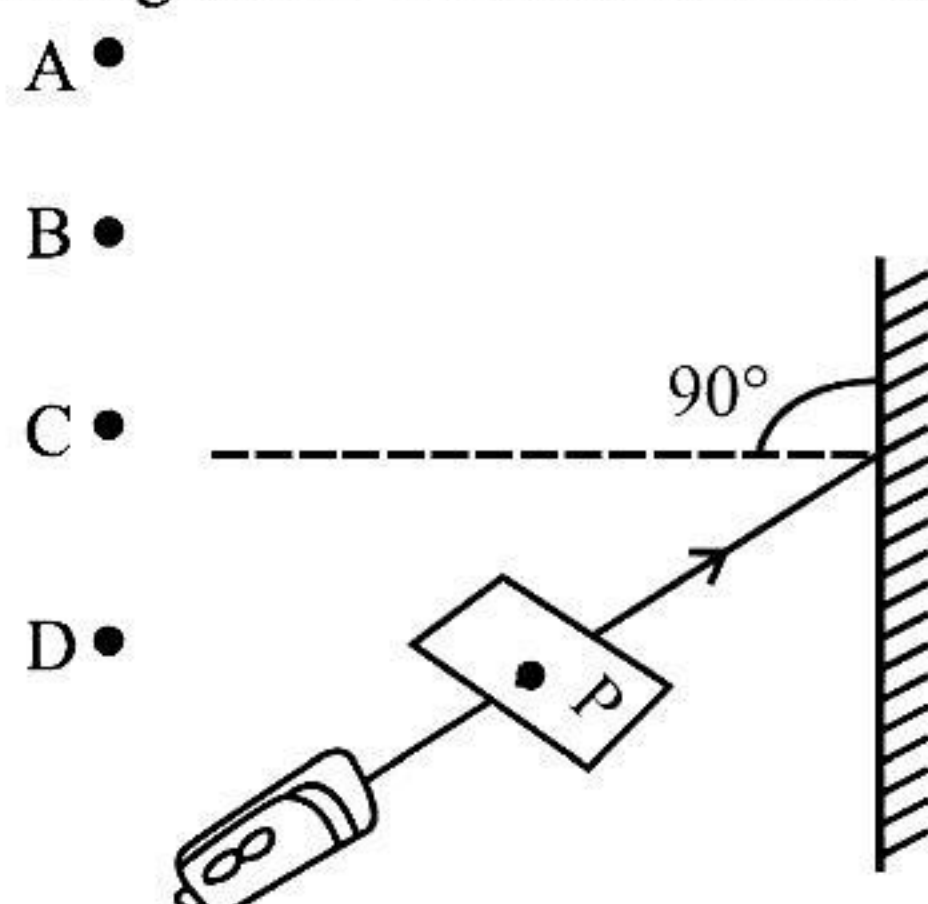
- (a) Iron (b) Sodium
(c) Gold (d) Magnesium

85. A cube of side 0.2 m rests on the floor, as shown. Given that the cube has a mass of 50 kg, the pressure exerted by the cube on the floor is (take $g = 10 \text{ N kg}^{-1}$)



- (a) 25 Nm^{-2} (b) 250 Nm^{-2}
(c) 1250 Nm^{-2} (d) 12500 Nm^{-2}

86. A small hole P is made in a piece of cardboard. The hole is illuminated by a torch as shown in the figure. The ray of light coming out of the hole falls on a mirror.



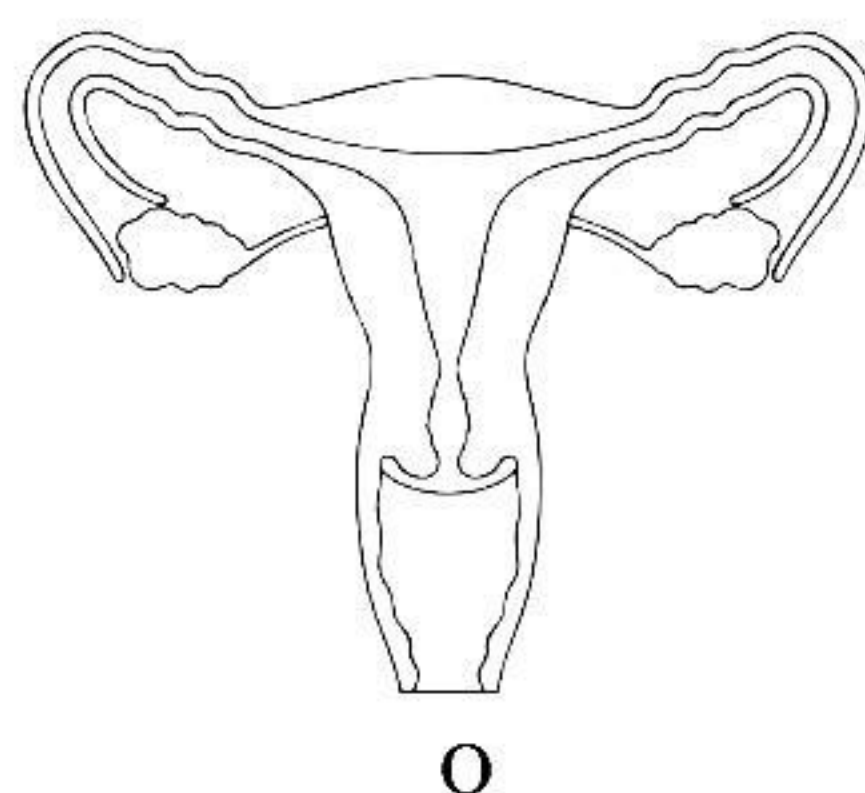
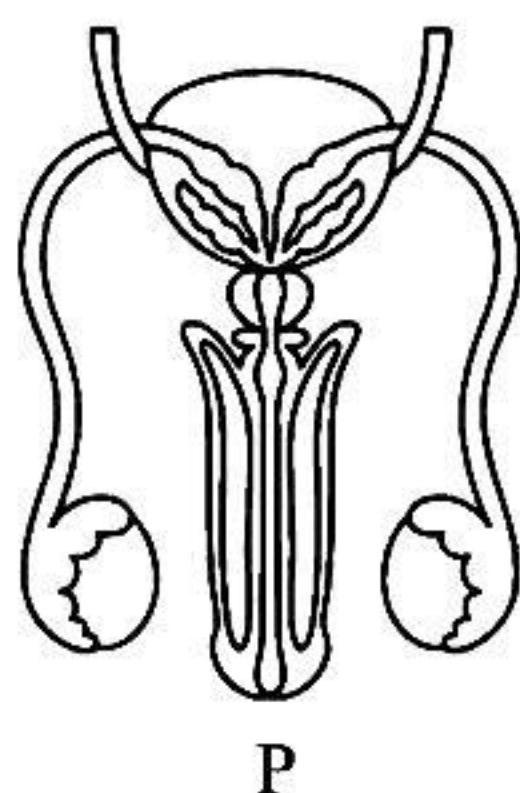
At which point should the eye be placed, so that the hole can be seen?

- (a) A (b) B
(c) C (d) D

87. The sex determining system in which males are XY and females are XX is found in all

- (a) Multicellular organism (b) Animals
(c) Vertebrates (d) Mammals

88. Refers to the given figures (P and Q). How do reproductive cells produce in P differ from produced in Q in terms of production and their modes of storage?



(a) Mature cells of P can get stored for longer periods in reproductive tract whereas in Q only immature cells remain stored.

- (b) P produces fewer reproductive cells than Q does.
(c) Reproductive cells produced by P do not show mobility.
(d) Q produces reproductive cells for longer period in an individual's life span P does.

89. A rubber sucker when pressed on a surface sticks to it because

- (a) Gravitational pull acts on it.
(b) Atmospheric pressure acts on it.
(c) Rubber sucker has some glycerine in it.
(d) Atmospheric pressure does not act on it.

90. Which of the following statements is true?

- (i) Yellow flame are ideal for heating.
(ii) The substance which vaporize during burning give flames.
(iii) Luminous zone contains unburnt carbon particles.
(iv) The non-luminous zone has highest temperature.

- (a) (i), (ii) and (iii) (b) (i), (ii) and (iv)
(c) (ii), (iii) and (iv) (d) (i), (ii) and (iv)

91. Loudness of sound is measured in units of

- (a) decibel (dB) (b) hertz (Hz)
(c) metre (m) (d) metre/second (m/s)

92. Crop rotation is performed to

- (A) Improve the fertility of soil
(B) Save nitrogenous fertilizers
(C) Help in weed control and pest control
(a) Only (A) and (B) (b) Only (B) and (C)
(c) Only (B) and (C) (d) (A), (B) and (C)

93. The substance expected to have the highest ignition temperature out of the following is

- (a) Kerosene (b) Petrol
(c) Coal (d) Alcohol

94. It is easier to swim in sea water than in river water because

- (a) Sea water is more dense than river water
(b) Sea water has waves
(c) Sea has large quantity of water
(d) Sea water is less dense than river water

95. When the applied force is doubled on an object and the object is still at rest, then friction becomes :

- (a) Doubled (b) Halved
(c) Quadrupled (d) Zero

96. Study the given correlation.

Heat treatment : sterilization : : Vaccination : X

What would be 'X' here?

- (a) Pasteurisation (b) Immunisation
(c) Fertilisation (d) Inoculation

97. Which of the following statements is incorrect regarding metamorphosis?

- (a) It is the process of transformation of larva into an adult through drastic changes.
 (b) In human beings, metamorphosis does not occur because the young ones resembles the adults at the time of birth.
 (c) Life cycle of butterflies is completed in the four stages involving egg, larva, pupa, adult.
 (d) A tadpole that hatches out of the egg resembles the adult frog in almost all respects.
98. Which of the following statements about plastics is true?
 (i) All plastics do not have same arrangement of monomer units.
 (ii) Melamine resist fire and can tolerate heat better than other plastics.
 (iii) Plastics with cross-linked monomers are also known.
 (iv) The application of plastics is limited.
 (a) (i) and (iii) (b) (iii) and (iv)
 (c) (i), (ii) and (iii) (d) (i), (iii) and (iv)
99. A toy car released with the some initial speed will travel farthest on
 (a) Muddy surface (b) Polished marble surface
 (c) Cemented surface (d) Brick surface
100. I am the source of synthetic polymer. I am a mixture of a number of carbon compounds, which can be separated by fractional distillation. I am
 (a) Petrol (b) Diesel
 (c) Petroleum (d) Kerosene
107. Which of the following is not an example of ground water?
 (a) Water flowing in rivers
 (b) Water through hand pumps
 (c) Water through submersible pumps
 (d) Water through wells
108. Forests help in maintaining a balance of _____.
 (a) Nitrogen and Carbon dioxide
 (b) Oxygen and Carbon dioxide
 (c) Argon and Carbon dioxide
 (d) Nitrogen and Oxygen
109. MLAs are the elected representatives of _____.
 (a) State Legislature
 (b) Rajya Sabha
 (c) Lok Sabha
 (d) Zila Parishad
110. The monazite sands of Kerala are rich in :
 (a) Uranium (b) Thorium
 (c) Platinum (d) Coal
111. The first successful modern textile mill in India was established in :
 (a) Mumbai (b) Chennai
 (c) Ahmedabad (d) Kanpur
112. Separation of religion from the State is referred to as _____.
 (a) Monarchy (b) Democracy
 (c) Secularism (d) Monotheism
113. Who was the first Governor General of free India?
 (a) C. Rajagopalachari
 (b) Dr. Rajendra Prasad
 (c) Sardar Vallabhbhai Patel
 (d) Pt. Jawahar Lal Nehru
114. What makes an object a substance or a resource?
 (a) Utility (b) Quantity
 (c) Usability (d) Both (a) and (c)
115. What are the devotees of Vishnu called?
 (a) Vaishnavas (b) Nayanmars
 (c) Lingayats (d) Chisti
116. Rourkela steel plant is located in which state of India?
 (a) Jharkhand (b) West Bengal
 (c) Odisha (d) Bihar
117. Which level of judiciary cannot send a person to jail _____.
 (a) Supreme Court (b) Nayaya Panchayat
 (c) High Court (d) Subordinate Court
118. What was the reason for the hanging of sepoy Mangal Pandey?
 (a) For refusing to use the greased catridges
 (b) For attacking the British or his officers
 (c) For disobeying orders
 (d) For killing the soldiers
119. Which one of the following is not a characteristic of minerals?

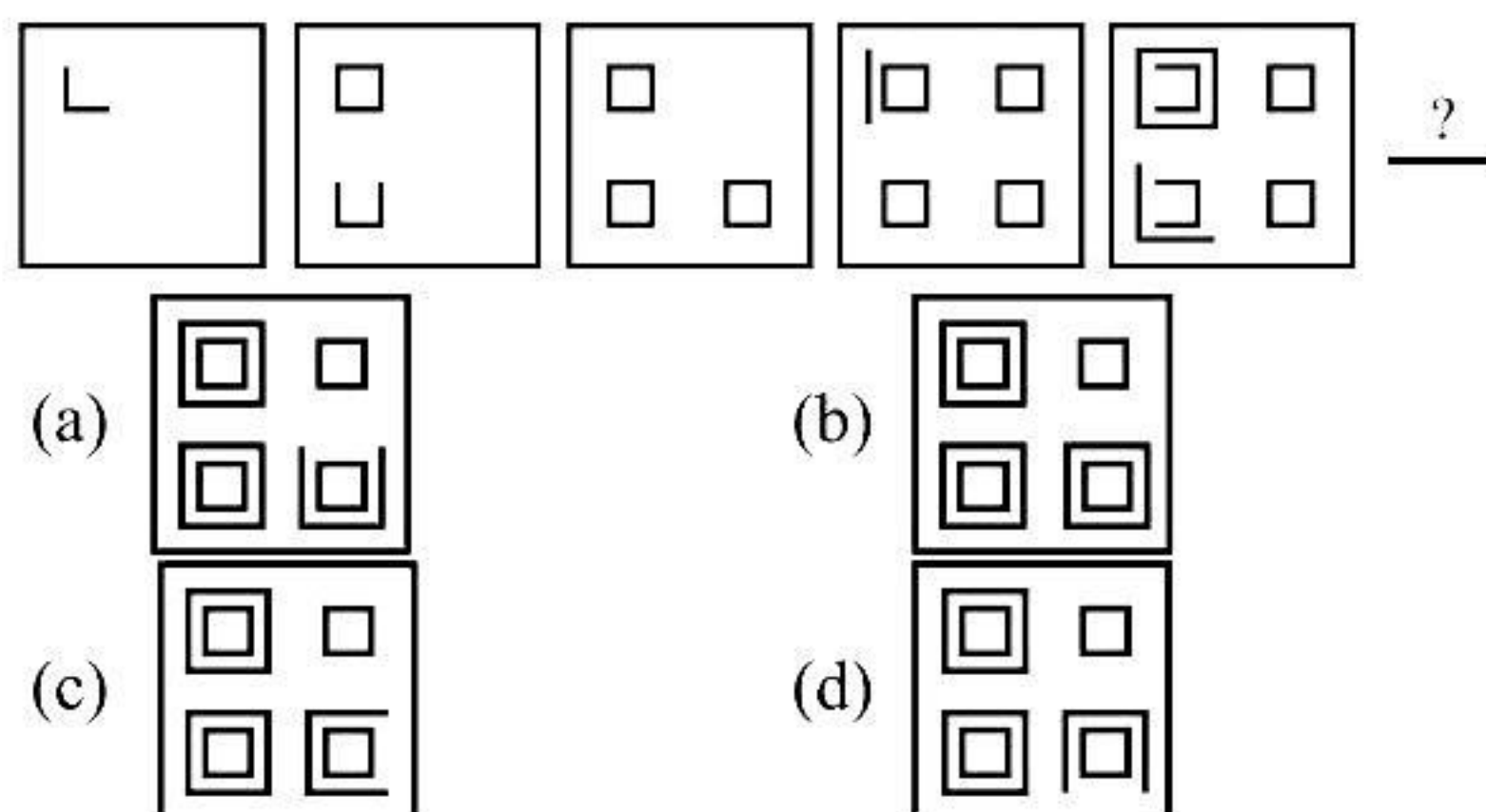
SECTION-D: SOCIAL STUDIES

101. Civil law does not deal with _____.
 (a) Property matters (b) Theft
 (c) Robbery (d) Murder
102. Industry which processes raw material obtained from ocean is called
 (a) Agro-based industry (b) Marine-based industry
 (c) Mineral-based industry (d) Forest-based industry
103. Justice Sachar Committee was set-up to look into the marginalization of _____.
 (a) Hindus (b) Muslims
 (c) Sikhs (d) Parsis
104. The President appoints _____ members of Rajya Sabha.
 (a) 12 (b) 15
 (c) 14 (d) 20
105. Give an example of shaft mining.
 (a) Surface mining (b) Deep bores
 (c) Off-shore drilling (d) None of these
106. The method used to extract oil from the earth is called _____.
 (a) Shaft Mining (b) Drilling
 (c) Open-cast mining (d) Quarrying

- (a) They are created by natural processes
 (b) They have definite chemical composition
 (c) They are inexhaustible
 (d) Their distribution is even
120. An FIR is filed with the _____.
 (a) Police (b) Court
 (c) Army (d) Chief Minister
121. Growing vegetables, flowers, fruits and decorative plants for commercial use is known as
 (a) Viticulture (b) Sericulture
 (c) Horticulture (d) Pisciculture
122. Who gave the call 'Back to Vedas'?
 (a) Raja Rammohan Roy
 (b) Tara Bai Shinde
 (c) Jyotiba Phule
 (d) Swami Dayanand Saraswati
123. Contaminated water causes _____.
 (a) Malaria (b) Dengue
 (c) Swine Flu (d) Jaundice
124. The CHILD MARRIAGE RESTRICTION ACT was passed in the year _____.
 (a) 1926 (b) 1928
 (c) 1927 (d) 1929
125. Which of the following are Fundamental Rights?
 (a) Right to equality
 (b) Right to freedom
 (c) Right against exploitation
 (d) All of the above

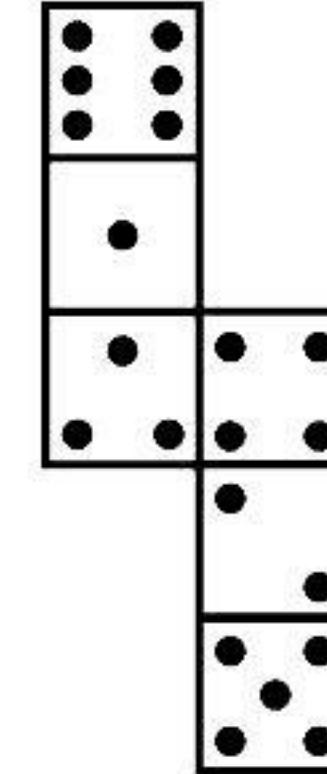
SECTION-E: INTELLIGENCE TEST

126. Which figure will come next to continue the series?



127. If the seventh day of a month is three days earlier than Friday, what day will it be on the nineteenth day of the month?
 (a) Wednesday (b) Monday
 (c) Friday (d) Sunday
128. Mr. Das left for his office in his car. He drove 12 km towards North and then 10 km towards West. He then turned to the South and covered 4 km. Further, he turned to the East and Moved 8 km. Finally, he turned right and drove 8 km. How far and in which direction is he from his point?

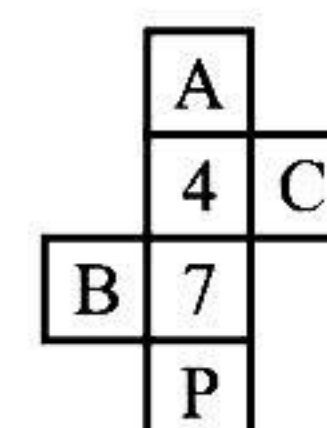
- (a) 2 km, West (b) 2 km, East
 (c) 4 km, North (d) 2 km, South
129. Observe the dice. If the surface of the below given die are reconstructed to form a perfect die as shown in the fig. How many dots lie opposite to the face having three dots?

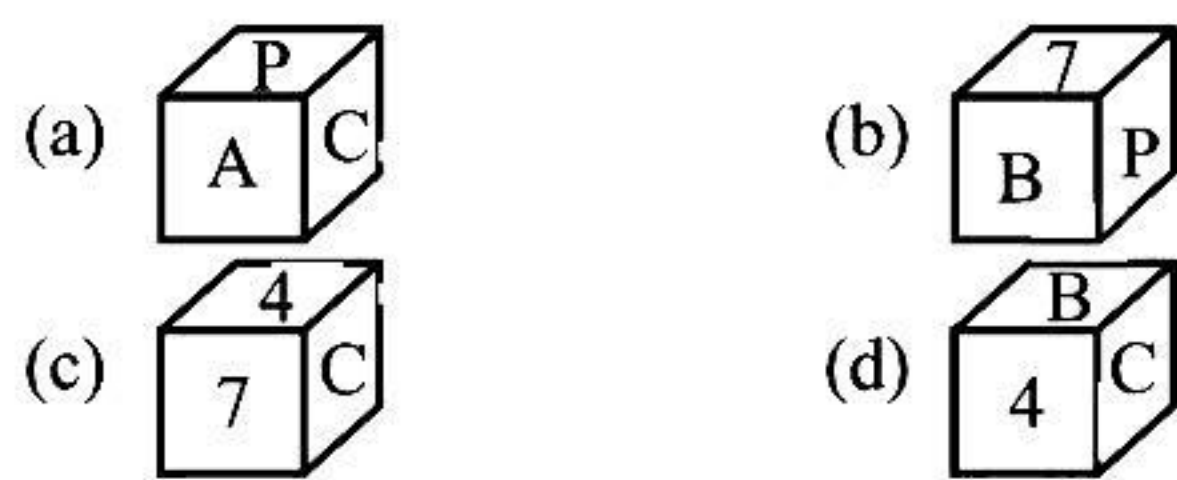


- (a) 2 (b) 4
 (c) 5 (d) 6
130. In a certain code 'CERTAIN' is coded as 'BFQUZJM'. How is 'MUNDANE' coded in this code?
 (a) LVMEZOD (b) NTCOMBF
 (c) NTOCNBF (d) LTM CZOF
131. From the given options, find the pair which is similar to the given pair 8 : 4
 (a) 27 : 9 (b) 216 : 32
 (c) 72 : 24 (d) 45 : 5
132. Arrangement of numbers in the following question follow a common logic. Find out the missing number.

	49	
3	?	4
9	25	16
	36	

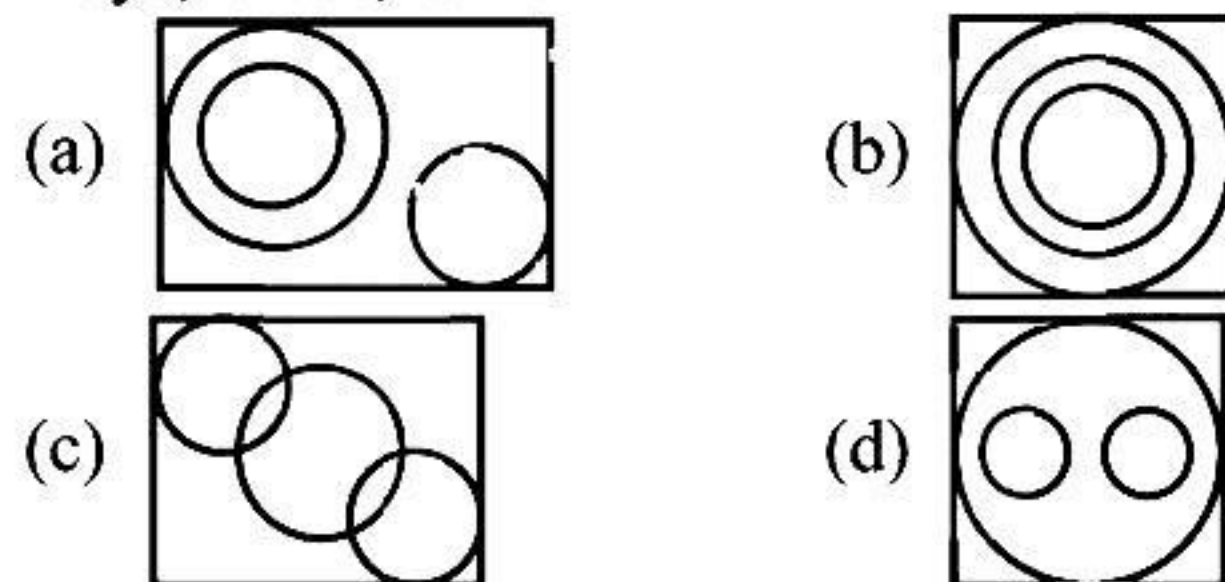
- (a) 2 (b) 3
 (c) 5 (d) 4
133. Complete the pattern.
 6, 11, 21, 36, 56, (.....)
 (a) 42 (b) 51
 (c) 81 (d) 91
134. In the following question, there is certain relationship between the two given numbers on one side of (::) and one number is given on another side of (::) where another number is to be found from the given alternatives, having the same relationship with this number as the numbers of the given pair bear. Choose the best alternative.
 100 : 121 :: 144 : ?
 (a) 160 (b) 93
 (c) 169 (d) 196
135. Which of the following cubes *cannot* be formed using the given cube net?





136. The question given below contains three items. These items may or may not have some relation with one another, The group of items may fit into one of the diagrams (a), (b), (c), (d). Indicate the diagram in which the group of items correctly fits into.

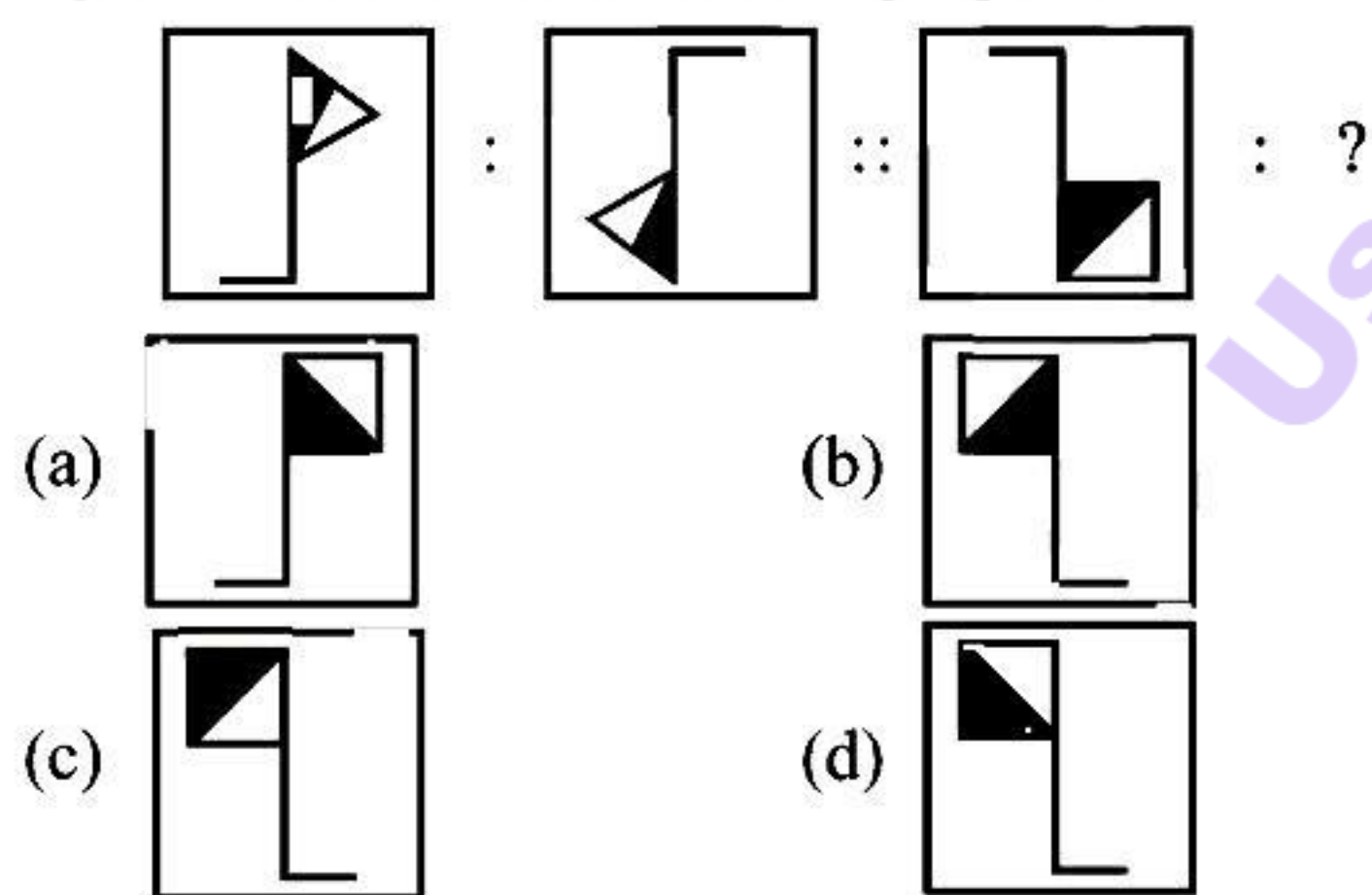
Boys, Class, Girls



137. Six books P, Q, R, S, T and U are placed side by side. R, Q, T have blue covers and other books have red covers. Only S and P are new books and the rest are old P, R, S are law reports, the rest are Gazetteers. Which two books are old Gazetteers with blue covers?

- (a) Q and U (b) T and U
(c) Q and T (d) Q and R

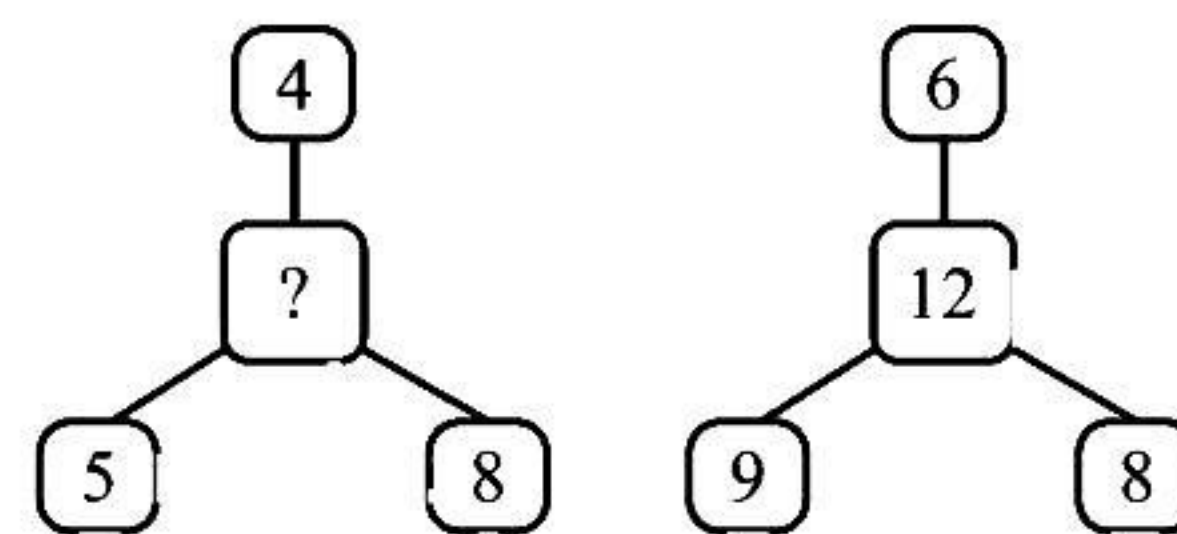
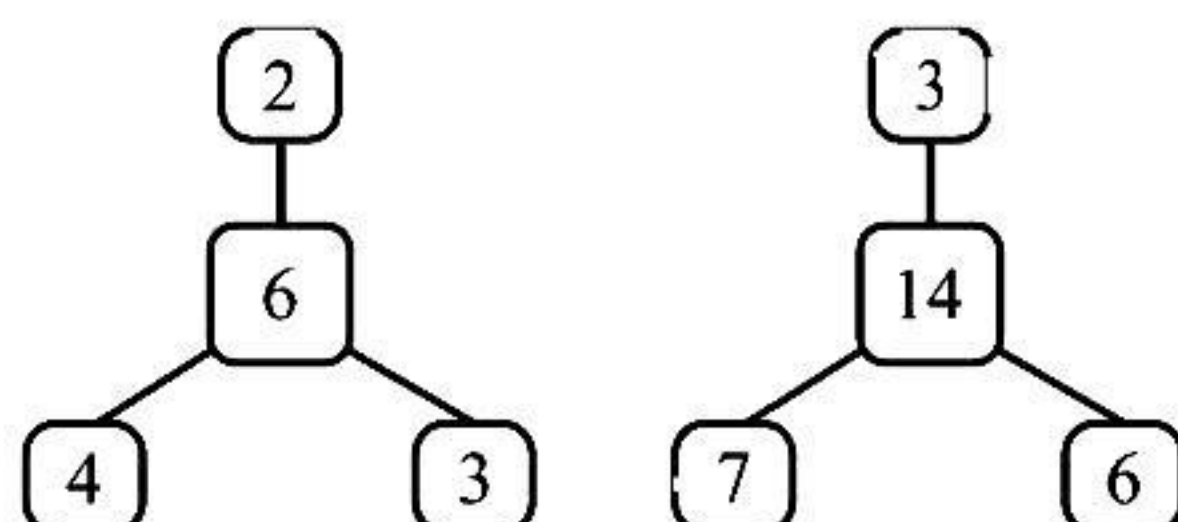
138. Given pair of figures on the either side of :: has a certain relationship. Identify the relationship between pair of figures and choose the missing figure.



139. A family consist of six members P, Q, R, X, Y and Z. P and R are a married couple. Q is the son of R, but R is not the mother of Q. Y is the brother of R. X is the daughter of P. Z is the brother of P. How many female members are there in the family?

- (a) 1 (b) 2
(c) 4 (d) 3

140. Which one of the following numbers will replace the question mark (?) in the number pattern given below?



- (a) 12 (b) 10
(c) 8 (d) 15

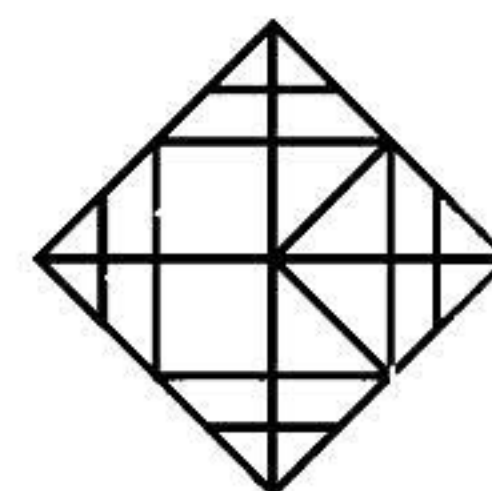
141. If 'PARK' is coded as '5394'. 'SHIRT' is coded as '17698' and 'PANDIT' is coded as '532068', then how is 'NISHAR' written in that code?

- (a) 891560 (b) 261739
(c) 268519 (d) 151738

142. In a code language, SUGAR is written as BCDZF and WATER is written as PZQMF. Put the word TEARS into the same code.

- (a) QCMPB (b) QZFB D
(c) QMZFB (d) QBDPM

143. Find the minimum number of line segments used in forming the given figure.

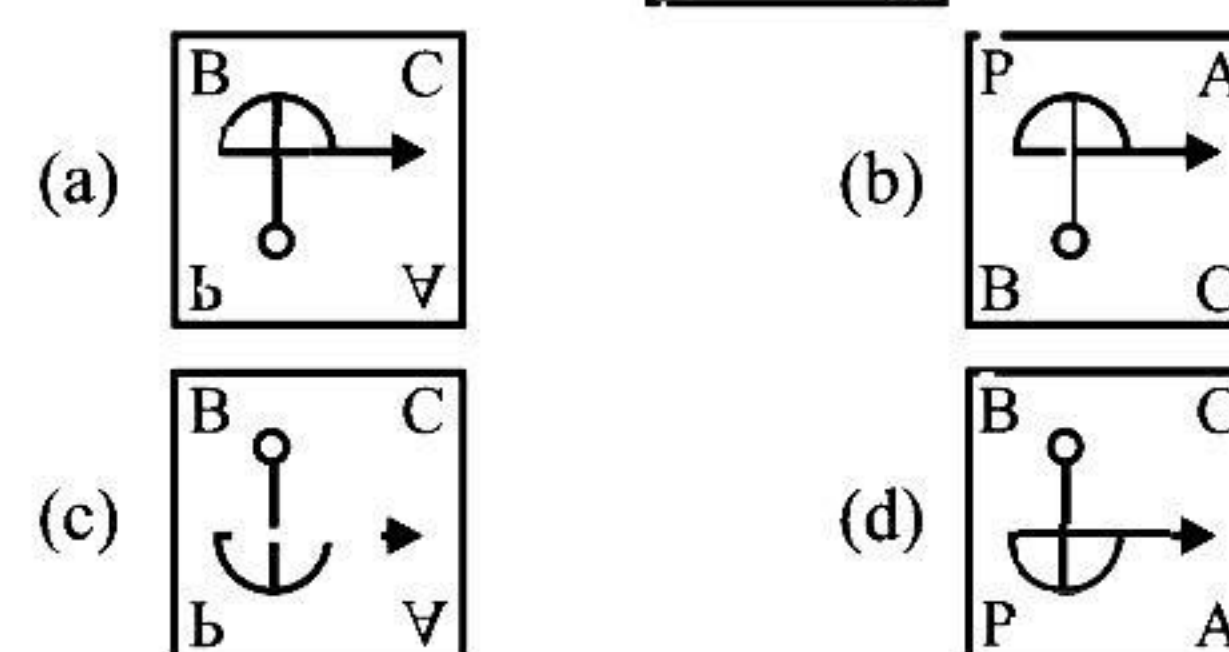
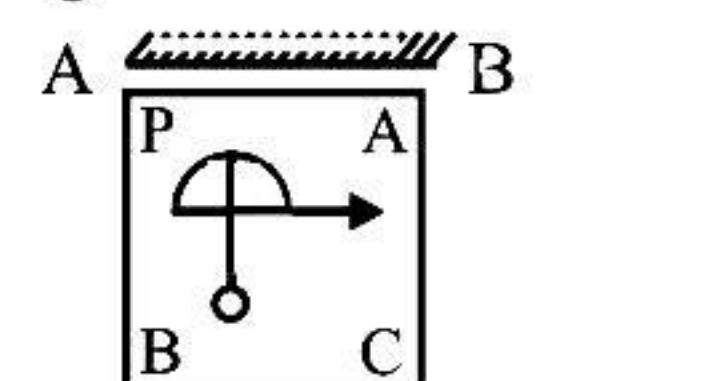


- (a) 24 (b) 20
(c) 18 (d) 16

144. If $P + R = 2Q$ and $Q + S = 2P$, which of the following is correct?

- (a) $P + Q = R + S$ (b) $P + S = R + Q$
(c) $P + Q = 2R$ (d) $P + Q = 2S$

145. In the following question, choose the correct mirror image from the answer figures.



146. Using the table given below, identify the correct expression.

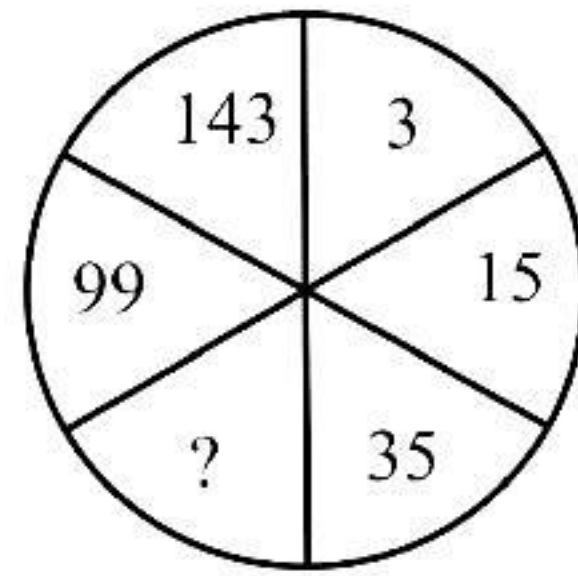
P	Q	R	S
$\times$	$\div$	$+$	$-$

- (a) $2 P 9 S 24 Q 8 R 1 = 32$
(b) $2 R 9 S 24 Q 8 P 1 = 8$
(c) $2 P 8 S 24 R 9 Q 1 = 4$
(d) $2 P 8 S 24 Q 8 S 1 = 16$

147. Freya is on the left of the person sitting in middle but is on the right in Bella. Sara is on the right of Jamie and Austin is on the right of Sara. Austin is the second person from the person sitting in the middle. Who is sitting in the middle?

- (a) Freya (b) Jamie
(c) Bella (d) Sara

148. Find the missing number in the figure below.



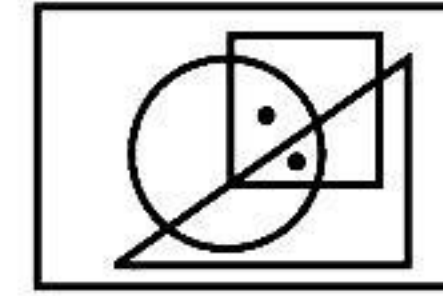
- (a) 56 (b) 60
(c) 63 (d) 65

149. A person is standing on a staircase. He walks down 4 steps, up 3 steps, down 6 steps, up 2 steps, up 9 steps and down 2

steps. Where is he standing in relation to the step on which he started?

- (a) 2 steps above (b) 1 step above
(c) The same place (d) 1 step below

150. Select the option which satisfies the same conditions of placement of the dots as in the Figure.



- (a) (b)
(c) (d)

UsuallyCorrect

Hints & Explanations

SECTION-A: MATHEMATICS

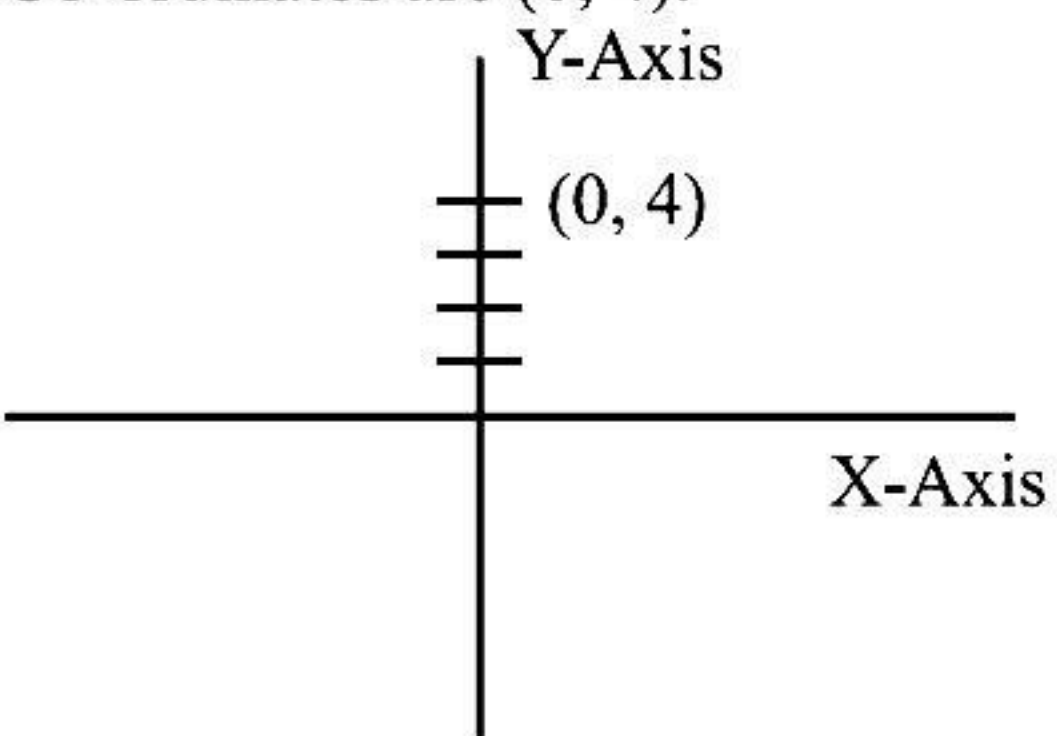
1. (b) MRP of wrist-watch = ₹ 5000
Successive discount in first show-room
 $= 50 + 40 - \frac{50 \times 40}{100} = 70\%$
Discount in second show-room = 80%
 $\therefore$ Difference in two selling price
 $= 5000 \times \frac{(80 - 70)}{100} = ₹ 500$
2. (d) Throwing a stone from a roof of a building is not a random experiment.
3. (d) 'A' is smallest two digit perfect cube number is 27.
 $\therefore$ Number is 274b.
and A's unit place digit exceeds b, by 3
 $\therefore$ Number is 2744.
Cube root of 2744 is 14.
So, the required sum is $2744 + 14 = 2758$.
4. (d) A circular prism can be another name of a cylinder.
5. (b) $p = \frac{5}{7}$
Now, $\frac{1+p}{p} = \frac{1+\frac{5}{7}}{\frac{5}{7}} = \frac{\frac{12}{7}}{\frac{5}{7}} = \frac{12}{5}$
which is greater than p.
6. (b) Let x men were originally employed.
 $\therefore x \times 9 = (x - 6) \times 15$
 $\Rightarrow 9x = 15x - 90$
 $\Rightarrow 6x = 90$
 $\Rightarrow x = 15$
So, 15 men were originally employed.
7. (d) Sum of the first 'n' odd natural numbers.
Because sum of first 'n' odd number = (n^2) .
8. (d) Blood type A or B,
Number of people = $16\% + 25\% = 41\%$
From the question,
 $41\% = 82$
 $\therefore 1\% = 2$
Then number of people with blood types AB or O
 $= 19\% + 40\% = 59\%$
So, number of people with blood types AB or O
 $= 59 \times 2 = 118$
9. (b) Interior angle of regular polygon = 162°
Sum of interior and exterior angle of a regular polygon = 180°
 $\therefore$ Exterior angle = $180^\circ - 162^\circ = 18^\circ$

Number of sides of a regular polygon

$$= \frac{\text{sum of exterior angle}}{\text{each exterior angle}}$$

$$= \frac{360}{18} = 20.$$

So, number of sides are 20.

10. (d) $0.000064 = \frac{64}{1000000} = 64 \times 10^{-6}$
 $= 6.4 \times 10^{-5}$
11. (a) Let the speed of the train is S m/s.
Train took 21 sec. to cross 84 m platform and 9 sec to cross the man.
 $\therefore$ Train took 12 sec. to cover 84 m.
 $\therefore$ Speed of the train (S) = $\frac{84}{12}$ m/s.
 $= 7 \times \frac{18}{5}$ km/h.
 $= 25.2$ km/h.
12. (b) In a non-isolated system, the time-temp. graph can only go in one direction, either downwards or upwards if external energy is supplied.
13. (d) Number of students studying History = 200
Number of students studying Architecture = 500
Required ratio = $200 : 500 = 2 : 5$
14. (a) Let three consecutive multiples of 7 are
 $7x + (7x + 7) + (7x + 14) = 357$.
 $\Rightarrow 21x + 21 = 357$
 $\Rightarrow 21(x + 1) = 357$
 $\Rightarrow x + 1 = 17$
 $\Rightarrow x = 16$
So, the smallest multiple of 7 is
 $7x = 7 \times 16 = 112$.
15. (d) Co-ordinates are (0, 4).

16. (c) Let the side of chess-board is x cm.
According to the question,
 $4x - x = 42$
 $\Rightarrow 3x = 42$
 $\Rightarrow x = 14$ cm.
 $\therefore$ Area of the chess-board = $\text{Side}^2 = (14)^2 = 196 \text{ cm}^2$

17. (a) Curved surface area of cone = $\pi r l$

According to the question,

$$\pi r_1 l_1 = \pi r_2 l_2$$

$$\Rightarrow r_1 \times 3 = r_2 \times 5$$

$$\Rightarrow \frac{r_1}{r_2} = \frac{5}{3}$$

So, the required ratio of radii is 5 : 3.

18. (a) $3a + 4b = 16$

Squaring on both sides,

$$(3a + 4b)^2 = 16^2$$

$$\Rightarrow 9a^2 + 16b^2 + 24ab = 256$$

$$\Rightarrow 9a^2 + 16b^2 = 256 - 24 \times 4 \quad [ab = 4 \text{ (given)}]$$

$$\Rightarrow 9a^2 + 16b^2 = 160.$$

19. (a) $\sqrt{1 + \frac{27}{169}} = 1 + \frac{x}{13}$

$$\Rightarrow \sqrt{\frac{169 + 27}{169}} = 1 + \frac{x}{13}$$

$$\Rightarrow \sqrt{\frac{196}{169}} = 1 + \frac{x}{13}$$

Squaring on both sides,

$$\frac{14}{13} = 1 + \frac{x}{13}$$

$$\Rightarrow \frac{x}{13} = \frac{14}{13} - 1 = \frac{1}{13}$$

$$\Rightarrow x = 1.$$

20. (b) Cuboids = $8 \times 15 \times 20 = 2^5 \times 3 \times 5^2$

We need perfect cube, so multiply by $3^2 \times 5 \times 2$.

So, we need 90 cuboids to form a cube.

21. (a) $\frac{1}{1+x^{b-a}+x^{c-a}} + \frac{1}{1+x^{a-b}+x^{c-b}} + \frac{1}{1+x^{b-c}+x^{a-c}}$

$$= \frac{1}{1+\frac{x^b}{x^a}+\frac{x^c}{x^a}} + \frac{1}{1+\frac{x^a}{x^b}+\frac{x^c}{x^b}} + \frac{1}{1+\frac{x^b}{x^c}+\frac{x^a}{x^c}}$$

$$= \frac{x^a}{x^a+x^b+x^c} + \frac{x^b}{x^b+x^a+x^c} + \frac{x^c}{x^c+x^b+x^a}$$

$$= \frac{x^a+x^b+x^c}{x^a+x^b+x^c} = 1.$$

22. (a) C.P. of one chocolate = ₹ 10

C.P. of one candy = ₹ 5

$$\text{S.P. of one chocolate} = 10 \times \frac{120}{100} = ₹ 12$$

$$\text{S.P. of one candy} = 5 \times \frac{108}{100} = ₹ 5.4$$

Profit of one chocolate and one candy

$$= 2 + 0.4 = ₹ 2.4$$

Total profit on chocolate and candies = ₹ 240.

So, number of chocolates she had purchased

$$= \frac{240}{2.4} = 100 \text{ chocolates.}$$

23. (b) $2x + 2x + 2x = 192$

$$\Rightarrow 2x(1 + 1 + 1) = 192$$

$$\Rightarrow 2x = 64 \Rightarrow 2x = 2^6$$

Comparing on both sides,

$$\therefore x = 6$$

24. (b) $0.\bar{3} + 0.\bar{2} = \frac{3}{9} + \frac{2}{9} = \frac{5}{9}$

25. (d) Diagonals of square and rectangle are equal.

26. (c) Diameter of coin = 1.4 cm.

$\therefore$ Radius of coin (r) = 0.7 cm.

Thickness of coin (h) = 0.4 cm.

$\therefore$ Volume of coin = $\pi \times r^2 \times h$.

$$= \pi \times 0.7 \times 0.7 \times 0.4$$

Let n number of coins are required to form a right circular cylinder.

$$n \times \pi \times 0.7 \times 0.7 \times 0.4$$

$$= \pi \times \frac{3.5}{2} \times \frac{3.5}{2} \times 16.$$

(Volume of cylinder = $\pi r^2 h$)

$$\Rightarrow n = \frac{25 \times 4}{0.4} = 250$$

So, 250 coins are required.

27. (d) In a polyhedron, the ratio between faces, vertices and edges is $F + V - E = 2$

From option no. (d),

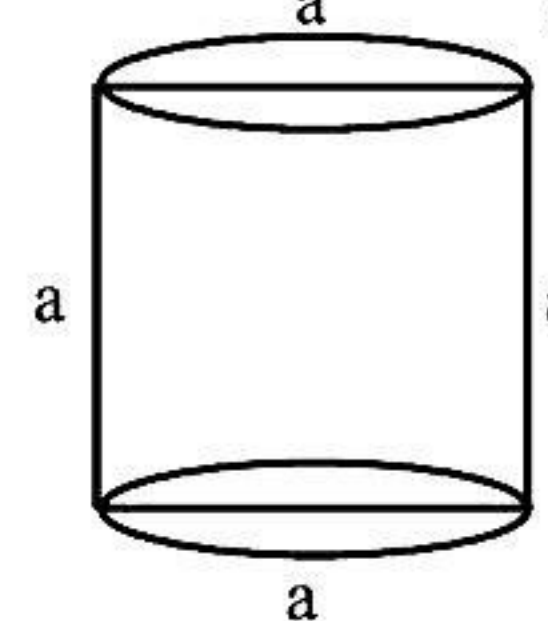
$$V = 4, F = 6, E = 6$$

$$\therefore 6 + 4 - 6 = 2.$$

$$4 \neq 2.$$

So, option (d) can not be true for a polyhedron.

28. (b) Radius of circular end (r) = $\frac{a}{2}$



$\therefore$ Area of circular end = πr^2

$$= \pi \times \frac{a^2}{4} = \frac{a^2}{4} \pi$$

29. (a) Inside diameter of well = 10 m.

$\therefore$ Inside radius of well (r) = $10/2 = 5$ m.

Depth of well (h) = 14 m.

Let outer radius of well is R m.

Then, according to the question,

$$\pi r^2 h = \pi (R^2 - r^2) \times H$$

(where H is height of embankment)

$$\Rightarrow 5 \times 5 \times 14 = (R^2 - 25) \times \frac{14}{3}$$

$$\Rightarrow 75 = R^2 - 25$$

$$\Rightarrow R^2 = 100$$

$$\Rightarrow R = 10 \text{ m.}$$

$$\text{So, width of embankment} = R - r$$

$$= 10 - 5 = 5 \text{ m.}$$

30. (d) Additive inverse of $\frac{2}{9}$ is $-\frac{2}{9}$
And multiplicative inverse of $\frac{2}{9}$ is $\frac{1}{2/9} = \frac{9}{2}$

$$\text{Sum} = \frac{-2}{9} + \frac{9}{2} = \frac{-4 + 81}{18} = \frac{77}{18}$$

31. (d) When two dice are rolled together,
Total outcomes = $6 \times 6 = 36$.
Possible outcomes = 6.

$$\text{Required probability} = \frac{6}{36}$$

32. (c) HCF and LCM of a and b is x and y .
 $(a + b) = x + y$ (given) ... (1)
HCF $\times$ LCM = 1st number $\times$ 2nd number
 $x \times y = a \times b$.

Squaring on both sides in Eqn. (1)

$$(a + b)^2 = (x + y)^2$$

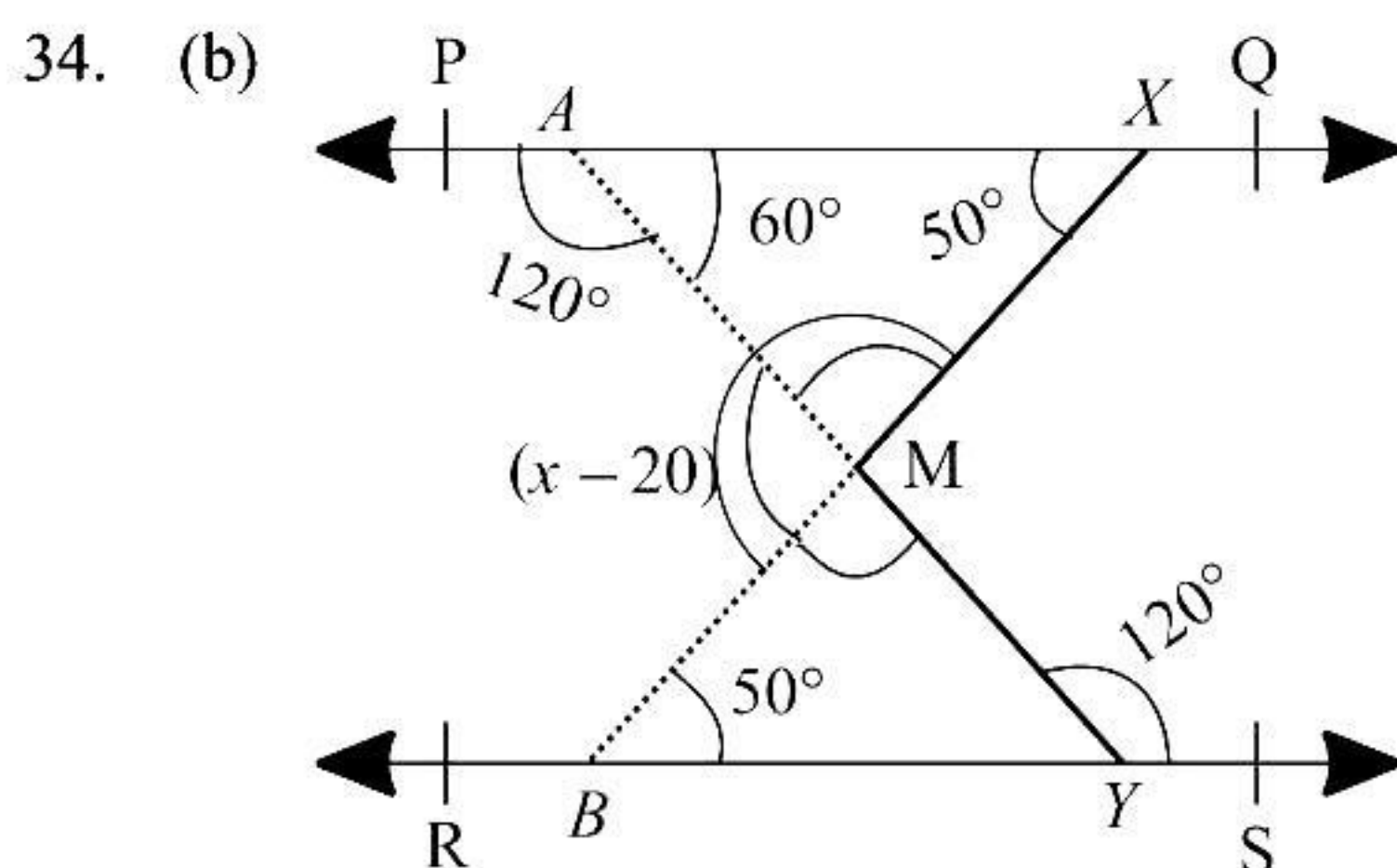
$$\Rightarrow a^2 + b^2 + 2ab = x^2 + y^2 + 2xy$$

$$\Rightarrow a^2 + b^2 = x^2 + y^2 \quad (\because ab = xy)$$

33. (c) C.P. of 11 books = ₹ 10
S.P. of 10 books = ₹ 11
To make the equal quantity of books, multiply by 10 in C.P. and multiply by 11 in S.P.
C.P. $\rightarrow 11 \times 10 = ₹ 10 \times 10$
S.P. $\rightarrow 10 \times 11 = ₹ 11 \times 11$
 $\therefore$ C.P. of 110 books = ₹ 100
 $\therefore$ S.P. of 110 books = ₹ 121.

Profit Percentage

$$= \frac{(\text{S.P.} - \text{C.P.})}{\text{C.P.}} \times 100 = \frac{(121 - 100)}{100} \times 100 = 21\%$$



In triangle XMA ,

$$\angle XMA = 180^\circ - (50^\circ + 60^\circ) = 70^\circ$$

$$\text{and } \angle YMB + \angle BMA = 180^\circ$$

($\because AY$ is a straight line).

$$\therefore (x - 20) = 70^\circ + 180^\circ$$

$$\Rightarrow x - 20 = 250^\circ$$

$$\Rightarrow x = 270^\circ$$

35. (a) Pipe A can fill the tank = 12 min.

$$\text{Pipe A can fill the tank in one minute} = \frac{1}{12}$$

$$\text{Pipe B can fill the tank} = 15 \text{ min.}$$

$$\text{Pipe B can fill the tank in one minute} = \frac{1}{15}$$

$$\text{Pipe C can empty tank} = 10 \text{ min}$$

$$\text{Pipe C can empty tank in one minute} = \frac{1}{10}$$

Time taken by all the pipes to fill the tank in one minute

$$= \frac{1}{12} + \frac{1}{15} - \frac{1}{10} = \frac{5 + 4 - 6}{60}$$

$$= \frac{3}{60} = \frac{1}{20}$$

$\therefore$ Time taken by all the pipes to fill the tank completely = 20 min.

36. (c) Sum of complementary angles is equal to 90° .

Let the two angles are $13x$ and $5x$.

Then,

$$13x + 5x = 90^\circ$$

$$\Rightarrow 18x = 90^\circ$$

$$\Rightarrow x = 5^\circ$$

So, angles are : 65° and 25° .

37. (b) 1, 3, 4, 5, 7 and 10

Mean of above observations

$$= \frac{1 + 3 + 4 + 5 + 7 + 10}{6}$$

$$\Rightarrow m = \frac{30}{6}$$

$$\Rightarrow m = 5$$

And, 3, 2, 4, 2, 3, 3 and P

$$\text{Mean of above observation} = \frac{3 + 2 + 4 + 2 + 3 + 3 + P}{7}$$

$$\Rightarrow (m - 2) = \frac{17 + P}{7}$$

$$\Rightarrow (5 - 2) \times 7 = 17 + P$$

$$\Rightarrow 21 = 17 + P$$

$$\Rightarrow P = 4$$

Arrange the above observations in ascending order

2, 2, 3, 3, 3, 4, 4

$\therefore$ Median = Middle term (There are 7 terms)

$$q = (7 + 1) \div 2 = 4^{\text{th}} \text{ terms}$$

So, $q = 3$.

38. (b) Number of students who come to school by bus = 30
 Number of students don't come to school by bus
 = 42 - 30 = 12

According to the question,

$$\frac{3}{4}B + \frac{2}{3}G = 30 \quad \dots(1)$$

$$\frac{1}{4}B + \frac{1}{3}G = 12 \quad \dots(2)$$

Multiply by 2 in Eqn (2) and then, Eqn (1) - Eqn (2)

$$\frac{3}{4}B + \frac{2}{3}G = 30 \quad \dots(1)$$

$$\frac{1}{2}B + \frac{2}{3}G = 24 \quad \dots(3)$$

$$\begin{array}{r} \frac{3}{4}B + \frac{2}{3}G = 30 \\ - \left(\frac{1}{2}B + \frac{2}{3}G = 24 \right) \\ \hline \frac{1}{4}B = 6 \end{array}$$

$$\Rightarrow B = 24.$$

So, number of boys in the class are 24.

39. (b) (a) $0.09 > \frac{7}{8}$ (b) $6\% < 0.09$

$$0.09 > 0.87 \text{ (False)} \quad \frac{6}{100} < 0.09$$

$$0.06 < 0.09 \text{ (True)}$$

- (c) $8.0 \times 10^{-3} > 6\%$ (d) $\frac{7}{8} < 9 \times 10^{-9}$

$$0.008 > \frac{6}{100} \quad 0.87 > 0.009 \text{ (False)}$$

$$0.008 > 0.06 \text{ (False)}$$

40. (b) 1729 is known as Hardy-Ramanujan Number.

41. (b) Hearts in cards = 13

There are two red kings in cards, one is heart and second is diamond.

$\therefore$ Probability that card is either heart or red king

$$= \frac{13+1}{52} = \frac{7}{26}$$

Probability that card is neither a heart nor a red king

$$= 1 - \frac{7}{26} = \frac{19}{26}$$

42. (c) $x^2 + \frac{1}{x^2} + 2 - 2x - \frac{2}{x} = \left(x + \frac{1}{x}\right)^2 - 2\left(x + \frac{1}{x}\right)$

$$\left(x + \frac{1}{x}\right) \left[\left(x + \frac{1}{x}\right) - 2 \right]$$

So, $\left(x + \frac{1}{x}\right)$ is one of its factor.

43. (c) Principal amount (P) = ₹ 1600
 Time (t) = 2 years.

$$\text{Sum } (A) = ₹ 1764$$

Let rate of interest is r .

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

$$\Rightarrow 1764 = 1600 \left(1 + \frac{r}{100}\right)^2$$

$$\Rightarrow \frac{1764}{1600} = \left(1 + \frac{r}{100}\right)^2 \Rightarrow \left(\frac{42}{40}\right)^2 = \left(1 + \frac{r}{100}\right)^2$$

Taking square root on both sides.

$$\frac{42}{40} = 1 + \frac{r}{100}$$

$$\Rightarrow \frac{42-40}{40} = \frac{r}{100} \Rightarrow \frac{2}{40} = \frac{r}{100}$$

$$\Rightarrow r = 5\%$$

So, rate of interest is 5% per annum.

44. (c) Let number x is $(10x + y)$.

$\therefore$ Number y is $(10y + x)$.

$$\text{So, } x - y = (10x + y) - (10y + x)$$

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

So, $(x - y)$ is divisible by 9.

45. (c) The sum of angles in a quadrilateral is 360° .

Let angles are $6x$, $7x$, $8x$ and $9x$.

$$\text{Then, } 6x + 7x + 8x + 9x = 360^\circ$$

$$\Rightarrow 30x = 360^\circ$$

$$\Rightarrow x = 12^\circ$$

$\therefore$ Angles are :

$$72^\circ, 84^\circ, 96^\circ \text{ and } 108^\circ$$

So, exactly two angles are obtuse (96° and 108°) and two pairs of angles are supplementary [$(72^\circ + 108^\circ)$ and $(84^\circ + 96^\circ)$].

46. (d) We know that number of non-perfect square numbers between x^2 and $(x+1)^2$ is $2x$.

So, number of non-perfect square numbers between the squares of 698 and 699 is $2 \times 698 = 1396$

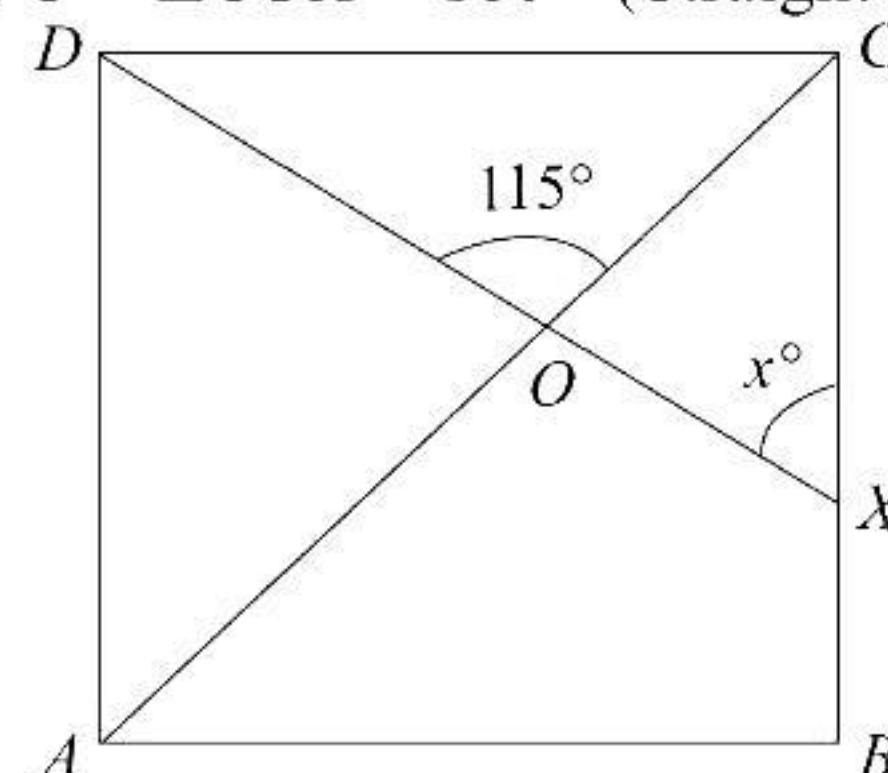
47. (c) Sides of triangular field are 15 m, 20 m and 25 m.

This is a right angle triangle.

$$\therefore \text{Area of field} = \frac{1}{2} \times 15 \times 20 = 150 \text{ sq. m.}$$

Cost of sowing seeds in the field at the rate of ₹ 5 per sq m = $150 \times 5 = ₹ 750$.

48. (b) $\angle DOC + \angle COX = 180^\circ$ (Straight line)



$\therefore \angle COX = 180^\circ - 115^\circ = 65^\circ$
 In triangle COX ,
 $\angle COX + \angle OCX + \angle OXC = 180^\circ$
 $65^\circ + 45^\circ + x^\circ = 180^\circ$
 $(\because \text{In a square diagonal bisects the angle.})$
 $\therefore \angle OCX = 45^\circ$
 $\Rightarrow x = 180^\circ - (45^\circ + 65^\circ)$
 $\Rightarrow x = 180^\circ - 110^\circ$
 $\Rightarrow x = 70^\circ$

49. (a)
$$\begin{array}{r} 1 \quad y \\ + x \quad y \\ \hline z \quad 6 \end{array}$$

$$\left\{ \begin{array}{l} y + y = 6 \quad z - y = 3 \quad 1 + x = z \\ 2y = 6 \quad z - 3 = 3 \quad 1 + x = 6 \\ y = 3 \quad z = 6 \quad x = 5 \end{array} \right.$$

$\therefore$ Value of y and z is 3 and 6.

50. (b) $2x = 3y = 6z$
 Let $2x = 3y = 6z = k$ (where k is any constant) ... (1)
 From equation (1),
 $2x = k \Rightarrow 2 = k^{\frac{1}{x}}$... (2)
 Similarly, $3 = k^{\frac{1}{y}}$... (3)
 and, $6 = k^{\frac{1}{z}}$... (4)
 Multiplying equation (2) and (3),
 $k^{\left(\frac{1}{x} + \frac{1}{y}\right)} = 6$
 $k^{\left(\frac{1}{x} + \frac{1}{y}\right)} = k^{\frac{1}{z}}$ from equation (4)
 $\therefore \frac{1}{x} + \frac{1}{y} = \frac{1}{z}$
 $\Rightarrow \frac{x + y}{xy} = \frac{1}{z}$
 $\Rightarrow z = \frac{xy}{x + y}$

SECTION-B : ENGLISH

51. (c) Refer to second passage, second last line, "and of course there must be something wrong in wanting to silence any song....."
52. (b) "Insignificance with which man regards nature" is the correct explanation for the usage of the word "minor" in the title of the poem.
53. (a) The poem doesn't end with philosophical idea that acceptance of nature and its elements is a must. Hence option (b)
54. (b) "aabb" is the correct option. "aabb" is when the Collection of poems where the ending words of first

two lines (A) rhyme with each other and the ending words of the last two lines (B) rhyme with each other

55. (c) "Irritation" is correct option.

Excitement- a feeling of great enthusiasm and eagerness.

Arrogance- having or revealing an exaggerated sense of one's own importance or abilities.

Irritation- the state of feeling annoyed, impatient, or slightly angry.

Elation- great happiness and exhilaration.

56. (b) In reported speech "now" gets replaced by "then", the sentence is transformed from direct sentence to indirect sentence.

57. (d) **A few** works might not be sufficient to give someone a promotion. Therefore, a few is also a incorrect option. **Several** should not be chosen as a correct answer because in reality it's not possible to check several works of all candidates competing for a promotion. Thus, **several** is also a wrong option. **Enough** is the correct option because to promote someone is giving new responsibilities to the concerned person so enough of his/her works should be considered and reviewed before doing so.

58. (a) "Each" is a determiner and a pronoun. In formal English, with the pronouns: **another, each, either, neither and one**, always singular verbs, singular personal and possessive pronouns are used.

59. (c) "Has" is the correct option. Only one of the boys (Subject) is Singular. It will agree with a Singular Verb, hence option(c)

60. (b) "Are" is the correct answer; "are" it's a helping verb, and is used with the plural nouns.

61. (a) "Few" is the correct option; "few" is a quantifier, Quantifiers are used to give information about quantity (the number of something). Rest of the option, if placed in the blank would render the sentence grammatically incorrect.

62. (c) "We shall be" is the correct option.

The given sentence portrays the future continuous tense. 'The project details will be shown tomorrow,' so it will take a future continuous tense. Options (a) and (c) are present continuous and present perfect continuous tenses. Therefore, they will not be placed in the blank. Option (d) is in the wrong format, It should have been 'will have been presenting' to be correct.

63. (d) "She told the boys not to waste their money" is the correct option to fill the blank space in the question. The following question converts the direct form of speech into the indirect form.

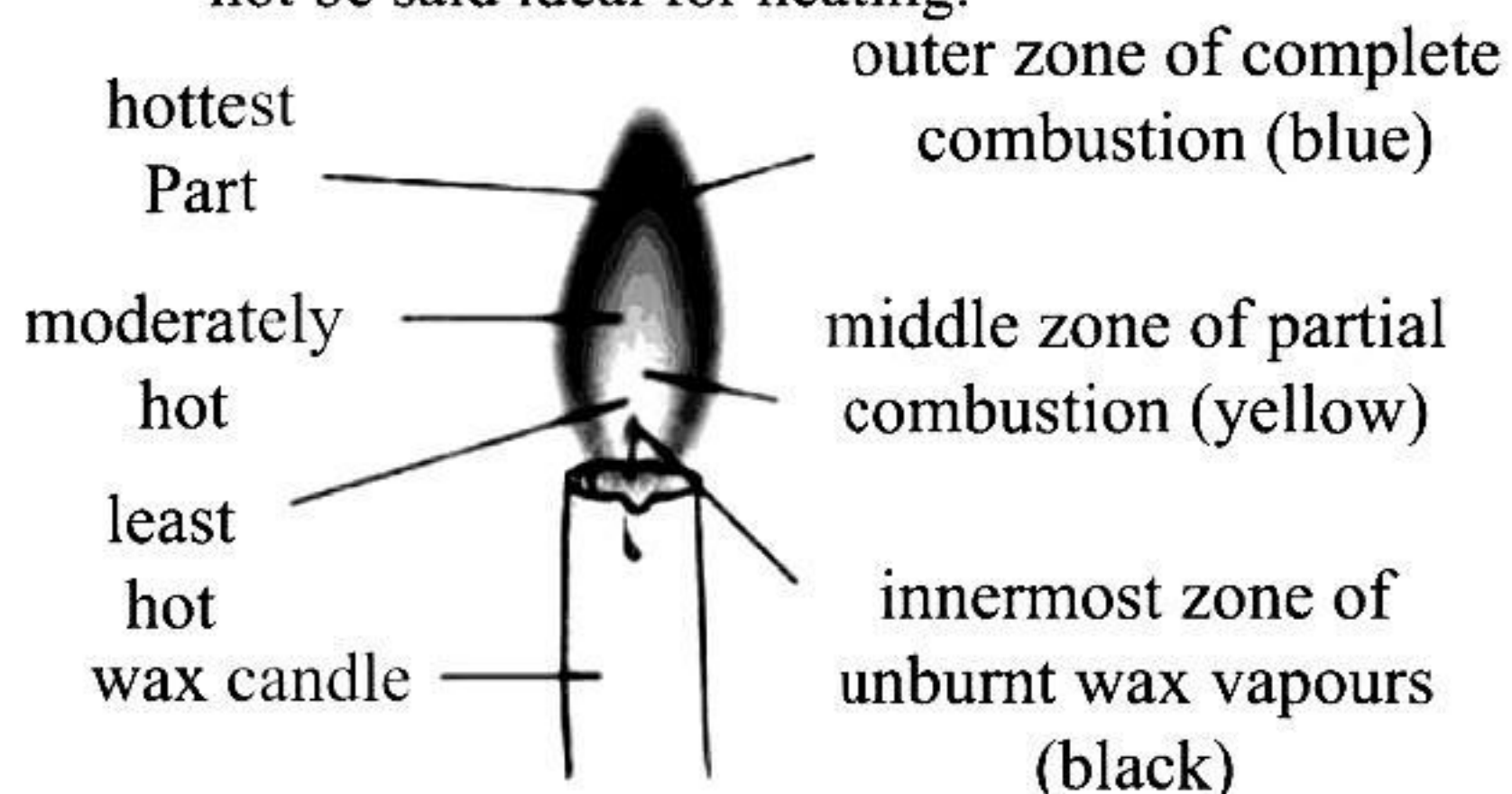
64. (a) **"Is"** appropriately fits the blank; "is" is a helping verb; A helping verb always stands in front of a main verb. "Everybody" means "each one", so it's used as a singular pronoun. Hence option (a).
65. (b) **"Need to"** fits the blank appropriately.
66. (c) **"Open the windows"** is the correct option.
An imperative sentence is a sentence that expresses a direct command, request, invitations, warning, or instruction.
67. (b) **"Conjunction"** is the correct option; In grammar, a **conjunction** is a part of speech that connects words, phrases, or clauses that are called the conjuncts of the conjunctions..
68. (d) **"Thinks that he has finished the course"** is the predicate in the sentence; A **predicate** is the part of a sentence or clause containing a verb and stating something about the subject.
69. (a) **"A difficult situation"** is the closest in meaning to the given idiom in the question.
By dictionary 'weather the storm' idiom means - to deal with a difficult situation without being harmed or damaged
70. (a) **"The baby broke the glass"** is the correct option: as the it is evident from **"broke"** that the sentence is in simple past tense form. **"simple past tense"** shows that you are talking about something that has already happened. Unlike the past continuous tense, which is used to talk about past events that happened over a period of time, the simple past tense emphasizes that the action is finished.
71. (c) **"Poor urban planning may give rise to noise pollution."** is the correct option, as it alone makes a grammatically correct and contextually meaningful sentence.
72. (b) **"Paw is to dog as hoof is to horse"** is the correct option. A Paw is a part of the body of a dog, similarly, a hoof is a part of the body of a horse. Both the analogy are referring to a limb of a being, purpose of which is to walk, run, stand so on..
73. (d) **"Noise pollution affects both behaviour and health."** is the correct option, as it alone makes a grammatically correct and contextually meaningful sentence
74. (b) **"Does"** is used for singular subjects like "he," "she," "it," "this," "that," or "John.". When we talk about specific clock times, time **is countable**, hence **"What time does the news start?"** is the correct option.
75. (c) **"Paraguayan, Parisian, Peruvian, Polish, Portuguese, Prussian"** is the correct order. In the dictionary, words are arranged in the alphabetical

order, so "Paraguayan" and "Parisian" have "par" common so we will consider fourth alphabet of the words. Next, "Peruvian" as it has "e" in the second place. To choose from "Polish", "Portuguese" we will again use the similar method we used for the 1st and 2nd position. "po" will remain same, 3rd alphabet of the word will be considered, in English alphabets, "l" come before "r" hence order will be "Polish" in fourth place and "Portuguese" in the fifth, and "Prussian" in the last place.

SECTION-C: GENERAL SCIENCE

76. (b) A cell converts chemical energy into electrical energy. In a cell hence produce electrical energy chemical reaction takes place which generates electron.
77. (b)
(i) Sodium is a very reactive metal and reacts vigorously with atmospheric oxygen and moisture.
$$4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$$
$$2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$$
It is stored in kerosene. Hence X is sodium (Na).
(ii) Phosphorus is very reactive non metal, It catches fire on exposure to air.
$$\text{P}_4 + 5\text{O}_2 \rightarrow 2\text{P}_2\text{O}_5$$
It is stored in water .Hence Y is phosphorus (P).
(iii) Iron reacts slowly with water. It reacts with steam.
$$3\text{Fe} + 4\text{H}_2\text{O (steam)} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$$
Hence Z is iron (Fe).
78. (a) Full form of LED is Light emitting diode. It is a semiconductor diode which produces light when current is passed through it. It is widely used these days in street lights, outdoor area lighting, televisions due to its long life , energy efficiency, high brightness and intensity.
79. (a) Loudness of sound depends upon the amplitude of sound. It is directly proportional to the square of the amplitude of the sound. Higher the amplitude , louder will be the sound wave and vice versa.
80. (c) The term that refers to the process of sowing seeds manually by sprinkling them on the soil by hand is known as **broadcasting**. Reshuffling of option (c) gives the term broadcasting.
81. (a) When an object moves closer to a concave lens, the image formed by it shifts away from the lens.
82. (c) The mismatched pair is option (c)
Endocrine gland in pancreas is known to secrete insulin which help in regulating the level of glucose in body.
83. (c) Termites live on wood cellulose, but they depend on protozoa in their gut which provide an enzymes that can digest the wood cellulose into soluble carbohydrates.

84. (b) Alkali metals like sodium are very soft and can be cut with a knife.
85. (d) Given
 Side of a cube = 0.2 m
 Mass of cube = 50 kg
 Force applied on the floor by cube (F)
 $= mg = 50 \text{ kg} \times 10 \text{ N kg}^{-1} = 500 \text{ N}$
 Area of the cube = $0.2 \times 0.2 = 0.04 \text{ m}^2$
 Pressure = $F/A = 500/0.04 = 12500 \text{ Nm}^{-2}$
86. (a) As we know in case of plane mirror the angle of incidence is equal to the angle of reflection. So, if we place the eye on point A the hole can be seen.
87. (d) Mammals have sex determining system in which males have XY pair of chromosomes while females have XX pair of chromosomes. These combines at the time of fertilization in zygote and determines the baby's gender.
88. (a) P represents male reproductive part producing sperms whereas Q represents female reproductive part producing ovum. Mature cell of P can be stored for longer period in reproductive tract whereas in Q only immature cells remains stored.
 (b) P produce more reproductive cell than Q
 (c) R productive cell produced by p shows mobility.
 (d) Q produces reproductive cell for shorter period in an individual life spans
 Hence only (a) is correct.
89. (b) When a rubber sucker is pressed against the surface, the air inside it, comes outside and a partial vacuum is created inside. Hence, the pressure outside the rubber i.e atmospheric pressure becomes greater than the pressure inside the rubber and cause rubber sucker to stick to the surface.
90. (c) (i) Yellow flame occurs in middle zone or luminous zone where partial combustion of unburnt carbon particles take place . It is moderately hot hence, can not be said ideal for heating.



- (ii) The substance that vaporize during burning gives flames. Substance like candle, kerosene etc can vaporise hence they can produce flame but coal can not vaporise therefore, it does not produce flame on burning.

- (iv) Complete combustion of carbon particles occur in outer zone or non luminous zone. This zone has the highest temperature.
91. (a) Loudness of sound depends on amplitude. It is measured in units of decibel (dB).
92. (d) Crop rotation is the practice of growing different type of crops sequentially on the same area or field to improve soil fertility, optimize nutrients in the soil, and help in controlling the weeds and pests. For example , legumes plants play an important role in crop rotation . Rotating legumes with non-legumes has the advantage that they not only reduce the weeds and pest in the soil but also ennrich the soil by collaborating with nitrogen-fixing bacteria in the soil.
93. (c) Out of the given substances, coal is suspected to have the highest ignition temperature because kerosene, petrol and alcohols are highly flammable substances and have low ignition temperature.
94. (a) Sea water has high salt concentration than river water due to which its density is high. Hence It is easier to swim in sea water than in river water.
95. (a) The force of static friction depends upon the applied force and the nature of the surface in contact. Hence, when the applied force is doubled on an object when it is still at rest then the friction is doubled.
96. (b) **Vaccination** is the way of protecting people against harmful diseases, before they come into contact with that disease causing microorganism. Thus it helps in improving immunity system.
Pasteurization : It is defined as the process of heat-treatment given to certain foods and beverages that destroys harmful microorganisms.
Fertilization: it is the process by which two reproductive cells or gametes (male and female) fuse to form a zygote, which develops into a new organism.
Inoculation : It is the process of producing immunity and method of vaccination that consists of introduction of the infectious agent to abraded or absorptive skin surface .
97. (d) Metamorphosis is a biological phenomena by which an animal develops physically like an adult after birth or hatching, through cell growth and differentiation. Hence a tadpole that hatches out of egg does not resemble the adult frog. It undergoes some series of transformation with timw through cell differentiation to like and adult.
98. (c) Plastics have been used widely in almost every field in different forms. For example it is used in the form of polythene as carrier bags, Thermoplastic material

are used in making sports equipment, toys, containers like shampoo bottles, drinking bottles, and food storage containers etc.. Thermosets plastics are used in the manufacture of various products, such as fabrics, thermal insulators, electrical devices, hospital articles, tires, etc.

99. (b) Friction is defined as the force that resists the motion of one object over other. More the friction lesser will be the speed of moving objects. Muddy surface, cemented surface, brick surface are rough and offers more friction while polished marble surface offers very less friction. Hence, car will travel farthest on it.
100. (c) Fractional distillation is a method of distillation which is used to separate a mixture of miscible liquids that do not have much difference in their boiling points. It is most commonly used in petroleum refineries, petrochemical and chemical plants.
- Petroleum is a mixture of number of carbon compounds such as Gasoline, Kerosene, Diesel Oil and Petrol etc., which can be separated by fractional distillation.
- Petroleum is a source of number synthetic polymers.

SECTION-D: SOCIAL STUDIES

101. (d) Civil law deals with Property, Money, Housing, Divorce, custody of a child in the event of divorce, etc. It doesn't deal with murder or criminal offences.
102. (b) When products from seas and oceans are used as raw materials, it is called marine-based industry, e.g. sea food industry. Marine based industries use products from the sea and oceans raw materials. Industries processing sea food or manufacturing fish oil are some examples.
103. (b) The Sachar Committee was a seven-member High Level Committee in India established in March 2005 by then Prime Minister Manmohan Singh. The committee was headed by former Chief Justice of Delhi High Court Rajinder Sachar to study the social, economic and educational condition of Muslims in India.
104. (a) Twelve members are nominated to the Rajya Sabha by the President of India for six-years term for their contributions towards arts, literature, sciences, and social services.
105. (c) Deep bores, are called shaft have to be made to reach minerals deposits that lies at great depths. This is called shaft mining. Ex:- petroleum and natural gases are the examples that occur far below the earth surface.
106. (b) Oil is generally extracted from the ground using vertical drilling and pumping.
107. (a) Water flowing in rivers is not an example of ground water. Rivers receive water from rain and melting snow, from underground springs and aquifers, and from lakes.
108. (b) Since forests consist of a big number of plants and trees, they help to maintain the balance between oxygen and carbon dioxide in the atmosphere.
109. (a) A Member of the Legislative Assembly (MLA) is a representative elected by the voters of an electoral district (constituency) to the legislature of State government in the Indian system of government.
110. (b) The minerals found in the Monazite sands of Kerala is Thorium.
111. (a) The first successful mechanized textile mill was established in Mumbai in 1854.
112. (c) Secularism refers to the separation of religion from the State. One of the basic principles of secularism is that government should not be involved in matters concerning religion.
113. (a) Upon independence in August 1947, the title of viceroy was abolished. The representative of the British Sovereign became known once again as the governor-general. C. Rajagopalachari became the only Indian governor-general.
114. (a) Utility makes an object or substance a resource.
115. (a) The devotees of Lord Vishnu or Narayana are known as Vaishnavas and are spread over time and place in our subcontinent over the centuries, before and after the Common Era (CE).
116. (c) Rourkela Steel Plant is located in the north-western tip of Odisha and at the heart of a rich mineral belt.
117. (b) Nyaya panchayat can only fine up to ₹100 and cannot send anyone to jail.
118. (b) Mangal Pandey was arrested and sentenced to death after he attacked British officers in Barrackpore on March 29, 1857. Anticipating a revolt, British authorities moved up his initial execution date from April 18 to April 8, when he was hanged.
119. (c) Minerals are inexhaustible.
120. (a) An FIR is generally filed in the police station within whose jurisdiction the offence is committed. The FIR should mention the date, time and location of the incident and the identity of the accused (if known) in a precise manner.
121. (c) Horticulture is the science and art of cultivating fruits, vegetables, flowers, or ornamental plants. It also includes plant conservation, landscape restoration, soil management, landscape and garden design, construction, and maintenance.

132. (c) The pattern is :

$$\begin{array}{ccc} 3^2 & \boxed{5^2} & 4^2 \\ \downarrow & \downarrow & \downarrow \\ 9 & 25 & 16 \end{array}$$

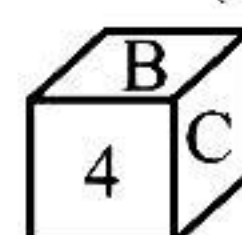
133. (c) The pattern is as :

6 11 21 36 56 81

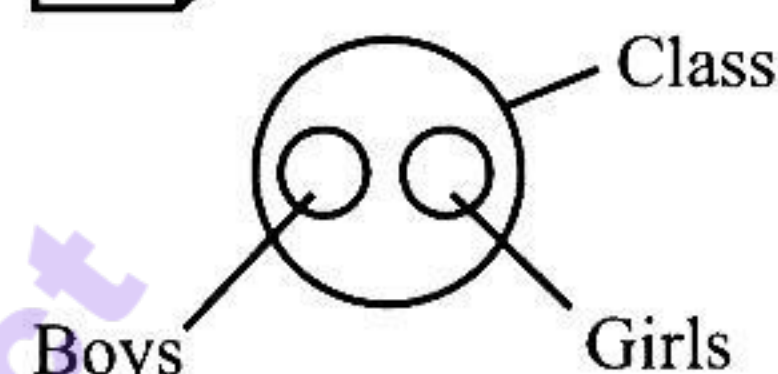
+5 +10 +15 +20 +25

134. (c) The pattern is as :

$$\begin{array}{ccccccc} 100 & : & 121 & :: & 144 & : & \boxed{169} \\ \uparrow & & \uparrow & & \uparrow & & \uparrow \\ (10)^2 & & (11)^2 & & (12)^2 & & (13)^2 \end{array}$$



135. (d)

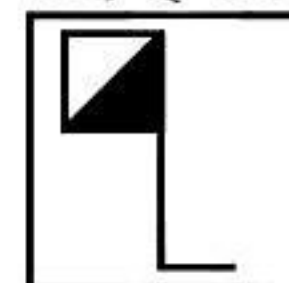


136. (d)

137. (c)

	Red			Blue		
Law	P	S		R		
Gazetteers			U		Q	T

138. (b)



139. (b) $\begin{array}{c} \text{Z}^+ - \text{P}^- \\ | \\ \text{X}^- \end{array} \longleftrightarrow \begin{array}{c} \text{R}^+ - \text{Y}^+ \\ | \\ \text{O}^+ \end{array}$

140. (b) The pattern is as :

$$\frac{4 \times 3}{2} = 6, \frac{7 \times 6}{3} = 14, \frac{5 \times 8}{4} = 10$$

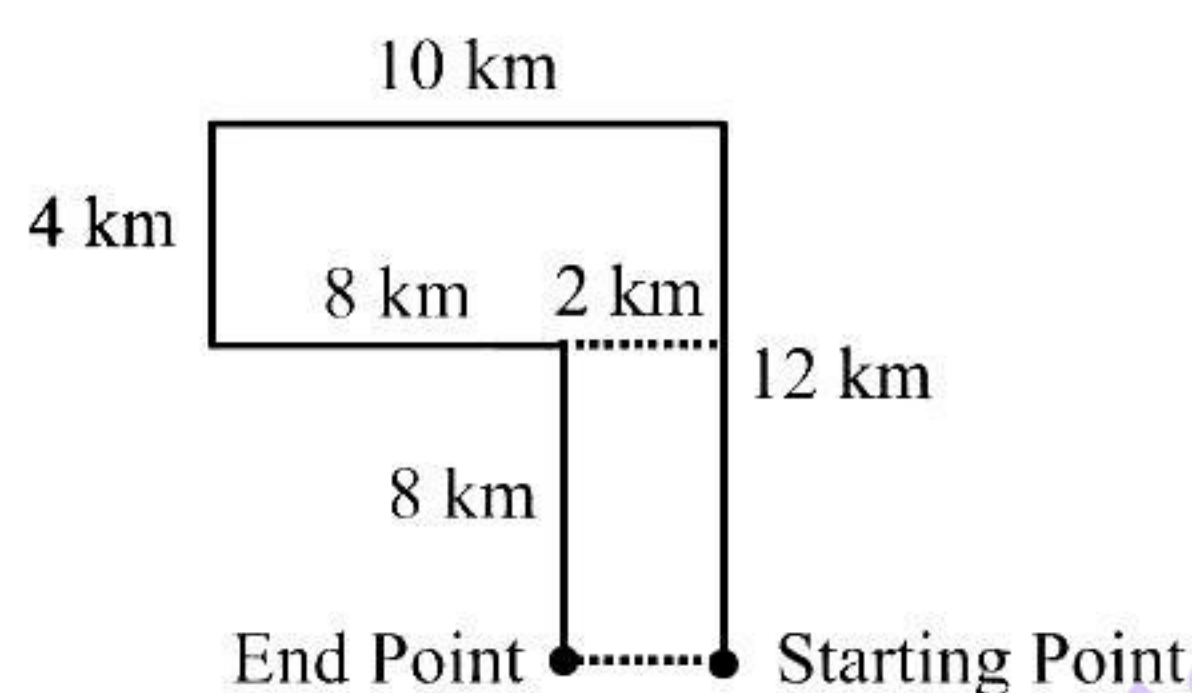
$$\text{and } \frac{9 \times 8}{6} = 12$$

141. (b)

P	A	R	K	S	H	I	R	T
5	3	9	4	1	7	6	9	8

P	A	N	D	I	T	N	I	S	H	A	R
5	3	2	0	6	8	2	6	1	7	3	9

128. (a)



130. (a) As,

$$\begin{array}{ccccccc} \text{C} & \text{E} & \text{R} & \text{T} & \text{A} & \text{I} & \text{N} \\ \downarrow -1 & \downarrow +1 & \downarrow -1 & \downarrow +1 & \downarrow -1 & \downarrow +1 & \downarrow -1 \\ \text{B} & \text{F} & \text{O} & \text{U} & \text{Z} & \text{J} & \text{M} \end{array}$$

M	U	N	D	A	N	E
↓ ₋₁	↓ ₊₁	↓ ₋₁	↓ ₊₁	↓ ₋₁	↓ ₊₁	↓ ₋₁
L	V	M	E	Z	O	D

131. (a) As,

$$\begin{array}{ccc} 8 & : & 4 \\ \uparrow & & \uparrow \\ (2)^3 & : & (2)^2 \end{array}$$

Similarly,

$$\begin{array}{ccc} 27 & : & 9 \\ \uparrow & & \uparrow \\ (3)^3 & : & (3)^2 \end{array}$$

Diagram illustrating the base pairing between two DNA strands:

S	U	G	A	R	W	A	T	E	R
B	C	D	Z	F	P	Z	Q	M	F



144. (a) $P + R = 2Q$ (i)

$$Q + S = 2P \quad \dots\dots (ii)$$

$$P + R = Q + Q \quad \text{..... (iii)}$$

(ii),

$$\Rightarrow R + S = P + Q$$

$$\Rightarrow P + Q = R + S$$

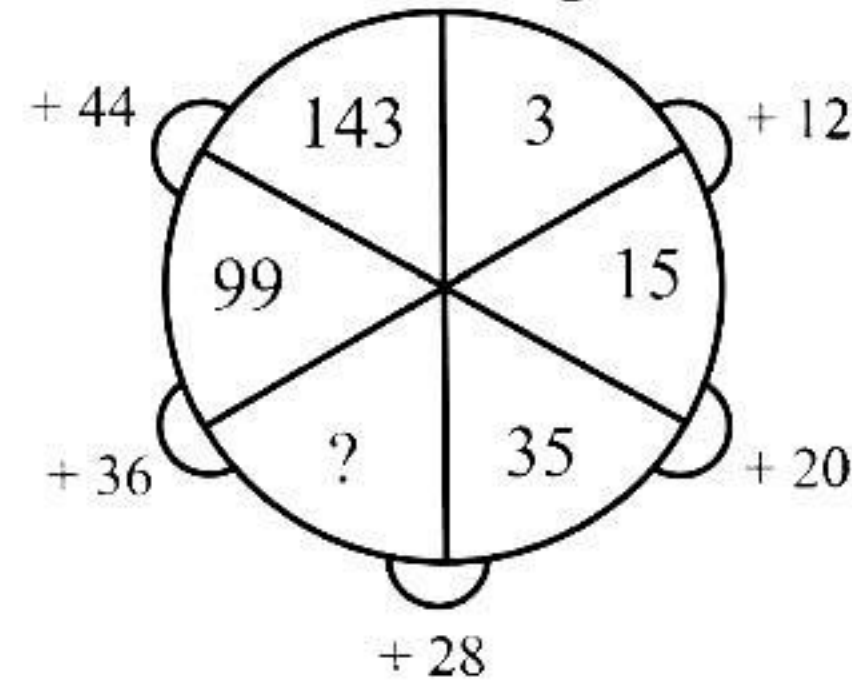
146. (b) From option (b),

$$\Rightarrow 2 + 9 - 24 \div 8 \times 1 = 8$$

$$\Rightarrow 11 - 3 \times 1 = 8$$

$$\Rightarrow 8 = 8$$

A horizontal number line with five vertical tick marks. Below each tick mark is a name: Bella, Freya, Jamie, Sara, and Austin, in order from left to right.



149. (a) UP Down

3	4
2	6
9	2
14	12

150. (d) Figure (d) satisfies the same conditions.