RRB Group D Previous Year Paper (Held on: 19 Sept 2022 Shift 3)

RRB Group D • 2022 • 100 questions • 90 minutes • Answer key and solutions

Take this paper as a timed mock test

Practise under exam conditions, then review your answers after you submit.

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CBT

Q1. What will come in the place of the question mark (?) in the following equation, if '+' and '-' are interchanged and also '×' and '÷' are interchanged?

160 × 8 + 12 - 6 ÷ 180 × 6 - 4 = ?

(a) 202
(b) 172
(c) 192
(d) 182

Q2. Five students are sitting in a straight row facing the north. A and B are sitting at the extreme left and the extreme right end of the row, respectively. D is an immediate neighbour of B. C is an immediate neighbour of D and second to the right of A. E is an immediate neighbour of A. Who among the following is sitting in the third position from the extreme right end?

(a) B
(b) E
(c) C
(d) D

Q3. If ' + ' means ' - ', ' - ' means ' × ', ' × ' means ' ÷ ', ' ÷ ' means ' + ', what will come in place of the question mark (?) in the following equation?

38 ÷ 10 × 5 - 7 + 10 × 2 = ?

(a) 48
(b) 50
(c) 47
(d) 45

Q4. The position of how many letter will remain unchanged if each of the letters in the word GERMANY is arranged in alphabetical order?

(a) 4
(b) 2
(c) 3
(d) 5

Q5. In the given letter-cluster pairs, the first letter-cluster is related to the second letter-cluster following a certain logic. Study the given pairs carefully, and from the given options, select the pair that follows the same logic.

ON : NPMO

IN : HJMO

(a) AT : CDUV
(b) TO : SUNP
(c) DO : ACMN

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(d) GO : ARED

Q6. Three statements are given, followed by two conclusions numbered I and II. Assuming the statements to be true, even if they seen to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statements:

All jugs are cans.

All cans are engines.

Some jugs are stoves.

Conclusions:

I. Some engines are stoves.

II. Some cans are jugs.

(a) Only conclusion I follows.
(b) Only conclusion II follows.
(c) Both conclusion I and II follow.
(d) Neither conclusion I nor II follows.

Q7. In this question, a group of numbers/symbols is coded using letters as per the table given below and the conditions which follow. The correct combination of codes following the conditions is your answer.

Number/Symbol	**6**	**8**	**4**	**•**	**5**	**#**	**%**	**2**	**$**	**1**	**^**	**7**	**9**	**•**	**@**
Code	S	U	T	W	N	P	V	D	A	Z	J	M	O	M	Y

Conditions:

(i) If the first and last elements are numbers, then the last element will be replaced by the symbol @.

(ii) If the first elements is a symbol, then the first element will be coded as ©.

(iii) If both the first and second elements are numbers, then the third element will be coded as *.

What will be the code for the following?

6 % $ 8 5

(a) ©UAV@
(b) SUAV©
(c) SVAU@
(d) SVAU©

Q8. Three statements are given followed by three conclusion numbered I, II and III. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide

Which of the conclusions logically follow(s) from the statements.

Statements:

All creepers are vegetables.

All vegetables are fruits.

Some fruits are flowers.

Conclusions:

I. Some creepers are flowers.

II. Some fruits are creepers.

III. All vegetables are flowers.

(a) Only conclusions II and III follow
(b) Only conclusion II follows
(c) Only conclusion I and III follow
(d) Only conclusions I and II follow

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Q9. If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 5613742678, what will be the sum of the digits which are third from the left and second from the right, in the number thus formed?

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

Q10. Each vowel in the word FLOWER is changed to the letter following it in the English alphabetical order and each consonant is changed to the letter preceding it in the English alphabetical order. If each letter, thus formed, is arranged in alphabetical order, which letter will be second from the right?

(a) Q
(b) K
(c) P
(d) E

Q11. How many such pairs of letters are there in the word REPUBLICAN (in both forward and backward directions) which have as many letters between them in the word as there are in the English alphabetical order?

(a) 5
(b) 3
(c) 4
(d) 6

Q12. A statement is given followed by two conclusions numbered I and II. You have to assume everything in the statement to be true and decide which of the conclusion logically follow(s) beyond a reasonable doubt from the information given in the statement.

Statement:

It is reported that heavy and erratic rainfall has destroyed many agricultural crops and farmers are in debt.

Conclusions:

I. Farmers need not repay the debt.

II. Prices of groceries and other essential food items such as lentils and grains will surge.

(a) Both conclusions I and II follow
(b) Neither conclusion I nor II follows
(c) Only conclusion I follows
(d) Only conclusion II follows

Q13. Seven friends, Chandan, Aman, Falak, Manoj, Mahima, Bony and Fatima, are standing in a line facing east but not necessarily in the same order. Chandan is to the immediate right of Fatima. Fatima is fourth to the right of Falak. Manoj is an immediate neighbour of both Aman and Bony. Falak, who is third to the left of Aman, is standing at one of the extreme end.

What is the correct position of Mahima?

(a) To the immediate left of Chandan
(b) To the immediate left of Bony
(c) Immediate neighbour of Bony and Fatima
(d) Fourth to the right of Manoj

Q14. In this question, a group of numbers/symbols is coded using letters as per the table given below and the conditions which follow. The correct combination of codes following the conditions is your answer.

Number/Symbols	**2**	**@**	**9**	**5**	**$**	**&**	**3**	**%**	**#**	**7**	**•**	**4**	**8**	**6**
Code	T	F	A	J	L	E	W	Q	D	P	R	B	U	S

Conditions:

(i) If the first element is a symbol and the last is a number, the codes for these two (the first and last elements) are to be interchanged.

(ii) If the first element is an odd number and the last is an even number, the first and the last elements are to be coded as ©

(iii) If both the second and the third elements are perfect squares, the third element is to be coded as the code for the second element.

Question: + # 7 & 6

(a) SDPER
(b) DEPSR
(c) RDPRS
(d) PERDS

Q15. Ajay is driving in the east direction and covers a distance of 2.5 km and then takes a turn in the left direction and travels a distance of 3 km. Further, he turns to the right and travels a distance of 4.5 km. Lastly, he turns to his right and travels a distance of 3 km. How far is he form the starting point? (All turns are 90 degree turns only)

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

Q16. Which of the following numbers will replace the question mark (?) in the given series?

100, 90, 81, 73, 66, 60, 55, ?

(a) 52
(b) 53
(c) 51
(d) 50

Q17. Select the option that is related to the seventh number in the same way as the second number is related to the first number, the fourth number is related to the third number and the sixth number is related to the fifth number.

6 : 36 :: 13 : 169 :: 17 : 289 :: 23 : ?

(a) 578
(b) 533
(c) 529
(d) 521

Q18. Three statements are given, followed by four conclusions numbered I, II, III and IV. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statements:

Some pouches are combs.

All combs are reds.

All reds are sticks.

Conclusions:

I. All pouches are sticks.

II. All combs are sticks.

III. Some reds are combs.

IV. Some sticks are pouches.

(a) All the conclusions follow.
(b) Only conclusions I, III and IV follow.
(c) Only conclusions I, II and III follow.
(d) Only conclusions II, III and IV follow.

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Q19. In a class of 100 students, 24 students score more marks than Sharmistha whereas 18 students score lesser marks than Amit. How many students score lesser marks than Sharmistha but more marks than Amit?

(a) 54
(b) 57
(c) 56
(d) 55

Q20. Mohan drives 6 km towards the south and takes a turn to the right at 90°. After driving a distance of 3 km, he turns to the right and drives further 3 km. Now, in which direction is he from the starting place? (All turns are 90 degree turns only)

(a) North
(b) South-East
(c) South-West
(d) South

Q21. Refer to the following letter, symbol series and answer the question.

(Left) D # Y * C $ O A T U @ I & E % N F P % & L # Z (Right)

How many such symbols are there which are immediately preceded and immediately followed by a vowel?

(a) One
(b) Three
(c) Two
(d) Four

Q22. In a queue, Manish is 18^(th) from the front end and Aman is 12^(th) from the rear end, and there are 8 people between them. How many people are there in the queue if Aman is standing somewhere behind Manish in the queue?

(a) 38
(b) 37
(c) 39
(d) 40

Q23. Which of the following numbers will replace the question mark (?) in the given series?

2, 3, 4, 4, 6, 8, 6, 9, 12, 8, 12, 16, ?

(a) 12
(b) 10
(c) 15
(d) 20

Q24. The given statements are followed by two conclusions. Find out which conclusion is true based on the given statements.

Statements:

J > K = L, M ≥ N < K, O < J < P, N > Q > R

Conclusions:

I. P > M

II. N < P

(a) Only conclusion I is true
(b) Both conclusion I and II are true
(c) Neither conclusion I nor II is true
(d) Only conclusion II is true

Q25. Each of the six security guards, L, M, N, O, P and Q, have their night shift duties on six different days of a week, starting from Monday and ending on Saturday of the same week, but not necessarily in the same order. L's nightshift duties are on the day immediately after N. O's nightshift duties are on the day immediately before P but it is not on Monday. M's nightshift duty is on Saturday. Q's nightshift duty is on Wednesday.

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Who among the following has nightshift duties on Tuesday?

(a) L
(b) P
(c) N
(d) O

Q26. Select the option that represents the letters that, when placed from left to right in the blanks below, will complete the letter series.

K P _ L Z _ P _ MZK _ B _ Z _ PB _ Z

(a) B K B P N P O
(b) B K B P N K O
(c) B K B P N K P
(d) B K P P O K P

Q27. Select the set in which the numbers are related in the same way as are the numbers of the following sets. (NOTE : Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digit. E.g. 13 - Operations on 13 such as adding/deleting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed)

(7, 127, 6)

(8, 129, 5)

(a) (10, 156, 4)
(b) (11, 144, 9)
(c) (13, 131, 5)
(d) (9, 168, 3)

Q28. Amongst six friends P, Q, R, S, T and U, each has a different height. S is taller than only two other friends. R is shorter than only one friend. P is shorter than S but taller than Q. T is shorter than U. Who is the shortest among all the friends?

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

Q29. The length of each edge of a cube is increased by 50%. The percentage increase in the surface area is:

(a) 25%
(b) 125%
(c) 225%
(d) 150%

Q30. If $x \neq y$, $z > 0$, and $(x + z)^2 : (y + z)^2 :: x : y$, then find a, where $a > 0$, such that $x : a :: a : y$.

(a) -Z
(b) Z
(c) x - y
(d) $x^2 y^2$

Q31. The number 0.33535... can be represented in the from of P/Q (where P and Q are natural numbers) as:

(a) 332/895
(b) 332/995
(c) 332/980
(d) 332/990

Q32. Which of the numbers below is exactly divisible by 33?

(a) 25080
(b) 19679
(c) 73205

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(d) 27441

Q33. The measures of three angles of a quadrilateral are given as 110°, 55° and 125°. The measure of its fourth angle is _____.

(a) 60 °
(b) 90°
(c) 70°
(d) 110^o

Q34. Raju's age after 30 years will be 2 times his age 4 years ago. The present age of Raju is:

(a) 38 years
(b) 40 years
(c) 36 years
(d) 42 years

Q35. The product of the HCF and the LCM of 4, 20, 28 is:

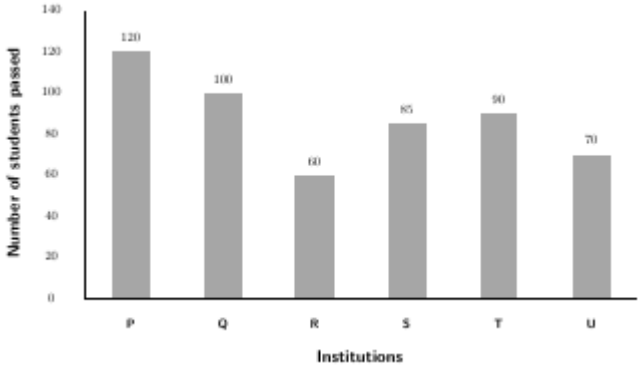
(a) 140
(b) 564
(c) 136
(d) 560

Q36. The volume (in cm^3) of a right circular cone, whose slant height is 28 cm and radius of base is 21 cm, is _____.(Take π = 22/7)

(a) 38808
(b) 3234√7
(c) 30808
(d) 1617√7

Q37. Study the graph and answer the question that follows.

The following bar graph shows the number of students passed in class XII board exam from six different institutions.



Students passed from institutions U, T, P and Q together is how much more than that of institutes S and R together?

(a) 225
(b) 234
(c) 235
(d) 265

Q38. If one angle of a quadrilateral measures 120° and its remaining three angles are equal in measure to one another, then the measure of each of these three remaining angles is equal to _____.

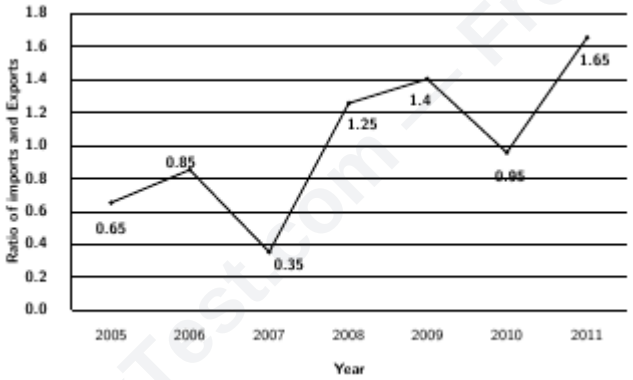
(a) 90°
(b) 80°
(c) 110°
(d) 60°

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Q39. A shopkeeper allows 18% discount on the marked price of an article and still makes a profit of 23%. If he gains Rs. 1,840 on the sale of the article, then what is the marked price of the article?

(a) Rs. 15,000
(b) Rs. 12,000
(c) Rs. 9,840
(d) Rs. 10,000

Q40. The following graph shows the ratio of the imports and exports of an industry during the period from 2005 to 2011. Study the graph and answer the question that follows.



If the imports of the company in 2009 were 420 crore, then how much were the exports?

(a) 400 crore
(b) 350 crore
(c) 250 crore
(d) 300 crore

Q41. If cot A + cos A = m and cot A - cos A = n, then:

(a) $(m^2 - n^2)^2 = 4mn$
(b) $(m^2 - n^2)^2 = 16mn$
(c) $m^2 - n^2 = 16mn$
(d) $m^2 + n^2 = 4mn$

Q42. A hollow cylinder of height h has inner and outer radii of base given as r and R, respectively. The ratio of the curved surface area to the total surface area of this cylinder is:

(a) h : (R - r - h)
(b) (R + r - h) : h
(c) h : (h + R - r)
(d) (R - r - h) : r

Q43. If m = -9 and n = 13, find the value of $25m^2 + 40mn + 16n^2$.

(a) 49
(b) 64
(c) 81
(d) 100

Q44. A train travels at speed of 30 km/h for 6 hours and at 45 km/h for 4 hours. What is the average speed of the train during these 10 hours?

(a) 40 km/h
(b) 35 km/h
(c) 36 km/h
(d) 371/2 km/h

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Q45. The expression $(3.7)^3 - 3 \times (3.7)^2 \times (0.7) + 3(3.7) \times (0.7)^2 - (0.7)^3$ is equal to:

(a) 27
(b) 10
(c) 30
(d) 35

Q46. Two trains start at the same time from A and B and proceed towards each other at speed of 85 km per hour and 105 km per hour, respectively. When they meet, it is found that train from B has travelled 200 km more than the train from A. The distance between A and B is:

(a) 1800 km
(b) 2000 km
(c) 1950 km
(d) 1900 km

Q47. The value of $40 - [3 - \{4 - (6 - 6 - 4)\}]$ is _____.

(a) 100
(b) 300
(c) 47
(d) 37

Q48. Johnny borrows Rs. 7,000 from a bank at simple interest. After 3 years he pays Rs. 4,000 to the bank, this amount being entirely adjusted as repayment of part of the principle borrowed. At the end of 5 years from the date of borrowing he pays Rs. 4,350 to the bank to settle the account. Find the rate of interest.

(a) 6%
(b) 4%
(c) 5%
(d) 7%

Q49. Which of the options given below correctly describes the nature of the roots of the quadratic equation $x^2 + 4\sqrt{3}x + 3 = 0$?

(a) irrational and unequal
(b) rational and unequal
(c) rational and equal
(d) irrational and equal

Q50. Sony and Mary can complete a painting in 4 days and 6 days, respectively. Then work on same painting on alternate days starting with Mary. In how many days will they together complete the painting?

(a) 4.5
(b) 5.25
(c) 5
(d) 4.75

Q51. Five years ago the sum of the ages of A and B was 58 years. The difference between B's age 8 years ago and A's age 8 years hence is 16 years. The ratio of the present ages of A and B is:

(a) 9 : 25
(b) 25 : 9
(c) 5 : 13
(d) 36 : 52

Q52. The total cost price of 100 apples is Rs. 700. They are sold at a rate of Rs. 96 per dozen. The profit percentage is _____.

(a) 82/3 %
(b) 142/7 %
(c) 241/7 %
(d) 131/7 %

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Q53. The ratio of the present ages of A to B is 7 : 3. The ratio of A's age 4 years ago to B's age 4 years hence is 2 : 1. The difference between A's age 4 years hence and B's age 4 years ago is:

(a) 88 years
(b) 46 years
(c) 36 years
(d) 56 years

Q54. The roots of 2^(2x) - 10 × 2^x + 16 = 0 are:

(a) 1, 3
(b) 1, 8
(c) 2, 8
(d) 2, 3

Q55. For a certain number of observations the median is 55 and the mean is 58. Find the mode.

(a) 49
(b) 52
(c) 51
(d) 50

Q56. What is the unit of magnification?

(a) Dioptre
(b) Newton
(c) cm
(d) It has no unit

Q57. Precipitation reactions occur when cation of one reactant and anion of second reactant, found in an aqueous solution, combine to form _____.

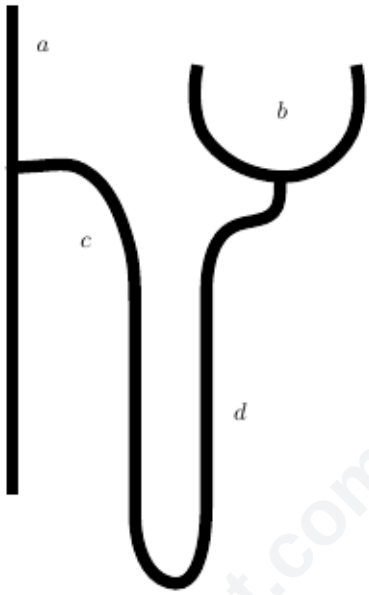
(a) an insoluble acid
(b) an insoluble ionic solid
(c) a soluble acid
(d) a soluble ionic solid

Q58. When an object is placed at a point 21 cm in front of a convex mirror, the image is formed at 7 cm behind the mirror. Now, someone moves the object to a distance of 14 cm in front of the mirror. The distance of the image from the mirror (in cm) now is:

(a) +3
(b) -3
(c) +6
(d) -6

Q59. The following figure shows a human nephron. Which part is the collection duct?

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(a) Region a
(b) Region c
(c) Region b
(d) Region d

Q60. Which of the following develops into a seedling under appropriate conditions?
(a) Endosperm
(b) Cotyledons
(c) Embryo
(d) Seed coat

Q61. Which of the following gases are evolved at the anode and the cathode, respectively, during electrolytic decomposition of aqueous sodium chloride?
(a) H2 gas at the anode and O2 gas at the cathode.
(b) O2 gas at the anode and H2 gas at the cathode.
(c) Cl2 gas at the anode and H2 gas at the cathode.
(d) H2 gas at the anode and Cl2 gas at the cathode.

Q62. What happens when aqueous silver nitrate is added to sodium chloride solution?
(a) Brown precipitate of silver chloride is produced.
(b) Yellow precipitate of silver chloride is produced.
(c) No precipitate of silver chloride is produced.
(d) White precipitate of silver chloride is produced.

Q63. A needle of height 4 cm is placed at a distance of 45 cm in front of concave lens of focal length 30 cm. The height of the image of the needle will be:
(a) 2.2 cm
(b) 1.6 cm
(c) 1.9 cm
(d) 2.5 cm

Q64. 6CO2(aq) + 12H2O(I) - C6H12O6 (aq) + 6O2 (aq) + 6H2O(I)
Select the correct reaction conditions for a given reaction.
(a) Sunlight and chlorophyll
(b) Inert atmosphere
(c) High pressure
(d) High temperature

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Q65. Saturated carbon compounds are normally _____.

(a) having a double bond between carbon atoms
(b) having electrostatic force of attraction
(c) less reactive than unsaturated compounds
(d) less stable than unsaturated compounds

Q66. If coil A of resistance 15 Ω and coil B of resistance 5 Ω are subjected to time varying magnetic field, then the current induced in these coils are:

(a) in the ratio 1 : 2
(b) in the ratio 1 : 1
(c) same
(d) different

Q67. Name the process through which gaseous exchange takes place across the cell membrane.

(a) Diffusion
(b) Osmosis
(c) Endocytosis
(d) Absorption

Q68. In the Modern Periodic Table, atomic size increases down the group because _____.

(a) nuclear charge increases
(b) tendency to lose electrons decreases
(c) number of shells increases
(d) valency increases

Q69. The term 'triads' was used by _____.

(a) Johann Wolfgang Dobereiner
(b) Henry Moseley
(c) Mendeleev
(d) John Newlands

Q70. Suppose in a circuit, several electric lamps are required to be used on a 220 V electric supply line, and they are rated as 10 W. If the maximum allowable current is 10 A. then the number of lamps that can be connected in parallel with each other across the two wires of the 220 V line is:

(a) 110
(b) 220
(c) 55
(d) 165

Q71. Consider two circuits, A and B, each of which has six resistors and each Circuit of resistance R_A and R_B respectively. In each circuit, the resistors are in such a way that the net resistance of each circuit is the minimum. Now a 20 V battery with negligible internal resistance is connected across each circuit separately, and the current drawn by circuit A and circuit B are 6 A and 8 A, respectively. Then R_A and R_B will be:

(a) R_A = 20 Ω and R_B = 15 Ω
(b) R_A = 30 Ω and R_B = 15 Ω
(c) R_A = 15 Ω and R_B = 20 Ω
(d) R_A = 15 Ω and R_B = 30 Ω

Q72. The most essential difference between a DC and AC generator is _____.

(a) Higher voltages are generated by DC generator only
(b) Higher Voltages are generated by AC generator Only
(c) DC generator has permanent magnet and AC has an electromagnet
(d) DC generator uses a commutator and AC generator uses Slip rings

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Q73. The HIV - AIDS virus CANNOT be transmitted by _____.

(a) sexual contact
(b) breast feeding
(c) shaking hand
(d) blood transfusion

Q74. Which of the following is produced when baking powder is heated?

(a) Carbon dioxide and sodium carbonate is produced.
(b) Carbon monoxide and sodium carbonate is produced.
(c) Carbon dioxide and sodium salt of tartaric acid is produced.
(d) Carbon monoxide and sodium salt of tartaric acid is produced.

Q75. Which of the following organelles are present only in plants?

(a) Lysosomes
(b) Plastids
(c) Mitochondria
(d) Vacuoles

Q76. What is the heat energy produced in a resistance of 10 Ω when 5 A current flows through it for 5 minutes?

(a) 7.5×10^3 J
(b) 7.5 × 10^6 J
(c) 7.5 × 10^4 J
(d) 7.5 × 10^5 J

Q77. Bone cells are embedded in a hard matrix that is composed of _____.

(a) phosphorus and potassium
(b) fluoride and calcium
(c) potassium and calcium
(d) calcium and phosphorus

Q78. The sky appears blue due to:

(a) scattering of light of lower wave length
(b) dispersion of light of lower wave length
(c) dispersion of light of higher wave length
(d) scattering of light of higher wave length

Q79. In which state is the 'Solung' festival celebrated?

(a) Madhya Pradesh
(b) Uttar Pradesh
(c) Himachal Pradesh
(d) Arunachal Pradesh

Q80. Identify the states from following, which are related to Pre-Monsoon shower 'Nor westers'

(a) Kerala and Karnataka
(b) West Bengal and Assam
(c) Gujarat and Maharashtra
(d) Rajasthan and Punjab

Q81. Which of the following functions does NOT fall under the jurisdiction of local bodies?

(a) Public Health
(b) Law and Order
(c) Sanitation
(d) Registration of Births and Deaths

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Q82. Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) kendras added nutraceuticals to their product basket in March 2022. Which of the following is NOT included under nutraceuticals?

(a) Protein powder
(b) Vitamin supplements
(c) Dry fruits
(d) Immunity bars

Q83. Whom did PV Sindhu beat to win the women's singles title at the Swiss Open Super 300 Badminton Tournament in Basel on 27 March 2022?

(a) Chen Yu Fei
(b) Michelli Li
(c) Busanan Ongbamrungphan
(d) Kristy Gilmour

Q84. What is the age limit for a judge of the Supreme Court of India?

(a) 65 years
(b) 60 years
(c) 70 years
(d) 62 years

Q85. Which social reformer founded the Satyashodhak Samaj?

(a) Dayananad Saraswati
(b) Narayan Guru
(c) Jyotirao Phule
(d) Keshab Chandra Sen

Q86. Which sportsperson among the following was honoured with the Padma Bhushan in 2022?

(a) Avani Lekhara
(b) Devendra Jhajharia
(c) Sumit Antil
(d) Pramod Bhagat

Q87. _____ is the leading manganese ore producing State of India and accounted for 33% of the total production in 2018-19.

(a) Maharashtra
(b) Karnataka
(c) Odisha
(d) Madhya Pradesh

Q88. In which North Eastern City will you find The Christ Church which is regarded as the oldest Church of North East India?

(a) Guwahati
(b) Aizawl
(c) Itanagar
(d) Kohima

Q89. According to Economic Survey Report of 2021-22, as on September 2021, what percentage of people have opted for Rs. 1,000 pension per month under the Atal Pension Yojana?

(a) 90%
(b) 78%
(c) 80%
(d) 85%

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Q90. In which place of Tamil Nadu will you find 'The Tamil University'?

(a) Salem
(b) Madurai
(c) Thanjavur
(d) Erode

Q91. _____ was launched in January 2021 to conceptualise innovative toys based on the Indian value system which will inculcate the positive behaviour and good value among the children.

(a) Toycathon
(b) Code Gladiators
(c) Great Indian Alexa Hackathon
(d) Smart India Hackathon

Q92. Of the options listed below, _____ is considered the most important contribution of the British rule in India in terms of infrastructural development.

(a) Highways
(b) Railways
(c) Airways
(d) Ports

Q93. Many groups like the 'Narmada Bachao Andolan' oppose building of big dams. What is the negative social impact of a big dam that such groups oppose?

(a) It causes flash floods in the downstream area.
(b) It leads to conflicts between people of different States.
(c) People have to wait for many years (decades) to get benefits.
(d) It displaces people in the upstream reservoir area.

Q94. Which of the following rivers is NOT a tributary of the Yamuna?

(a) Chambal
(b) Betwa
(c) Gandak
(d) Ken

Q95. Which of the following dams was constructed on river Ganga?

(a) Chamera dam
(b) Koyna dam
(c) Tehri dam
(d) Rihand dam

Q96. Under the NITI Aayog SDG India Index overall State and UT scores are generated from goal-wise scores to measure aggregate performance of the sub-national unit based on its performance across the 16 SDGs. Based on these scores, States/UTs are categorised in four categories. Which of the following is NOT one of the categories?

(a) Excellent
(b) Front Runner
(c) Aspirant
(d) Performer

Q97. Article 123 of the Constitution of India gives the power of enacting Ordinances to who among the following?

(a) Vice-President
(b) Prime Minister
(c) President
(d) Speaker of the Lok Sabha

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Q98. What is the term used for pricing strategy in which a firm charges different customers difference prices for the same product?

(a) Two Part Pricing
(b) Price discrimination
(c) Price mechanism
(d) Price elasticity

Q99. In Economics, which of the following curves is 'inverse U-shaped?

(a) Marginal product curve
(b) Short run marginal cost curve
(c) Average variable cost curve
(d) Long run average cost curve

Q100. In March 2022, the Reserve Bank of India (RBI) increased the eligibility criteria for microfinance loans to a household having an annual income of up to _____.

(a) Rs. 4 lakhs
(b) Rs. 3 lakhs
(c) Rs. 3.5 lakhs
(d) Rs. 3.25 lakhs

ANSWER KEY

1	c	2	c	3	c	4	c	5	b	6	c	7	c	8	b	9	a	10	a
11	b	12	d	13	d	14	a	15	c	16	c	17	c	18	d	19	c	20	c
21	c	22	a	23	b	24	d	25	a	26	b	27	a	28	d	29	b	30	b
31	d	32	a	33	c	34	a	35	d	36	b	37	c	38	b	39	b	40	d
41	b	42	c	43	a	44	c	45	a	46	d	47	d	48	c	49	a	50	c
51	a	52	b	53	d	54	a	55	a	56	d	57	b	58	c	59	a	60	c
61	c	62	d	63	b	64	a	65	c	66	d	67	a	68	c	69	a	70	b
71	a	72	d	73	c	74	c	75	b	76	c	77	d	78	a	79	d	80	b
81	b	82	c	83	c	84	a	85	c	86	b	87	d	88	a	89	b	90	c
91	a	92	b	93	d	94	c	95	c	96	a	97	c	98	b	99	a	100	b

SOLUTIONS

Q1. Answer: (c) 192

Given:

160 × 8 + 12 - 6 ÷ 180 × 6 - 4 = ?

Concept Used:

Follow BODMAS rule to solve this question, as per the order given below,

Calculation:

=> 160 × 8 + 12 - 6 ÷ 180 × 6 - 4

When signs are interchanged,

=> 160 ÷ 8 – 12 + 6 × 180 ÷ 6 + 4

=> 20 – 12 + 6 × 30 + 4

=> 20 – 12 + 180 + 4

=> 24 – 12 + 180

=> 12 + 180 = 192

Therefore, the required value of the expression is 192.

Hence, the correct answer is option 3).

Q2. Answer: (c) C

The logic followed is:

Given:

Five students are sitting in a straight row facing the north.

A and B are sitting at the extreme left and the extreme right end of the row, respectively.

D is an immediate neighbour of B.

C is an immediate neighbour of D and second to the right of A.

E is an immediate neighbour of A.

According to the arrangement, C is sitting in the third position from the extreme right end.

Hence the correct answer is 'C'.

Q3. Answer: (c) 47

Given :

38 ÷ 10 × 5 - 7 + 10 × 2

Concept used:

BODMAS table:

Decoding the information,

Sign	•	×	÷	•
Means	×	÷	•	•

After replacing the signs from left to right and using the BODMAS rule,

=> 38 + 10 ÷ 5 × 7 - 10 ÷ 2

=> 38 + 2 × 7 - 5

=> 38 + 14 - 5

=> 52 - 5

=> 47

Hence, the correct answer is '47'.

Q4. Answer: (c) 3

The word arranged in alphabetical order is:

Thus, the total 3 letter positions remained unchanged.

Hence, the correct answer is 'option 3'.

Q5. Answer: (b) TO : SUNP

The position of the letters according to the English alphabet series:

The logic followed here is as follows:

The code for the 1^(st) and 2^(nd)letters of one part in the letter-cluster pair is the previous and the subsequent letter gives the other part of the letter-cluster pair according to the English alphabet series.

According to the question:

ON : NPMO

and,

IN : HJMO

Similarly,

Hence, the correct answer is option 2.

Q6. Answer: (c) Both conclusion I and II follow.

The Venn diagram according to the given statements we have:

Conclusions:

I. Some engines are stoves → Follow (Since given that all jugs are cans and all cans are engines and some jugs are stoves. Thus, some engines are stoves is true.)

II. Some cans are jugs.→ Follow (Since given all jugs are cans and so some cans are jugs is true.)

Thus, both conclusion I and II follows.

Hence, the correct answer is 'Option 3'.

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Q7. Answer: (c) SVAU@

We follow the given table and code the given combination:

Number/Symbol	6	8	4	•	5	#	%	2	$	1	^	7	9	•	@
Code	S	U	T	W	N	P	V	D	A	Z	J	M	O	M	Y

Given combination: 6 % $ 8 5

Since first and last elements are numbers, first condition will be applied which says 'If the first and last elements are numbers, then the last element will be replaced by the symbol @.' so the code will contain '@' at last.

Now none of the other conditions apply so the code becomes:

Hence, the correct answer is option 3).

Q8. Answer: (b) Only conclusion II follows

Statements:

All creepers are vegetables.

All vegetables are fruits.

Some fruits are flowers.

Venn Diagram:

Conclusions:

I. Some creepers are flowers → Does not follow → We have no information which suggests the relationship between creepers and flowers so we cannot assume anything and thus the conclusion does not follow.

II. Some fruits are creepers→ Follow → Since all creepers are fruits, they both are directly related to each other & the same can be seen in the Venn diagram so we can say that some fruits are creepers therefore the conclusion follows.

III. All vegetables are flowers→ Does not follow → We have 'All vegetables are fruits' and 'Some fruits are flowers' which means vegetables and flowers are directly not related to each other so the conclusion does not follow.

So only conclusion II follows.

Hence, the correct answer is option 2).

Q9. Answer: (a) 10

According to the given condition the series becomes:

Now we have, 2 as third from left and 8 as second from right.

Sum = 2 + 8 = 10

Hence, the correct answer is option 1).

Q10. Answer: (a) Q

According to the English alphabets and their positional values:

After applying the condition, the word becomes:

Now we arrange the word in alphabetical order, we get:

Here Q is the second letter from right.

Hence the correct answer is option 1)

Q11. Answer: (b) 3

The Positional value Table:

In a forward direction : RU

In a backward direction : PR and BE

Thus, there are three pairs of words have as many letters between them as there are in the English alphabetical order.

Hence, the correct answer is Option 2.

Q12. Answer: (d) Only conclusion II follows

Statement:

It is reported that heavy and erratic rainfall has destroyed many agricultural crops and farmers are in debt.

Conclusions:

I. Farmers need not repay the debt → Does not follow → From the given statement there is no information that tells us about the repayment of debt so we cannot assume anything so the conclusion does not follow.

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II. Prices of groceries and other essential food items such as lentils and grains will surge → Follow → Since the farmers are in debt and their crops has been destroyed, there will be an increase in the price of upcoming crops by the farmers so that they can make a good amount of money to pay their debt, we can see that this conclusion directly justifies the statement, therefore, the conclusion follow.

So only conclusion II follows.

Hence the correct answer is option 4)

Q13. Answer: (d) Fourth to the right of Manoj

From the given information:

Step 1: Falak, who is third to the left of Aman, is standing at one of the extreme ends. Fatima is fourth to the right of Falak.

Falak is at the extreme end but Fatima is 4^(rd) to the right of Falak which means Falak has to be at the left end.

Step 2: Chandan is to the immediate right of Fatima.

Here we place Chandan to the right of Fatima.

Step 3: Manoj is an immediate neighbour of both Aman and Bony.

Now we place Manoj next to Aman and Bony next to Manoj.

So the only person left is Mahima at the right end.

Now we consider the given options:

Option 1) To the immediate left of Chandan: False.

Option 2) To the immediate left of Bony: False.

Option 3) Immediate neighbour of Bony and Fatima: False.

Option 4) Fourth to the right of Manoj: True.

Hence the correct answer is option 4)

Q14. Answer: (a) SDPER

We follow the given table and code the given combination:

Number/Symbols	**2**	**@**	**9**	**5**	**$**	**&**	**3**	**%**	**#**	**7**	**•**	**4**	**8**	**6**
Code	T	F	A	J	L	E	W	Q	D	P	R	B	U	S

Given combination: + # 7 & 6

Since the first element is a symbol and a last element is a number, the first condition will be applied which says 'If the first element is a symbol and the last is a number, the codes for these two (the first and last elements) are to be interchanged.'

Now, none of the other conditions apply so the code becomes:

Hence the correct answer is option 1)

Q15. Answer: (c) 7 km

From the given information:

Step 1: Ajay is driving in the east direction and covers a distance of 2.5 km and then takes a turn in the left direction and travels a distance of 3 km.

Step 2: Further, he turns to the right and travels a distance of 4.5 km. Lastly, he turns to his right and travels a distance of 3 km.

Total distance = 2.5 + 4.5 = 7 km

Hence the correct answer is option 3)

Q16. Answer: (c) 51

The pattern followed in the given series is:

The difference between the terms is -1 of the previous difference.

Hence, the correct answer is option 3).

Q17. Answer: (c) 529

The pattern followed in the given series is:

(First term)² = Second term

Now we apply the pattern to the given series:

6 : 36 :: 13 : 169 :: 17 : 289 :: 23 : ?

(6)² = 36

36 = 36

6 : 36 :: 13 : 169 :: 17 : 289 :: 23 : ?

(13)2 = 169

169 = 169

6 : 36 :: 13 : 169 :: 17 : 289 :: 23 : ?

(17)2 = 289

289 = 289

6 : 36 :: 13 : 169 :: 17 : 289 :: 23 : ?

(23)2 = ?

529 = Answer

Hence, the correct answer is option 3).

Q18. Answer: (d) Only conclusions II, III and IV follow.

Statements:

Some pouches are combs.

All combs are reds.

All reds are sticks.

Venn diagram:

Conclusions:

I. All pouches are sticks→ Does not follow → From the given statements 'All combs are reds.' & 'All reds are sticks.' which means all combs are sticks but only some pouches are combs, therefore, some pouches are sticks so the conclusion does not follow.

II. All combs are sticks→ Follow → Since 'All combs are reds.' & 'All reds are sticks.' we can say that all combs are sticks and the same can be seen in the Venn diagram so the conclusion follows.

III. Some reds are combs→ Follow → We have 'all combs are reds' which means reds and combs are directly related so it is safe to say that some reds are combs thus the conclusion follows.

IV. Some sticks are pouches→ Follow → From the diagram and the statements it can be clearly seen that some part of sticks is shared with pouches and we can say that some sticks are pouches, therefore the conclusion follows.

So only conclusions II, III, and IV follow.

Hence the correct answer is option 4)

Q19. Answer: (c) 56

From the given information:

Total number of students in a class = 100

Students with marks more than Sharmistha = 24

Students with marks less than Amit = 18

Total = 24 + 18 = 42

Now we have to find out the number of students who score lesser marks than Sharmistha but more marks than Amit:

100 - 42 - 2 (Sharmistha & Amit) => 100 - 44 = 56

Hence the correct answer is option 3)

Q20. Answer: (c) South-West

From the given information:

Step 1: Mohan drives 6 km towards the south and takes a turn to the right at 90°.

Step 2: After driving a distance of 3 km, he turns to the right and drives further 3 km.

From the diagram we can see that, Mohan is towards south-west from the starting point.

Hence the correct answer is option 3)

Q21. Answer: (c) Two

In the given series, there are only two symbols which are immediately preceded and immediately followed by a vowel:

The 2 symbols are @ and &.

Hence the correct answer is option 3)

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Q22. Answer: (a) 38

From the given information:

People till Manish = 18

People till Aman = 12

People between Aman & Manish = 8

Total people = 18 + 12 + 8 = 38

Since Aman is behind Manish we don't have to calculate anything else.

Hence the correct answer is option 1)

Q23. Answer: (b) 10

The pattern followed in the given series is:

The series breaks down into triads and then each triad have a difference with increasing natural number and the first term of each triad is +2 of the first term of previous triad.

Hence, the correct answer is option 2).

Q24. Answer: (d) Only conclusion II is true

Given:

J > K = L, M ≥ N < K, O < J < P, N > Q > R

Conclusions:

I. P > M → False

We have P > J and J > K which means P > K

also M ≥ N < K so relation between P and M cannot be determined.

II. N < P → True

We have P > J and J > K which means P > K also N < K (given)

when we combine both the relations we get, P > K > N so P > N.

So only conclusion II is true.

Hence, the correct answer is Option 4.

Q25. Answer: (a) L

Given:

Step 1: M's night shift duty is on Saturday & Q's night shift duty is on Wednesday.

	Monday
	Tuesday
Q	Wednesday
	Thursday
	Friday
M	Saturday

Step 2: O's nightshift duties are on the day immediately before P but it is not on Monday.

	Monday
	Tuesday
Q	Wednesday
O	Thursday
P	Friday
M	Saturday

There are two weekdays reserved for O and P but not Monday-Tuesday it cannot be Tuesday-Wednesday(Q) and also not Wednesday(Q)-Thursday and therefore it is Thursday-Friday so O's is Thursday & P's is Friday.

Step 3: L's nightshift duties are on the day immediately after N

N	**Monday**

L	Tuesday
Q	Wednesday
O	Thursday
P	Friday
M	Saturday

We have only two weekdays left i.e., Monday and Tuesday since N's duties come before N works on Monday and L works on Tuesday.

From the chart, we can see that, L has nightshift duties on Tuesday.

Hence the correct answer is Option 1.

Q26. Answer: (b) B K B P N K O

Given:

K P _ L Z _ P _ MZK _ B _ Z _ PB _ Z

Let's check each option:

1) B K B P N P O → K P B /L Z/ K P B/ MZ/K P B /N Z/ P PB /O Z

2) B K B P N K O → K P B /L Z /K P B /MZ/K P B /N Z /K PB /O Z

So, In option 2 "KPB - L/M/N/O - Z" is repeating itself.

3) B K B P N K P → K P B /L Z/ K P B/ MZ/K P B/ N Z/ K PB/ P Z

4) B K P P O K P → K P B /L Z/ K P P/MZ/K P B/ O Z /K PB/ P Z

Hence, ‘B K B P N K O’ is the correct answer.

Q27. Answer: (a) (10, 156, 4)

The logic followed here is:

Logic: (1st number)² + (3rd number)² + 1st number × 3rd number = 2nd number.

Now,

(7, 127, 6)

→ (7)² + (6)2 + 7 × 6

→ 49 + 36 + 42 = 127.

(8, 129, 5)

→ (8)2 + (5)2 + 8 × 5

→ 64 + 25 + 40 = 129.

Similarly, for (10, 156, 4)

→ (10)2 + (4)2 + 10 × 4

→ 100 + 16 + 40 = 156.

Hence, the correct answer is "Option 1".

Q28. Answer: (d) Q

From the given information:

Step 1: S is taller than only two other friends.

_ > _ > _ > S > _ > _

Step 2: R is shorter than only one friend.

_ > R > _ > S > _ > _

Step 3: P is shorter than S but taller than Q.

_ > R > _ > S > P > Q

Step 4: T is shorter than U.

U > R > T > S > P > Q

From the arrangement, we can see that Q is the shortest among all the friends.

Hence the correct answer is option 4.

Q29. Answer: (b) 125%

Shortcut Trick

Surface area is proportional to the square of the edge length (Area prop. to side²).

Successive percentage formula: x + y + (x × y)/100

Here, x = 50 and y = 50 => 50 + 50 + (50 × 50)/100

=> 100 + 25 = 125%

Therefore The correct answer is 125%.

Alternate Method

Given: Let the initial edge length of the cube be a = 10 units.

Formula Used: Total Surface Area (TSA) = 6 × a²

=> Initial Surface Area = 6 × 10² = 600 sq. units.

=> New Edge length = 10 + 50% of 10 = 10 + 5 = 15 units.

=> New Surface Area = 6 × 15² = 6 × 225 = 1350 sq. units.

=> Increase in Area = 1350 − 600 = 750 sq. units.

=> Percentage Increase = (750 ÷ 600) × 100

=> Percentage Increase = 1.25 × 100 = 125%

Therefore The correct answer is 125%.

Additional Information

Volume Increase of Cube

If the edge is increased by x%, the volume increases by [(1 + x/100)³ − 1] × 100%.

Diagonal of a Cube

The length of the longest rod that can be placed in a cube is its diagonal, given by d = a√3.

Ratio Method for Area

If side ratio is x : y, then surface area ratio is x² : y² and volume ratio is x³ : y³.

Q30. Answer: (b) Z

Shortcut Trick

Given ratio: (x + z)2 / (y + z)2 = x / y

Expanding and cross-multiplying: y(x2 + 2xz + z2) = x(y2 + 2yz + z2)

yx2 + 2xyz + yz2 = xy2 + 2xyz + xz2

By canceling 2xyz: yx2 − xy2 = xz2 − yz2 => xy(x − y) = z2(x − y)

Since x ≠ y, we get xy = z2. Given x : a :: a : y => a2 = xy => a2 = z2.

Therefore The correct answer is Z.

Alternate Method

Given:

1. (x + z)2 : (y + z)2 = x : y

2. x : a :: a : y (where a > 0, z > 0, x ≠ y)

Formula Used:

=> If p : q :: r : s, then p/q = r/s

=> If a is the mean proportional between x and y, then a2 = xy

Calculations:

=> (x + z)2 / (y + z)2 = x / y

=> y(x + z)2 = x(y + z)2

=> y(x2 + 2xz + z2) = x(y2 + 2yz + z2)

=> x2y + 2xyz + yz2 = xy2 + 2xyz + xz2

=> x2y − xy2 + yz2 − xz2 = 0

=> xy(x − y) − z2(x − y) = 0

=> (xy − z2)(x − y) = 0

=> Since x ≠ y, then (x − y) ≠ 0, Therefore xy − z2 = 0

=> xy = z2

=> From the condition x : a :: a : y, we have a2 = xy

=> Substituting xy = z2 into a2 = xy, we get a2 = z2

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=> Since a > 0 and z > 0, taking square root on both sides: a = z

Therefore The correct answer is Z.

Additional Information

Mean Proportional

The mean proportional between two numbers x and y is given by √(xy). If x, a, y are in continued proportion, then a2 = xy.

Ratio and Proportion Basics

For a proportion x : a :: b : y, the product of means equals the product of extremes, i.e., ab = xy.

Algebraic Identities

The square of a binomial (x + z)2 expands to x2 + 2xz + z2, which is essential for simplifying proportional equations.

Q31. Answer: (d) 332/990

Shortcut Trick

For a mixed recurring decimal like 0.abc…, the fraction is (Number − Non-repeating part) ÷ (9 for each repeating digit and 0 for each non-repeating digit).

Value = 0.335

Numerator = 335 − 3 = 332

Denominator = 99 (for two repeating digits) followed by 0 (for one non-repeating digit) = 990

Therefore The correct answer is 332/990.

Alternate Method

Given: x = 0.3353535...

=> Multiply by 10: 10x = 3.353535... — (Eq. 1)

=> Multiply Eq. 1 by 100: 1000x = 335.353535... — (Eq. 2)

=> Subtract (Eq. 1) from (Eq. 2): 1000x − 10x = 335.3535... − 3.3535...

=> 990x = 332

=> x = 332/990

Therefore The correct answer is 332/990.

Additional Information

Pure Recurring Decimal

If all digits after the decimal repeat (e.g., 0.ab), the fraction is ab/99.

Mixed Recurring Decimal

If some digits are non-repeating (e.g., 0.abc), the fraction is (abc − a)/990.

Rational Numbers

Numbers that can be expressed as P/Q where P, Q are integers and Q ≠ 0. All recurring decimals are rational.

Q32. Answer: (a) 25080

Shortcut Trick

For a number to be divisible by 33, it must be divisible by both 3 and 11.

Divisibility by 3: Sum of digits must be a multiple of 3.

Divisibility by 11: Difference between sum of digits at odd places and even places must be 0 or a multiple of 11.

Checking 25080: Sum = 2+5+0+8+0 = 15 (Divisible by 3). Alternating sum = (2+0+0) − (5+8) = 2 − 13 = −11 (Divisible by 11).

Therefore The correct answer is 25080.

Alternate Method

Given: Number must be divisible by 33.

Formula Used: Divisibility rules for composite numbers (33 = 3 × 11).

Calculations:

Option 1: 25080

=> Sum of digits = 2 + 5 + 0 + 8 + 0 = 15. Since 15 is divisible by 3, 25080 is divisible by 3.

=> Diff of alternating digits = (2 + 0 + 0) − (5 + 8) = 2 − 13 = −11. Since −11 is divisible by 11, 25080 is divisible by 11.

Option 2: 19679

=> Sum of digits = 1 + 9 + 6 + 7 + 9 = 32. Not divisible by 3.

Option 3: 73205

=> Sum of digits = 7 + 3 + 2 + 0 + 5 = 17. Not divisible by 3.

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Option 4: 27441

=> Sum of digits = 2 + 7 + 4 + 4 + 1 = 18. (Divisible by 3).

=> Diff of alternating digits = (2 + 4 + 1) − (7 + 4) = 7 − 11 = −4. Not divisible by 11.

Therefore The correct answer is 25080.

Additional Information

Divisibility by 11

A number is divisible by 11 if the difference of the sum of digits in odd positions and the sum of digits in even positions is 0 or a multiple of 11.

Divisibility by 3

A number is divisible by 3 if the sum of its digits is divisible by 3.

Composite Divisibility

If a number is divisible by two co-prime numbers a and b, then it is also divisible by their product (a × b).

Q33. Answer: (c) 70°

Shortcut Trick

The sum of all interior angles of a quadrilateral is always 360°.

Sum of three given angles = 110° + 55° + 125° = 290°.

Fourth angle = 360° − 290° = 70°.

Therefore The correct answer is 70°.

Alternate Method

Given:

Three angles of a quadrilateral are 110°, 55°, and 125°.

Let the fourth angle be x.

Formula Used:

Sum of interior angles of a quadrilateral = (n − 2) × 180° = (4 − 2) × 180° = 360°

Calculations:

=> Angle A + Angle B + Angle C + Angle D = 360°

=> 110° + 55° + 125° + x = 360°

=> 290° + x = 360°

=> x = 360° − 290°

=> x = 70°

Option Analysis:

=> Option 1 (60°): If the fourth angle is 60°, the sum of angles would be 290° + 60° = 350° ≠ 360°. Thus, it is incorrect.

=> Option 2 (90°): If the fourth angle is 90°, the sum of angles would be 290° + 90° = 380° ≠ 360°. Thus, it is incorrect.

=> Option 4 (110°): If the fourth angle is 110°, the sum of angles would be 290° + 110° = 400° ≠ 360°. Thus, it is incorrect.

Therefore The correct answer is 70°.

Additional Information

Sum of Interior Angles of a Polygon

For any n-sided polygon, the sum of all interior angles is given by the formula (n − 2) × 180°.

Sum of Exterior Angles

The sum of the exterior angles of any convex polygon (including a quadrilateral) is always 360°.

Cyclic Quadrilateral Property

In a cyclic quadrilateral, the sum of opposite interior angles is always equal to 180°.

Q34. Answer: (a) 38 years

Shortcut Trick

Check options: If Raju's present age is 38 years.

Age after 30 years = 38 + 30 = 68 years.

Age 4 years ago = 38 − 4 = 34 years.

Condition: 68 = 2 × 34 (True).

Therefore The correct answer is 38 years.

Alternate Method

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Let Raju's present age be x years.

Age after 30 years = x + 30

Age 4 years ago = x − 4

According to the question:

=> x + 30 = 2 × (x − 4)

=> x + 30 = 2x − 8

=> 2x − x = 30 + 8

=> x = 38

Therefore The correct answer is 38 years.

Additional Information

Linear Equations in Ages

Most age problems can be solved by assuming the present age as 'x' and forming an equation based on past or future conditions.

Age Ratio Property

The difference between the ages of two people remains constant throughout their lives, regardless of the number of years passed.

Q35. Answer: (d) 560

Shortcut Trick

For any set of numbers, the product of HCF and LCM is NOT simply the product of the numbers if there are more than two numbers.

HCF of (4, 20, 28) → 4 is the largest number dividing all.

LCM of (4, 20, 28) → 4 × 5 × 7 = 140.

Product = 4 × 140 = 560.

Therefore The correct answer is 560.

Alternate Method

Given: Numbers are 4, 20, and 28.

Prime Factorization:

=> $4 = 2^2$

=> $20 = 2^2 \times 5^1$

=> $28 = 2^2 \times 7^1$

Calculations:

=> HCF (Highest Common Factor) = $2^2 = 4$

=> LCM (Least Common Multiple) = $2^2 \times 5^1 \times 7^1 = 4 \times 5 \times 7 = 140$

=> Product of HCF and LCM = 4 × 140

=> Product = 560

Therefore The correct answer is 560.

Additional Information

HCF and LCM Property for Two Numbers

For any two numbers A and B, HCF(A, B) × LCM(A, B) = A × B. This property does not necessarily apply to three or more numbers.

Definition of HCF

The Highest Common Factor is the product of the lowest powers of all common prime factors.

Definition of LCM

The Least Common Multiple is the product of the highest powers of all prime factors involved in the numbers.

Q36. Answer: (b) 3234√7

Shortcut Trick

Given Slant height (l) = 28 cm and Radius (r) = 21 cm.

Using the ratio of sides (r : l) = 21 : 28 = 3 : 4.

Height ratio factor = $\sqrt{(4^2 - 3^2)} = \sqrt{7}$. Actual Height (h) = $7 \times \sqrt{7} = 7\sqrt{7}$ cm.

Volume = $1/3 \times 22/7 \times 21 \times 21 \times 7\sqrt{7} = 22 \times 21 \times 7\sqrt{7} = 3234\sqrt{7}$ cm^3.

Therefore The correct answer is $3234\sqrt{7}$ cm^3.

Alternate Method

Given:

Radius (r) of the cone = 21 cm

Slant height (l) of the cone = 28 cm

Formula Used:

1. Slant height relation: $l^2 = r^2 + h^2$

2. Volume of cone = $(1/3)\pi r^2 h$

Calculations:

=> $h^2 = l^2 - r^2$

=> $h^2 = 28^2 - 21^2$

=> $h^2 = (28 - 21)(28 + 21) = 7 \times 49$

=> Height (h) = $\sqrt{(7 \times 49)} = 7\sqrt{7}$ cm

=> Volume (V) = $(1/3) \times (22/7) \times 21 \times 21 \times 7\sqrt{7}$

=> $V = (1/3) \times 22 \times 3 \times 21 \times 7\sqrt{7}$

=> $V = 22 \times 21 \times 7\sqrt{7}$

=> $V = 462 \times 7\sqrt{7}$

=> $V = 3234\sqrt{7}$ cm³

Therefore The correct answer is $3234\sqrt{7}$ cm³.

Additional Information

Curved Surface Area (CSA)

The lateral area of a cone is given by πrl, where r is the radius and l is the slant height.

Total Surface Area (TSA)

The total area includes the base: TSA = $\pi rl + \pi r^2 = \pi r(l + r)$.

Slant Height Calculation

For a right circular cone, the relation between height (h), radius (r), and slant height (l) is always governed by the Pythagoras Theorem: $l = \sqrt{(r^2 + h^2)}$.

Q37. Answer: (c) 235

Given:

Calculation:

=> Number of students passed from U, T, P, and Q = 70 + 90 + 120 + 100

=> Number of students passed from U, T, P, and Q = 380

=> Number of students passed from S and R = 85 + 60 = 145

Difference = 380 – 145 = 235

Therefore, Students passed from institutions U, T, P, and Q together is 235 more than that institutes S and R together.

Hence, the correct answer is option 3).

Q38. Answer: (b) 80°

Shortcut Trick

Total sum of all interior angles of a quadrilateral is always 360°.

Sum of the three equal angles = 360° − 120° = 240°.

Measure of each of the three equal angles = 240° ÷ 3 = 80°.

Therefore The correct answer is 80°.

Alternate Method

Given:

Measure of one angle = 120°

Measure of the other three angles = Equal (Let each be x)

Formula Used:

The sum of the interior angles of a quadrilateral is 360°.

Calculations:

Let the measure of each of the three equal angles be x.

According to the angle sum property of a quadrilateral:

=> 120° + x + x + x = 360°

=> 120° + 3x = 360°

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=> 3x = 360° − 120°
=> 3x = 240°
=> x = 240° ÷ 3
=> x = 80°
Therefore The correct answer is 80°.
Additional Information
Angle Sum Property of Polygons
The sum of interior angles of any polygon with n sides is calculated as (n − 2) × 180°.
Cyclic Quadrilateral
In a cyclic quadrilateral (vertices on a circle), the sum of opposite interior angles is always 180°.
Regular Quadrilateral
A quadrilateral with all sides and all angles equal is called a Square, where each interior angle is 90°.

Q39. Answer: (b) Rs. 12,000

Shortcut Trick
Selling Price (SP) = Profit × (100 + Profit%) ÷ Profit%
=> SP = 1840 × (123 ÷ 23) = Rs. 9,840
Marked Price (MP) = SP × 100 ÷ (100 − Discount%)
=> MP = 9840 × (100 ÷ 82) = Rs. 12,000
Therefore The correct answer is Rs. 12,000.
Alternate Method
Given:
Discount = 18%
Profit = 23%
Gain (Profit amount) = Rs. 1,840
Formula Used:
Profit = (Profit% ÷ 100) × CP
SP = CP + Profit
SP = MP × (100 − Discount%) ÷ 100
Calculations:
=> 23% of CP = 1840
=> CP = (1840 × 100) ÷ 23 = Rs. 8,000
=> SP = CP + Profit = 8000 + 1840 = Rs. 9,840
=> We know that SP = MP × (100 − 18) ÷ 100
=> 9840 = MP × (82 ÷ 100)
=> 9840 = 0.82 × MP
=> MP = 9840 ÷ 0.82
=> MP = Rs. 12,000
Therefore The correct answer is Rs. 12,000.
Additional Information
Relation between CP and MP
The ratio of Cost Price to Marked Price can be directly found using: CP/MP = (100 − Discount%) ÷ (100 + Profit%).
Successive Discounts
If two successive discounts of a% and b% are given, the equivalent single discount is (a + b − a × b ÷ 100)%.
Dishonest Dealer
When a dealer sells goods at CP but uses a false weight, the Profit% = (Error ÷ True Value − Error) × 100.

Q40. Answer: (d) 300 crore

Given:
Imports in 2009 = 420 crore
Calculation:
Let the export for the company in 2009 be x.

According to the ratio,

=> 420/x=1.4

=> x = 420/1.4

=> x = 300

Therefore, the export for the company in 2009 was 300 crore.

Q41. Answer: (b) $(m^2 - n^2)^2 = 16\ mn$

Shortcut Trick

Put A = 45° to verify the identity quickly.

$m = \cot 45° + \cos 45° = 1 + 1/\sqrt{2}$ and $n = \cot 45° - \cos 45° = 1 - 1/\sqrt{2}$

$m^2 - n^2 = (m + n)(m - n) = (2)(2/\sqrt{2}) = 2\sqrt{2}$ => $(m^2 - n^2)^2 = (2\sqrt{2})^2 = 8$

Check $16mn = 16(1 - 1/2) = 16(1/2) = 8$. Since 8 = 8, the relation holds.

Therefore The correct answer is $(m^2 - n^2)^2 = 16\ mn$.

Alternate Method

Given: $m = \cot A + \cos A$ and $n = \cot A - \cos A$

Formula Used: $(a + b)(a - b) = a^2 - b^2$

=> $m + n = 2 \cot A$ and $m - n = 2 \cos A$

=> $m^2 - n^2 = (2 \cot A)(2 \cos A) = 4 \cot A \cos A$

=> $(m^2 - n^2)^2 = 16 \cot^2 A \cos^2 A$

=> $mn = (\cot A + \cos A)(\cot A - \cos A) = \cot^2 A - \cos^2 A$

=> $mn = (\cos^2 A / \sin^2 A) - \cos^2 A = \cos^2 A (1/\sin^2 A - 1) = \cos^2 A ((1 - \sin^2 A)/\sin^2 A)$

=> $mn = \cos^2 A (\cos^2 A / \sin^2 A) = \cos^2 A \cot^2 A$

=> $16\ mn = 16 \cot^2 A \cos^2 A$

=> Comparing both sides, $(m^2 - n^2)^2 = 16\ mn$

Therefore The correct answer is $(m^2 - n^2)^2 = 16\ mn$.

Additional Information

Trigonometric Identity for cot and cos

A very common identity used in competitive exams: $\cot^2 A - \cos^2 A = \cot^2 A \times \cos^2 A$.

Tan and Sec Relation

If $\tan A + \sin A = m$ and $\tan A - \sin A = n$, then the same result holds: $(m^2 - n^2)^2 = 16\ mn$.

Value Substitution Method

For identities involving cot, tan, sin, or cos, substituting standard angles like 45° or 30° is often the fastest way to eliminate wrong options.

Q42. Answer: (c) h : (h + R - r)

Shortcut Trick

For a hollow cylinder, Curved Surface Area (CSA) = $2\pi h(R + r)$.

Total Surface Area (TSA) = CSA + 2 × Area of Base Ring = $2\pi h(R + r) + 2\pi(R^2 - r^2)$.

Ratio = $2\pi h(R + r) \div [2\pi(R + r)(h + R - r)] = h \div (h + R - r)$.

Therefore The correct answer is h : (h + R - r).

Alternate Method

Given: Height = h, Outer Radius = R, Inner Radius = r.

Formula Used:

=> Curved Surface Area (CSA) = $2\pi Rh + 2\pi rh = 2\pi h(R + r)$

=> Total Surface Area (TSA) = CSA + 2 × Area of circular ends = $2\pi h(R + r) + 2\pi(R^2 - r^2)$

Calculations:

=> Ratio = CSA ÷ TSA

=> Ratio = $[2\pi h(R + r)] \div [2\pi h(R + r) + 2\pi(R - r)(R + r)]$

=> Ratio = $[2\pi(R + r) \times h] \div [2\pi(R + r) \times (h + R - r)]$

=> Ratio = $h \div (h + R - r)$

Therefore The correct answer is h : (h + R - r).

Additional Information

Volume of Hollow Cylinder

The amount of material in a hollow cylinder is given by $V = \pi h(R^2 - r^2)$.

Lateral Surface Area

For a solid cylinder, CSA = $2\pi rh$, whereas for a hollow cylinder, it includes both inner and outer surfaces: $2\pi h(R + r)$.

Base Area of Ring

The area of the cross-section (ring) is Area = $\pi(R^2 - r^2)$.

Q43. Answer: (a) 49

Shortcut Trick

Recognize the perfect square trinomial form: $a^2 + 2ab + b^2 = (a + b)^2$.

Identify a = 5m and b = 4n, then $25m^2 + 40mn + 16n^2 \rightarrow (5m + 4n)^2$.

Substitute m = −9 and n = 13: $(5 \times (-9) + 4 \times 13)^2 \rightarrow (-45 + 52)^2$.

Calculated value: $7^2 = 49$.

Therefore The correct answer is 49.

Alternate Method

Given: m = −9 and n = 13.

Formula Used: $(a + b)^2 = a^2 + 2ab + b^2$

=> The given expression is $25m^2 + 40mn + 16n^2$.

=> This can be rewritten as $(5m)^2 + 2 \times (5m) \times (4n) + (4n)^2$.

=> Applying the algebraic identity, we get $(5m + 4n)^2$.

=> Substituting the values: $(5 \times (-9) + 4 \times 13)^2$

=> $(-45 + 52)^2$

=> $(7)^2 = 49$

Therefore The correct answer is 49.

Additional Information

Perfect Square Identities

$(a + b)^2 = a^2 + 2ab + b^2$ and $(a - b)^2 = a^2 - 2ab + b^2$ are fundamental quadratic identities used to simplify complex algebraic terms.

Product of Sum and Difference

The identity $a^2 - b^2 = (a - b)(a + b)$ is helpful for factoring expressions that are a difference of two squares.

Substitution Strategy

In quantitative aptitude, always factorize or condense an algebraic expression before substituting variable values to minimize calculation errors.

Q44. Answer: (c) 36 km/h

Shortcut Trick

Weighted Average method: Average Speed = (s1×t1 + s2×t2) ÷ (t1 + t2)

Average Speed = (30 × 6 + 45 × 4) ÷ (6 + 4)

Average Speed = (180 + 180) ÷ 10 = 360 ÷ 10

Average Speed = 36 km/h.

Therefore The correct answer is 36 km/h.

Alternate Method

Given:

Speed 1 (s1) = 30 km/h, Time 1 (t1) = 6 hours

Speed 2 (s2) = 45 km/h, Time 2 (t2) = 4 hours

Formula Used:

Average Speed = Total Distance ÷ Total Time

Distance = Speed × Time

Calculations:

=> Distance 1 = 30 × 6 = 180 km

=> Distance 2 = 45 × 4 = 180 km

=> Total Distance = 180 + 180 = 360 km

=> Total Time = 6 + 4 = 10 hours

=> Average Speed = 360 ÷ 10 = 36 km/h

Therefore The correct answer is 36 km/h.

Additional Information

Average Speed for Equal Distances

If a journey covers two equal distances at speeds 'a' and 'b', the average speed is given by (2ab) ÷ (a + b).

Unit Conversion

To convert km/h to m/s, multiply by 5/18. To convert m/s to km/h, multiply by 18/5.

Relative Speed

When two objects move in the same direction, relative speed is (s1 − s2). In opposite directions, it is (s1 + s2).

Q45. Answer: (a) 27

Given:

(3.7)3 - 3 × (3.7)2 × (0.7) + 3(3.7) × (0.7)2 - (0.7)³

Concept Used:

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

Calculation:

For the given expression, comparing it with the formula of $(a – b)^3$,

=> (3.7)3 - 3 × (3.7)2 × (0.7) + 3(3.7) × (0.7)2 - (0.7)³

=> a = 3.7 and b = 0.7

=> (3.7)3 - 3 × (3.7)2 × (0.7) + 3(3.7) × (0.7)2 - $(0.7)^3 = (3.7 – 0.7)^3$

=> $(3.7 – 0.7)^3 = 3^3 = 27$

Therefore, the required value is 27.

Q46. Answer: (d) 1900 km

Shortcut Trick

When two objects start at the same time and meet, Time (t) is constant.

Ratio of Speeds = 85 : 105 = 17 : 21.

Since Time is constant, Distance ratio = Speed ratio = 17 : 21.

Difference in distance units = 21 − 17 = 4 units → 200 km (Given).

Total distance (A to B) = (17 + 21) units = 38 units = 38 × (200 ÷ 4) = 38 × 50 = 1900 km.

Therefore The correct answer is 1900 km.

Alternate Method

Given: Speed of Train A = 85 kmph, Speed of Train B = 105 kmph, Difference in distance = 200 km.

Formula: Distance = Speed × Time

=> Let Time taken to meet be t hours.

=> Distance by Train A (D_A) = 85 × t

=> Distance by Train B (D_B) = 105 × t

=> Difference: D_B − D_A = 105t − 85t = 200

=> 20t = 200 => t = 10 hours.

=> Total Distance = D_A + D_B = (85 + 105) × 10

=> Total Distance = 190 × 10 = 1900 km.

Therefore The correct answer is 1900 km.

Additional Information

Relative Speed

When two objects move towards each other, their Relative Speed is the sum of their individual speeds (S1 + S2).

Proportionality in Motion

If time is constant, Distance is directly proportional to Speed (D1/D2 = S1/S2).

Meeting Point Distance

Difference in distance = (S_(large) − S_(small)) × Time to meet. Total distance = (S1 + S2) × Time to meet.

Q47. Answer: (d) 37

Given:

40 - [3 - {4 - (6 - 6 - 4)}]

Concept Used:

Follow BODMAS rule to solve this question, as per the order given below,

Calculation:

=> 40 - [3 - {4 - (6 - 6 - 4)}]

=> 40 – [3 – {4 – (6 – 2)]

=> 40 – [3 – {4 – 4}]

=> 40 – 3 = 37

Therefore, the value of the given expression is 37.

Q48. Answer: (c) 5%

Shortcut Trick

Total Amount Paid = Rs. 4,000 + Rs. 4,350 = Rs. 8,350

Total Interest = Total Paid − Principal = 8,350 − 7,000 = Rs. 1,350

Total Product (Principal × Time) = (7,000 × 3) + (3,000 × 2) = 21,000 + 6,000 = 27,000

Rate (R) = (Total Interest × 100) ÷ Total Product

R = (1,350 × 100) ÷ 27,000 = 5%

Therefore The correct option is C.

Alternate Method

Given:

Initial Principal (P1) = Rs. 7,000

Repayment after 3 years = Rs. 4,000

New Principal for next 2 years (P2) = 7,000 − 4,000 = Rs. 3,000

Total Time = 5 years (3 years + 2 years)

Final Settlement Payment = Rs. 4,350

Formula Used:

Simple Interest (SI) = (P × R × T) ÷ 100

Year 0

Year 3

Year 5

P = Rs. 7,000

P = Rs. 3,000

Repay Rs. 4,000

Final: Rs. 4,350

Calculations:

=> Total Payment = 4,000 + 4,350 = Rs. 8,350

=> Total Interest = 8,350 − 7,000 = Rs. 1,350

=> Total Interest = (P1 × R × T1)/100 + (P2 × R × T2)/100

=> 1,350 = (7,000 × R × 3)/100 + (3,000 × R × 2)/100

=> 1,350 = 210R + 60R

=> 1,350 = 270R

=> R = 1,350 ÷ 270

=> R = 5%

Therefore The correct option is C.

Additional Information

Simple Interest on Installments

When parts of the principal are repaid, the interest for the subsequent period is calculated only on the remaining balance of the principal.

Effective Principal Method

Total Interest = (Sum of [Principal × Time for each period] × Rate) ÷ 100. This is useful for multiple repayments.

Difference between SI and CI

In Simple Interest, the principal remains constant unless explicitly repaid. In Compound Interest, interest is added to the principal at the end of each period.

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Q49. Answer: (a) irrational and unequal

Shortcut Trick

Calculate the Discriminant (D) using $D = b^2 - 4ac$.

Here, $D = (4\sqrt{3})^2 - 4(1)(3) = 48 - 12 = 36$.

Since D > 0, the roots are unequal.

Since the coefficient 'b' is irrational ($4\sqrt{3}$) and $\sqrt{D}$ (6) is rational, the roots will be irrational.

Therefore The correct answer is irrational and unequal.

Alternate Method

Given Equation: $x^2 + 4\sqrt{3}x + 3 = 0$

Formula: The nature of roots is determined by $D = b^2 - 4ac$ and roots are $x = [-b \pm \sqrt{D}] / 2a$.

=> Comparing with $ax^2 + bx + c = 0$, we get $a = 1$, $b = 4\sqrt{3}$, $c = 3$.

=> $D = (4\sqrt{3})^2 - 4 \times 1 \times 3$

=> $D = (16 \times 3) - 12 = 48 - 12 = 36$

=> $x = [-4\sqrt{3} \pm \sqrt{36}] / (2 \times 1)$

=> $x = [-4\sqrt{3} \pm 6] / 2$

=> Root 1 = $-2\sqrt{3} + 3$

=> Root 2 = $-2\sqrt{3} - 3$

=> Since $\sqrt{3}$ is a non-terminating non-repeating decimal, both roots are irrational and clearly unequal.

Therefore The correct answer is irrational and unequal.

Additional Information

Discriminant and Nature of Roots

If D > 0, roots are real and unequal. If D = 0, roots are real and equal. If D < 0, roots are imaginary.

Rational vs Irrational Roots

For rational coefficients, if D is a perfect square, roots are rational. If D is not a perfect square, roots are irrational and occur in conjugate pairs.

Irrational Coefficients

If any coefficient (a, b, or c) is irrational, the roots can be irrational even if D is a perfect square. Always use the quadratic formula to check.

Q50. Answer: (c) 5

Shortcut Trick

Total Work (LCM of 4 and 6) = 12 units.

Efficiency: Sony = 3, Mary = 2.

In 2 days (Mary + Sony): 2 + 3 = 5 units.

In 4 days: 5 × 2 = 10 units. Remaining: 12 − 10 = 2 units.

Day 5: Mary completes remaining 2 units (2 ÷ 2 = 1 day).

Therefore The correct answer is 5 days.

Alternate Method

Given: Time taken by Sony = 4 days; Time taken by Mary = 6 days.

Person	Days	Total Work	Efficiency
Sony	4	12	3
Mary	6	2	

Calculations:

=> Total work = LCM(4, 6) = 12 units.

=> Mary starts on Day 1: Work done = 2 units.

=> Sony works on Day 2: Work done = 3 units.

=> Total work in 1 cycle (2 days) = 2 + 3 = 5 units.

=> Number of complete cycles = 12 ÷ 5 = 2 cycles (with remainder).

=> Work done in 2 cycles (4 days) = 2 × 5 = 10 units.

=> Remaining work = 12 − 10 = 2 units.

=> On Day 5, it is Mary's turn. Time taken for remaining work = 2 ÷ 2 = 1 day.

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=> Total time = 4 + 1 = 5 days.

Therefore The correct answer is 5 days.

Additional Information

Alternate Day Concept

In alternate work problems, identify the repeating cycle and calculate the total work done per cycle before finding the remaining work for the next individual.

Efficiency and Time

Efficiency is inversely proportional to time: Efficiency = Total Work ÷ Time.

Work & Wages

Wages are generally distributed in the ratio of work done or efficiency when the duration of work is the same for all.

Q51. Answer: (a) 9 : 25

Shortcut Trick

Sum of present ages = 58 + 5 + 5 = 68 years.

Difference (B − 8) − (A + 8) = 16 => B − A = 32 years.

A = (Sum − Diff) ÷ 2 = (68 − 32) ÷ 2 = 18 years.

B = (Sum + Diff) ÷ 2 = (68 + 32) ÷ 2 = 50 years.

Ratio A : B = 18 : 50 = 9 : 25.

Therefore The correct answer is 9 : 25.

Alternate Method

Let the present ages of A and B be A and B respectively.

According to first condition:

=> (A − 5) + (B − 5) = 58

=> A + B − 10 = 58

=> A + B = 68 --- (eq i)

According to second condition:

=> (B − 8) − (A + 8) = 16

=> B − 8 − A − 8 = 16

=> B − A = 32 --- (eq ii)

Adding (eq i) and (eq ii):

=> 2B = 100 => B = 50

Subtracting (eq ii) from (eq i):

=> 2A = 36 => A = 18

=> Ratio A : B = 18 : 50 = 9 : 25

Therefore The correct answer is 9 : 25.

Additional Information

Age Sum Property

If the sum of ages of 'n' people is S now, then 'x' years ago the sum was S − (n × x).

Age Difference Constant

The difference between the ages of two individuals remains constant at any point in time.

Ratio and Proportion

To find the ratio of two quantities, they must be in the same unit and simplified to their lowest terms.

Q52. Answer: (b) 142/7 %

Shortcut Trick

Total Cost Price (CP) of 100 apples = Rs. 700 => CP of 1 apple = Rs. 7.

Selling Price (SP) of 12 apples = Rs. 96 => SP of 1 apple = 96 ÷ 12 = Rs. 8.

Profit per apple = 8 − 7 = Rs. 1.

Profit percentage = (Profit ÷ CP) × 100 = (1 ÷ 7) × 100 = $14^{2}/7\%$.

Therefore The correct answer is 14(2)/(7) %.

Alternate Method

Given: CP of 100 apples = Rs. 700, SP of 12 apples (one dozen) = Rs. 96.

Formulas: Profit = SP − CP | Profit% = (Profit ÷ CP) × 100.

=> CP of 100 apples = Rs. 700.

=> SP of 12 apples = Rs. 96.

=> SP of 1 apple = 96 ÷ 12 = Rs. 8.

=> SP of 100 apples = 8 × 100 = Rs. 800.

=> Total Profit = 800 − 700 = Rs. 100.

=> Profit % = (100 ÷ 700) × 100 = 100 ÷ 7 = 14²/7%.

Therefore The correct answer is 14(2)/(7) %.

Additional Information

Fraction to Percentage Conversion

The fraction 1/7 is equal to 14.28% or 14²/7% in mixed fraction form.

Profit and Loss Basics

Profit occurs when Selling Price is greater than Cost Price. The percentage is always calculated on the Cost Price unless specified otherwise.

Q53. Answer: (d) 56 years

Shortcut Trick

Present ages of A and B are 7x and 3x.

According to condition: (7x − 4) / (3x + 4) = 2 / 1

=> 7x − 4 = 6x + 8 => x = 12.

Difference required = (7x + 4) − (3x − 4) = 4x + 8.

=> 4(12) + 8 = 48 + 8 = 56 years.

Therefore The correct answer is 56 years.

Alternate Method

Given: Present age ratio A : B = 7 : 3.

Formula Used: Ratio and linear equation method.

Let the present ages be 7x and 3x.

A's age 4 years ago = 7x − 4.

B's age 4 years hence = 3x + 4.

=> (7x − 4) / (3x + 4) = 2 / 1

=> 7x − 4 = 2 × (3x + 4)

=> 7x − 4 = 6x + 8

=> 7x − 6x = 8 + 4

=> x = 12.

A's age 4 years hence = 7(12) + 4 = 84 + 4 = 88 years.

B's age 4 years ago = 3(12) − 4 = 36 − 4 = 32 years.

=> Difference = 88 − 32 = 56 years.

Therefore The correct answer is 56 years.

Additional Information

Age Ratio Concept

If the ratio of ages is a : b, then actual ages are ax and bx where x is the common multiplier.

Time Shift Rule

For a person with present age P, age after 'n' years is P + n and age 'n' years ago was P − n.

Difference Invariance

The difference between the ages of two people remains constant throughout their lives.

Q54. Answer: (a) 1, 3

Given:

22x - 10 × 2x + 16 = 0

Calculation:

Splitting the middle terms to form factors,

=> 22x – 8.2x – 2.2^x + 16 = 0

=> 2^x(2^x – 8) – 2(2^x – 8) = 0

=> (2^x – 2)(2^x – 8) = 0

Now, we have 2^x = 2 and 2^x = 8

=> 2^x = 2^1 and 2^x = 2^3

Comparing both values, we get x = 1 or x = 3.

Therefore, the roots of the equation are 1 and 3.

Q55. Answer: (a) 49

Shortcut Trick

Use the Empirical Formula: Mode = 3 × Median − 2 × Mean

Given Median = 55 and Mean = 58

Mode = 3 × 55 − 2 × 58 = 165 − 116 = 49

Therefore The correct answer is 49.

Alternate Method

Given:

Median of the observations = 55

Arithmetic Mean of the observations = 58

Formula Used:

The relationship between Mean, Median, and Mode for a moderately skewed distribution is:

Mode = 3(Median) − 2(Mean)

Calculations:

=> Mode = (3 × 55) − (2 × 58)

=> Mode = 165 − 116

=> Mode = 49

Therefore The correct answer is 49.

Additional Information

Empirical Relationship

For a frequency distribution, the Mode is approximately equal to the difference between three times the Median and twice the Mean.

Symmetrical Distribution

If the distribution is perfectly symmetrical, then Mean = Median = Mode.

Skewness Property

In a negatively skewed distribution, Mean < Median < Mode. In this specific question, Mode (49) < Median (55) < Mean (58), indicating the distribution is positively skewed.

Q56. Answer: (d) It has no unit

The correct answer is It has no unit.

Key Points

• Magnification has no units because it is a length ratio.

• Magnification is the increase (or reduction) in the size of an optical system-produced picture relative to its actual size.

• Although angular magnification is seldom encountered, linear magnification is the most often used type of magnification.

• the standard representation of power as a measure of magnification.

• Calculating the overall magnification of an image you are looking at using a microscope is actually quite simple.

Additional Information

• Dioptre

• The optical power of a lens or curved mirror is measured in units of 1 dioptre, which is equal to the reciprocal of the focal length (f).

• In metres, the focal length is expressed.

• The dioptre, which has a focal length of one metre and is represented by the symbol D, is the SI unit of lens power.

• Newton

• In the International System of Units (SI units), the letter N stands for newton, an absolute measure of force. It is described as the amount of force required to accelerate a mass of one kilogramme by one metre per second.

• Newton was given its name in honour of Sir Isaac Newton, whose second rule of motion defines the modifications that a force

might make to a body's motion.

• Centimeter

• Centimeters, which are metric units of measurement, are used to determine an object's length.The abbreviation is cm.

• 100 centimetres make to a metre.

• The unit of measure changes to cm^2 when determining an object's surface area.

• The measurement unit changes to cm^3 for determining an object's volume.

Q57. Answer: (b) an insoluble ionic solid

The correct answer is an insoluble ionic solid.

Key Points

• When cations and anions in an aqueous solution come together to produce an insoluble ionic solid called a precipitate, this process is known as a precipitation reaction.

• Whether or not such a reaction occurs can be determined using the solubility principles for typical ionic solids.

• Before calculating the state of the products and creating a net ionic equation, one must refer to the solubility criteria because not all aqueous reactions produce precipitates.

Additional Information

• Precipitation reactions

• The word "precipitation reaction" is defined as a "chemical reaction occurring in an aqueous solution when two ionic bonds join, resulting in the production of an insoluble salt." Precipitates are the insolusalts created during precipitation reactions.

• Properties of Precipitates and Precipitation reaction

• In ionic or aqueous solutions, the precipitation reaction takes place.

• Ions present in the aqueous solutions interact and react to generate the product.

• Precipitates that are insoluble in aqueous solutions are the byproducts of the precipitation reaction.

• Since the ions actively participate in the reaction and produce the product, precipitation reactions are also referred to as ionic reactions.

• Temperature, solution concentration, buffer solution, and other factors all affect how these reactions behave.

• Applications of Precipitation reaction

• The precipitation reaction aids in identifying a specific element that is present in the supplied solution. When a chemical is introduced to solutions, these reactions also keep an eye on the precipitate that results. These are employed in the process of removing magnesium from saltwater. The responses between antigens and antibodies occur in the human body as well.

Q58. Answer: (c) +6

The correct answer is option c)+6

Given:

Convex mirror whose u=-21cm, v=+7cm

Formula:

Mirror equation: 1/f=1/u+1/v

Calculations:

1/f=1/(-21)+1/7

=(7-21)/(-21*7)

= 2/21

Now for object distance to be u=-14cm we have the image distance:

2/21=1/(-14)+1/v

1/v=2/21+1/14

= 7/42

=1/6

Therefore we have the image distance as v=+6cm

Q59. Answer: (a) Region a

The correct answer is "Region a".

Key Points

• Collecting Duct System

• Connecting tubules and collecting ducts make up the collecting duct system.

• Arcades that drain several nephrons are created when connecting tubules connect the distal convoluted tubules to the cortical

collecting ducts. Six nephrons on average drain into a collecting duct.

• Collecting ducts descend into the brain and medulla before successively fusing close to the inner medullary region. As the papillary tip approaches, convergent papillary ducts form about 20 large ducts that empty into the renal pelvis.

• The two cell types that make up the collecting ducts are principal and intercalated cells.

Additional Information

• Nephron

• The nephron is the basic anatomical and functional unit of the kidney.

• They are tiny structures made up of renal tubules and corpuscles. The English term "nephron" derives from the Greek word "nephros," which signifies kidney. There are millions of nephrons in each kidney of a human.

• Nephrons come in two different varieties: cortical and juxtamedullary.

• Functions of Nephron

• The primary functions of nephrons are to filter the blood of all waste materials, including solid wastes and extra water, as well as to reabsorb, secrete, and excrete a variety of substances.

• The tiny molecules are transported into the glomerular capsules and proceed through a twisting network of tubules when the blood is forced through the glomerulus under high pressure.

• The cell found in each tube absorbs various molecules, with the exception of glucose, water, and other advantageous compounds known as ultrafiltrate. More water is removed from the ultrafiltrate before it leaves the nephrons as the ultrafiltrate molecules become increasingly hypertonic as they go down the tubules.

Q60. Answer: (c) Embryo

The correct answer is "Embryo".

Key Points

• Seeds contain an embryo that, when nurtured under ideal circumstances, matures into a seedling. The endosperm found inside seeds aids in the formation and expansion of the embryo.

• It has stored nutrition, starch, which enables the embryo's quick growth. Oil is also stored there.

• A seedling is a juvenile sporophyte that has emerged from a plant embryo. The germination of the seed initiates the growth of the seedling.

• The radicle, hypocotyl, and cotyledons are the three primary structural components of a typical early seedling.

Additional Information

• Endosperm- The majority of angiosperm seeds have endosperm. The growing embryo receives nutrients from it. Dicotyledons have fleshy cotyledons in place of the endosperm. Endosperm remains and stores nourishment in mature seeds of monocotyledons. In addition to being rich in carbohydrates, the endosperm tissue also contains proteins and lipids.

• Cotyledons- The substantial portion of the embryo found inside the seed is referred to as a cotyledon. When the seed germinates, the earliest and most delicate leaf appears. Given that it supplies nutrients to the many components of an embryo, it is also known as the storage unit of seed.

• Seed coat- The interior components of a seed are shielded by its coat. Two layers comprise the seed coat. Testa, the term for the thick outer layer, Tegmen, is the name of the innermost, thin layer. The seed is shielded from water and sunlight by a thick seed coat.

Q61. Answer: (c) Cl2 gas at the anode and H2 gas at the cathode.

The correct answer is Cl2 gas at the anode and H2 gas at the cathode.

Key Points

• H2 and Cl2 gas are released when NaCl is electrolyzed. Cl2 gas is released from the anode and H2 gas from the cathode.

• Concentration solution of NaCl

• NaOH & H2 → at Cathode

• Cl2 → at Anode

• Dilute solution of NaCl

• NaOH → at Cathode

• Cl2 → at Anode

• The electrolysis of molten sodium chloride results in the production of chlorine gas at the anode.

Additional Information

• The chloride and hydroxide negative ions are drawn to the positively charged anode. While it is simpler to convert hydroxide ions to oxygen than chloride ions to chlorine, chloride ions arrive at the anode in far greater quantities.

• Since the cathode is the negative electrode, hydrogen gas is liberated there and is drawn to the cathode, while oxygen, which is the negative ion, is drawn to the positive electrode anode.

• Electrons from the external circuit interact with steam at the cathode to create hydrogen gas and negatively charged oxygen ions. The oxygen ions cross the solid ceramic membrane, where they react with the anode to produce oxygen gas and electrons for the external circuit.

Q62. Answer: (d) White precipitate of silver chloride is produced.

The correct answer is a White precipitate of silver chloride is produced.

Key Points

• When silver nitrate solution is combined with sodium chloride solution, a white precipitate of silver chloride is generated in addition to the sodium nitrate solution.

• Chemical reaction equation:

• AgNO 3 (aq) + NaCl (aq) → AgCl(aq) + NaNO 3 (aq)

• It is an illustration of a double displacement reaction.

Additional Information

• Double Displacement Reaction

• Chemical reactions known as double displacement reactions occur when the reactant ions move around to create new products. Precipitate production often happens as a result of a double displacement process. Covalent or ionic chemical bonds may be present between the reactant.

• For instance, a white precipitate of barium sulphate quickly forms when a solution of barium chloride and sodium sulphate is combined. These are ionic-based reactions. When the reactants are dissolved in water, they turn into ions, and when ions exchange in the solution, a product molecule is created.

• Ba ^(2+) (aq) + 2Cl ^- (aq) + 2Na ^+ (aq) + SO 4 ^(2-) (aq) →

Ba ^(2+) (aq) + SO 4 ^(2-) (aq) + 2Na ^+ (aq) + 2Cl ^- (aq)

Q63. Answer: (b) 1.6 cm

The correct answer is 1.6cm.

Given:

u=-45cm,f=-30cm

hi=4cm of a needle placed in a concave lens.

Formula:

Lens formula: 1/f=1/v-1/u

Calculations:

1/(-30)=1/v-1/(-45)

1/v=-(1/45+1/30)

1/v=-(45+30)/1350=-75/1350=-1/18

Therefore, v=-18cm for a concave lens.

Thus we have the height of needle is:

hi/ho=v/u

hi=(v*ho)/u

hi=(-18*4)/(-45)=72/45=1.6cm

Therefore, the height of the image formed by the needle is 1.6cm.

Q64. Answer: (a) Sunlight and chlorophyll

The correct answer is Sunlight and chlorophyll.

Key Points:

• The following is a basic general equation for photosynthesis: C6H12O6 = 6CO2 + 12 H2O + photons, which is carbon dioxide + water + light energy.

• We are well aware that plants serve as a means for recycling our surroundings.

• Technology has made so much CO2 available that plants can't handle it all.

• To commercially make this reaction—which may or may not use sunshine and green plants as the only input—feasible, some thought must have gone into it.

• One may employ alternatives in place of avoiding either or both.

Additional Information:

• Plants absorb water (H2O) and carbon dioxide (CO2) from the atmosphere and soil during photosynthesis.

• In the plant cell, carbon dioxide is reduced, which means it receives electrons, whereas water is oxidized, which means it loses

electrons.

• As a result, carbon dioxide is transformed into glucose and water into oxygen.

• The plant then releases the oxygen back into the atmosphere after storing energy within the glucose molecules.

Q65. Answer: (c) less reactive than unsaturated compounds

The correct answer is less reactive than unsaturated compounds.

Key Points:

• Due to the strong carbon-carbon single bonds, saturated carbon compounds are often not very reactive.

• Alkanes are single-bond C-C saturated carbon compounds.

• A general inertness to various chemical reagents is one of the characteristics of alkanes as a class.

• Strong connections between C and H can be found.

• Unless alkanes are heated to extremely high temperatures, they do not break.

• The bonds between carbon and hydrogen are only marginally polarised because carbon and hydrogen have approximately identical electronegativities.

• They are hence typically unaffected by the majority of bases.

• Alkanes have covalent bonds, which make it difficult for them to break and react.

Additional Information:

• Alkane molecules lack any unshared electrons that an acid could use as a site of attack.

• Alkanes were previously referred to as paraffins because of their poor reactivity toward various chemicals.

• We all know that when the right mixture is burned, alkanes react violently with oxygen.

• For instance, this combustion happens in the cylinders of cars and in oil furnaces.

• Alkanes react violently with fluorine and violently with bromine and chlorine when heated.

Q66. Answer: (d) different

The correct answer is different

Key Points

• A time-varying magnetic field produces an electric field

• This is according to Faraday's first law of electromagnetic induction which states that whenever a magnetic flux associated with a conductor changes, it produces an electromotive force.

• Thus, this electromotive force is different for the different coils as the resistances of them are different

• Since resistance and EMF is different we have the current induced in these coils are also different

Q67. Answer: (a) Diffusion

The correct answer is Diffusion.

Key Points:

• An essential mechanism by which gases are exchanged in a cell is diffusion.

• The difference in concentration pressure is what primarily controls this process.

• As a result, the gases shift from a place of high concentration to one of low concentration.

• The main time that diffusion occurs in plant cells is during photosynthesis when carbon dioxide diffuses into plant cells through the stomata on the leaf.

Additional Information:

• Osmosis is the naturally occurring net movement or diffusion of solvent molecules through a membrane that is selectively permeable, in a direction that tends to balance the solute concentrations on the two sides, from a region of high water potential (region of lower solute concentration) to a region of low water potential (region of higher solute concentration).

• Endocytosis is a process through which cells take in foreign material by enveloping it with their membrane.

• Absorption: The substance being absorbed's molecules, atoms, and ions move into the medium's bulk phase, which might be solid, liquid, or gas. A chemical or physical phenomenon is called absorption. Absorption is the process through which something completely dissolves into another substance.

Q68. Answer: (c) number of shells increases

The correct answer is number of shells increases.

Key Points:

• Atomic sizes drop as a period moves from left to right.

• The same shell receives progressively more electrons.

• As the atomic number rises, so does the nucleus's attraction to the valence b.

• The atomic size grows as one descends the group, top to bottom.

• This is so that more electron shells can be added when the atomic number rises.

Additional Information:

• The chemical elements are arranged in rows and columns on what is known as the periodic table, or periodic table of the (chemical) elements.

• It is frequently used in physics, chemistry, and other sciences and is frequently regarded as a symbol of chemistry.

• It is a visual representation of the periodic law, which claims that the atomic numbers of chemical elements have a roughly periodic relationship with their attributes.

• The table is divided into four blocks that are about rectangular in shape.

• The table's columns are referred to as groups and its rows are known as periods.

• The periodic table's elements in the same group have comparable chemical properties.

Q69. Answer: (a) Johann Wolfgang Dobereiner

The correct answer is Johann Wolfgang Dobereiner.

Key Points:

• Johann Wolfgang Dobereiner, a German scientist, was the first to categorise elements according to John Dalton's claims in the year 1829.

• He created 'Triads,' groups of three elements with identical chemical properties.

• The atomic mass of the middle element served as the defining characteristic of a trio.

• The middle element in a triad had an atomic mass that was about equal to the arithmetic mean of the other two elements when the elements were grouped in order of increasing atomic mass.

Additional Information:

• Henry Moseley:

• The justification of the earlier empirical and chemical concept of the atomic number by physical rules was Henry Gwyn Jeffreys Moseley's contribution to the science of physics.

• This came about as a result of his creation of Moseley's law in X-ray spectra.

• Mendeleev:

• Chemist and inventor Dmitri Ivanovich Mendeleev was from Russia.

• The Periodic Law and a modified version of the periodic chart of elements were two of his most famous creations.

• John Newlands:

• British chemist John Alexander Reina Newlands (26 November 1837 – 29 July 1898) focused on the periodicity of elements.

Q70. Answer: (b) 220

The correct answer is 220.

Given:

The voltage of the supply line, V=220 V,

Power on each bulb, P=10W,

Maximum current allowed, I= 10 A

Formulas:

Ohm's law: V=IR

$P=(V^2)/R=I^2R$

Calculations:

Resistance of each bulb is $R = (V^2)/P$

$R = ((220)^2)/10=4840$

Resistance of each bulb is 4840 ohm.:

Assume 'n' bulbs are to be connected in parallel with each other, we have

1/Rp = 1/4840+1/4840+...n

1/Rp = n/4840

Rp = 4840/nohm

Applying Ohm's law:

Rp = V/I

4840/n = 220/10

n = 4840×10/220=220

Therefore '220' lamps can be connected

Q71. Answer: (a) R_A = 20 Ω and R_B = 15 Ω

The correct answer is RA = 20 Ω and RB = 15 Ω.

Given:

Two circuits A and B having six resistors and resistance RA and R_B whose net resistance is minimum.

V=20 V, Current across A, I_A=6A and Current across B, I_B=8A.

Formula used:

Ohm's law:

V=IR

Calculations:

As the net resistance is minimum, the resistors must be connected in parallel.

Therefore,

1/R = 1/Ra+1/Ra+1/Ra+1/Ra+1/Ra+1/Ra

1/R=6/Ra

R=Ra/6=Rb/6

Now applying Ohm's law:

Ra/6 = 20/6

Ra=(20*6)/6=20Ω

Rb/6 = 20/8

Rb=(20*6)/8=15Ω

Therefore, the two resistances are RA = 20 Ω and RB = 15 Ω

Q72. Answer: (d) DC generator uses a commutator and AC generator uses Slip rings

The correct answer is Option 4.

Key Points

• A DC generator uses a commutator to convert the generated AC to DC, ensuring a unidirectional output.

• An AC generator uses slip rings instead of a commutator, allowing the output to vary sinusoidally and remain alternating.

• The essential difference between AC and DC generators lies in their mechanisms of current collection.

• In a DC generator, the commutator reverses the connection of the armature coils, converting alternating current into direct current.

• In an AC generator, slip rings maintain continuous contact between the rotating armature and the external circuit, allowing for the generation of alternating current.

Additional Information

• Option 1: Higher voltages can be generated by both AC and DC generators; the voltage capability depends on design factors rather than being specific to either type.

• Option 2: AC generators are commonly associated with high-voltage generation, but this is not an exclusive feature, as DC generators can also achieve high voltages.

• Option 3: Both AC and DC generators can use either permanent magnets or electromagnets depending on the design, making this statement incorrect.

Q73. Answer: (c) shaking hand

The correct answer is "shaking hands".

Key Points

• Human immunodeficiency virus is an epidemic that assaults the body's immune system.

• If it is not treated, it can lead to AIDS which is acquired immunodeficiency syndrome.

• HIV does not spread by:

• Air or water

• Mosquitoes, ticks or different insects.

• Saliva, tears or sweat that isn't blended with the blood of someone with HIV.

• Shaking hands, hugging, sharing toilets, sharing dishes, silverware, or drinking glasses.

• Drinking fountains

• Other sexual sports do not contain the alternative of frame fluids.

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Additional Information

• Mode of transmission

• HIV transmits by direct contact with certain body fluids from a person with HIV who has a detectable viral load. These fluids are:

• Blood

• Semen and pre-seminal fluid

• Rectal fluids

• Vaginal fluids

• Breast milk

• For transmission, the HIV virus in these fluids must get into the bloodstream of an HIV-negative person through a mucous membrane or by direct contact.

Q74. Answer: (c) Carbon dioxide and sodium salt of tartaric acid is produced.

The correct answer is "Carbon dioxide and sodium carbonate are produced."

Key Points

• When baking powder is heated, CO_(2) gas is produced.

• When baking powder is heated, it evolves carbon dioxide gas which gets converted into sodium carbonate.

• The chemical reaction is as followed:

• NaHCO_(3 -->)Na2CO3+CO2+ H2O

• When sodium hydrogen carbonate is dissolved, it slightly gets hydrolyzed.

Additional Information

• Some common and chemical names of important compounds:

Common Name	Chemical Name
Baking powder	Sodium Bicarbonate
Bleaching powder	Calcium hypochlorite
Washing soda	Sodium carbonate

Q75. Answer: (b) Plastids

The correct answer is "Plastids".

Key Points

• Plastids are the molecular organelles observed in all plant cells.

• They undergo a few particular pigments, supplying particular colors to the plants.

• Three kinds of plastids are:

• Chloroplast - contains Chlorophyll (green pigment)

• Chromoplast - contains Carotenoid (Red, yellow, and orange pigment)

• Leucoplast - contains colorless plastid, mainly stores foodstuff in a plant cell.

Additional Information

• Lysosomes

• Lysosomes are small sac-like systems surrounded by the aid of using an unmarried membrane and containing robust digestive enzymes.

• The lysosomes are also known as the suicide bag of the cell.

• Mitochondria

• The mitochondria are tube-like organelles that are surrounded by a double membrane, with the inner membrane being highly folded.

• The mitochondria are regularly called the "powerhouse" of the cell.

• Vacuoles

• Vacuoles are organelles of plant, fungal and algal cells.

• They are part of the internal membrane system and are separated from the rest of the cytoplasm by a tonoplast membrane.

• Vacuoles play crucial roles in cell expansion, serve as storage compartments for nutrients, and function as lytic organelles that contain digestive enzymes.

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Q76. Answer: (c) 7.5 × 10^4 J

The correct answer is 7.5 × 104 J.

Important Points

Given:

I=5A

R=10Ω

t=5min=5*60=300sec

Formula:

$H=I^2Rt$

Calculations:

$H=5^2*10*300$

H=75000J=7.5*10^4J

Therefore, the heat transferred is 7.5 × 104 J.

Q77. Answer: (d) calcium and phosphorus

The correct answer is calcium and phosphorus.

Key Points:

• The structure that holds the body up is made of bone.

• Additionally, it supports the body's major organs and anchors the muscles.

• It is a solid, unyielding tissue.

• A dense matrix made of calcium and phosphate molecules contains the bone cells.

• A different kind of connective tissue called a ligament can join two bones together.

• This tissue is extremely flexible.

• Another form of connective tissue is the tendon, which links bones and muscles.

Additional Information:

• Tendons are fibrous tissues with little flexibility and tremendous strength.

• The cells of cartilage are widely spaced.

• Sugars and proteins make up the solid matrix.

• In addition to the nose, ear, trachea, and larynx, cartilage smoothes the surfaces of bones at joints.

• Areolar connective tissue can be found in the bone marrow, around blood vessels and nerves, and between the skin and muscles.

• It supports internal organs, fills empty space inside the organs, and aids in tissue restoration.

Q78. Answer: (a) scattering of light of lower wave length

The correct answer is scattering of light of lower wave length.

Key Points:

• Rayleigh scattering, which is brought on by these tiny air molecules, rises as the wavelength of light decreases.

• Violet and blue light have the shortest wavelengths, whereas red light has the longest.

• Because blue light is more widely diffused than red light, the sky seems bluer throughout the day.

• More light must travel through the Earth's atmosphere at sunrise and sunset because the Sun is lower in the sky at those times.

• We cannot see blue light because it is scattered away, but because red light is not lost as much, the sky seems red.

Additional Information:

• You can study light entirely at the source.

• When light travels through a medium, such as air or water, some of the light is absorbed by the medium's particles, followed by its subsequent radiation in a certain direction.

• This occurrence is known as light scattering.

• The size of the scattered light's particles and its wavelength affect how intense it is.

• Due to the line's wavelike nature and its interaction with a particle, shorter wavelength and high frequency scatter more.

Q79. Answer: (d) Arunachal Pradesh

The correct answer is Arunachal Pradesh.

Key Points

• Solung Festival

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• The Adis of Arunachal Pradesh celebrate Solung, their most well-known festival, on September 1 every year, after the sowing of seeds in order to pray for prosperity and a successful harvest.

• It is primarily an agricultural celebration but exhibits the socio-religious characteristics of the populace.

• Additionally, tribal people trade presents of meat and apong (rice beer).

• Attending this festival is the best method to learn about the culture and socioeconomic importance of the Adi tribe.

Additional Information

• The celebration of this solung festival consists of three primary components. As follows:

• The main inaugural day, known as Sopi-Yekpi or Ardo-Bado, is when pigs and mithuns are sacrificed and offered to Dadi Bote, the god of domestic animals.

• Binyat is the second half of the festival, during which the goddess of crops and food, Kine Nane, is worshipped.

• During the festival's last phase, Ekop or Taktor, Miri, the singer leader, tells the story of Nibo or Abotani, the Tanis' forefather.

Q80. Answer: (b) West Bengal and Assam

The correct answer is West Bengal and Assam.

Key Points

• According to the India Meteorological Department, the pre-monsoon season lasts from March to May, therefore any precipitation during this time can be attributed to pre-monsoon showers.

• In Bengal and Assam, these terrifying evening thunderstorms are common. Their notoriety can be understood from the local term "Kalbaisakhi," which refers to a catastrophe that occurs in the month of Baisakh.

• These showers are helpful for growing rice, jute, and tea. These storms are referred to as "Bardoli Chheerha" in Assam.

Additional Information

• Pre-Monsoon shower

• Pre-monsoon rains, sometimes known as "mango showers," can range from small sprinkles to heavy downpours accompanying thunder. The thunderstorm that formed in the Bay of Bengal is to blame for them.

• Particularly around the shores of Kerala and Karnataka, pre-monsoon showers are frequent.

• Before the rainy season officially begins, there are pre-monsoon showers. It takes place from March to May. They can be anything from little drizzles to violent thunderstorms.

• They aid in the early ripening of mangoes and are sometimes known as summer rains or mango showers.

Q81. Answer: (b) Law and Order

The correct answer is Law and Order.

Key Points

• The nation's laws are made by the government, which also maintains peace and order.

• In order to accomplish this, it divides the tasks and takes the required actions to bring about peace and legality.

• It maintains relations with foreign countries, draughts laws periodically, and amends them as necessary for national progress.

• The constitution calls for an elected legislature to draught laws. Every law must be based on the constitution. Legal precedent refers to judicial rulings that have effects that are fundamentally comparable.

Additional Information

• Public Health

• The science of improving and preserving the health of people and their communities is known as public health. In order to do this task, healthy lifestyles are encouraged, illness and injury interference are researched, as well as infectious disease detection, prevention, and response.

• Sanitation

• Sanitation is the term used to describe the public health conditions linked to clean, potable, and effective handling of human waste and sewage disposal.

• Registration of Births and Deaths

• Between decennial censuses, population movements are tracked using birth and death registration data, which is supplemented with migration statistics (immigration and emigration). Worldwide, two-thirds of deaths and one-third of births are not officially documented.

Q82. Answer: (c) Dry fruits

The correct answer is Dry fruits.

Key Points

• Any food-related item that has health and medical benefits is referred to as a nutraceutical.

• They also aid in the treatment and prevention of several illnesses. Protein powders, protein bars, malt-based dietary

supplements, immunity bars, vitamin supplements, etc. are examples of nutraceutical items.

• A medical facility called Pradhan Mantri Janaushadhi Kendra was established as part of the programme to provide everyone with access to high-quality medications at reasonable costs.

• At the moment, PMBJP Kendras are offering residents generic medications that are easily accessible, standardised, and economical.

• Currently, 240 pieces of surgical equipment and 1,451 medicines are available at PMBJP Kendras.

• By the end of March 2025, the government wants to see their number reach 10,500.

Additional Information

• Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP)

• The Ministry of Chemicals & Fertilizers' Department of Pharmaceuticals introduced the Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) in 2008. It was reintroduced by Prime Minister Narendra Modi in 2015.

• The Pharmaceuticals & Medical Devices Bureau of India (PMBI), a society registered under the Societies Registration Act of 1960, is in charge of carrying out the PMBJP.

• Aim of the Pradhan Mantri Bhartiya Janaushadhi Project (PMBJP)

• To make generic medications accessible to everyone in India at reasonable prices.

• To guarantee everyone has access to high-quality medications, especially the underprivileged and disadvantaged.

• To dispel the misunderstanding that expensive drugs must be of good quality.

• To educate the public about generic medications and to publicise their availability.

• To increase employment by enlisting business owners in the launch of Janaushadhi Kendras.

Q83. Answer: (c) Busanan Ongbamrungphan

The correct answer is Busanan Ongbamrungphan.

Key Points

• At the Swiss Open Super 300 badminton competition in this city on Sunday, veteran Indian shuttler P V Sindhu won the women's singles championship with a straight-game victory over Thailand's Busanan Ongbamrungphan.

• At the St. Jakobshalle in this city, double Olympic medalist Sindhu defeated fourth-seeded Busanan 21-16 21-8 in 49 minutes to go to her second consecutive championship final.

• After losing to Carolina Marin of Spain, who won the gold medal in the Rio Olympics, in the previous edition's final, Sindhu finally took the trophy, and it was a proud occasion for her. The Hyderabadi athlete, 26, has fond recollections of this location because it was where she won the gold at the 2019 World Championships.

Additional Information The top 10 women's badminton players from India are as follows:

S.No	Name	Age	State
1.	PV Sindhu	27 years	Hyderabad
2.	Saina Nehwal	32 years	Hyderabad
3.	Malvika Bansod	21 years	Maharashtra
4.	Aakarshi Kashyap	21 years	Chhattisgarh
5.	Anupama Upadhyaya	17 years	Bengaluru
6.	Ashmita Chaliha	23 years	Assam
7.	Tanya Hemanth	19 years	Bangalore
8.	Samiya Imad Farooqui	19 years	Hyderabad
9.	Ira Sharma	22 years	Haryana
10.	Tasnim Mir	17 years	Gujarat

Q84. Answer: (a) 65 years

The correct answer is 65 years.

Key Points

• Justices of the Supreme Court must retire by age 65.

• In the UK, judges must retire at the age of 75.

• In October 1963, the initial retirement age for High Court judges, which was set at 60 years, was increased to 62 years.

Additional Information

• Supreme Court of India

• The Supreme Court of India is the country's highest court. The Indian legal system's supreme court is also located there. The Chief Justice of India is one of the court's sanctioned 31 judges. However, the Indian Constitution only permits it to have a maximum of 34 judges. Its members are appointed by the Indian President and include both active and retired judges. The court has jurisdiction in original, appellate, and advisory matters.

• The court has a wide range of authority, including the ability to enact writs, conduct judicial reviews, and invalidate legislation.

• The Indian Constitution was shaped in large part by the Supreme Court, which still has a significant position in the legal system of the nation.

• It is the final arbiter of the Indian Constitution. It settles disputes between the nation's various governments. The Supreme Court is essential in ensuring that the fundamental rights of Indian citizens be upheld.

Q85. Answer: (c) Jyotirao Phule

The correct answer is Jyotirao Phule.

Key Points

• Jyotiba Phule established the Satyashodhak Samaj, a social reform organization, on September 24, 1873, in Pune, Maharashtra.

• It advocated for the empowerment of marginalized people through education and greater political and social access, paying particular attention to women, peasants, and Dalits in Maharashtra.

• Savitribai, the wife of Jyotirao, presided over the society's female division.

• The Samaj dissolved in the 1930s as its leaders left to join the Indian National Congress party.

Additional Information

• Objectives of Satyashodhak Samaj

• Stop Brahmins from taking advantage of Dalits, ati-Shudras, or Shudras.

• Convincing and influencing everyone to think that they are omnipotent's children. Therefore, everyone must submit to and obey a single God.

• Claiming and establishing that no medium or means of communication with God is required. Phule further argued that every prayer subject and voice originates with the almighty before spreading through any channel to the outside world.

• Oath and affirmations of Satyashodhak Samaj

• It is essential that persons from lower castes have access to education.

• Promoting cottage enterprises and the value of products made in the India.

• Destroying the long-established social status of Brahmins.

Q86. Answer: (b) Devendra Jhajharia

The correct answer is Devendra Jhajharia.

Key Points:

• The Padma Bhushan honor has been bestowed upon Devendra Jhajharia.

• The Paralympic medalist made history by being the first Indian Paralympic athlete to win two gold medals.

• His first gold medal came from the Athens 2004 Games, and his second came from the Rio de Janeiro Paralympics in 2016.

• He also brought home the silver, earning his third medal in the 2020 Tokyo Olympics.

Additional Information:

• Avani Lekhara:

• Avani Lekhara is a rifle shooter and Paralympian from India.

• At the Tokyo 2020 Paralympics, she earned a Gold Medal in the 10m air rifle standing event and a Bronze Medal in the 50m rifle three positions event.

• Sumit Antil:

• Javelin thrower and Paralympian from India, Sumit Antil.

• In the men's F64 javelin throw category at the 2020 Summer Paralympics, he took home a gold medal.

• Pramod Bhagat:

• Indian professional para-badminton player Pramod Bhagat is from the Vaishali district of Bihar.

• He earned a gold medal in the Men's singles SL3 event at the 2020 Summer Paralympics and is presently rated second in the world in para-badminton.

Q87. Answer: (d) Madhya Pradesh

The correct answer is Madhya Pradesh.

Key Points:

• Manganese is a mineral that naturally occurs in a silvery grey color and is exceedingly hard and brittle.

• It is constantly combined with minerals like laterite, iron, and others.

• Steel production requires manganese in the form of an alloy, and steel production is one of the most significant markers of growth in any nation's industrial sector.

• India's top manganese producer in Madhya Pradesh.

• India is currently one of the main countries importing manganese ore.

Additional Information:

• Other states in India that produce manganese include Madhya Pradesh, Maharashtra, Odisha, Karnataka, and Andhra Pradesh.

• Madhya Pradesh produced almost 33% of all the manganese produced in India in 2019–20.

• Maharashtra produced almost 25% of all the manganese produced in India in 2019–20.

• Around 18% of India's total manganese production in 2019–20 was produced in Odisha.

• Karnataka and Andhra Pradesh made about 11% each of the nation's manganese production in 2019–20.

Q88. Answer: (a) Guwahati

The correct answer is "Guwahati"

Key Points

• The Christ Church Guwahati positioned close to Nehru Park in Panbazar is the oldest Church, now no longer simply of Guwahati but the complete northeastern region.

• It is undoubtedly the biggest and most popular name in the league of churches in Guwahati.

• Its production began in 1844 and it became consecrated in 1850.

• The church witnessed effective earthquakes one in 1854 and the alternative in 1897 while a few components of the construction have been damaged.

• The church was maintained by the diocese of Kolkata.

• People go right here to experience the serene and stunning splendor and to wait for the fascinating Sunday mass services, Bible research classes and Confirmation classes, conducted over the weekends.

• In 2017, the Christ Church got a major facelift.

Additional Information

States	Capital
Mizoram	Aizawl
Arunachal Pradesh	Itanagar
Nagaland	Kohima

Q89. Answer: (b) 78%

The correct answer is "78%".

Key Points

• More people are opting for a pension amount of Rs 1,000 per month, under the government-run Atal Pension Yojana (APY).

• The scheme is gaining recognition amongst youngsters, consistent with the Economic Survey 2021-22.

• The flagship social protection scheme of the authorities become released on May 9, 2015, to offer old-age profits security, mainly to the residents withinside the unorganized sectors.

• On September 2021, around 78 percent of subscribers opted for a Rs 1,000 per month pension amount, as compared to 38 percent of subscribers on March 2016.

• As many as eight in keeping with cent of the subscribers have opted for the pension subscription class of Rs1,000/ 3,000/ 4,000 per month, while 14 percent have opted for a Rs 5,000 per month pension.

• The APY scheme is being allotted through extra than 250 lively APY provider vendors which include all banks and publish offices.

• Citing the age-profile-related data of the APY subscribers, the Survey said, as, on September 2021, more than 43 percent of subscribers have been between 18 and 25 years, in comparison to 29 in keeping with cent as on March 2016, suggesting growing enrolments at younger age.

• Uttar Pradesh, Bihar, West Bengal, Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka, Madhya Pradesh, Rajasthan, Gujarat, and Orissa are among the top states which have APY account enrolment of 10 lakhs and more.

Q90. Answer: (c) Thanjavur

The correct answer is "Thanjavur".

Key Points

• Tamil University is a public kingdom college placed in Thanjavur, Tamil Nadu, India.

• It turned into hooked up to offer better studies withinside the Tamil language.

• The university is situated on a campus of about 900 acres (3.6 km²), granted by the State government of Tamil Nadu, making it the largest university in the state by area.

• Buildings and blocks for the executive and educational departments are positioned withinside the campus.

• The administrative block with its gopuram motif may be visible from the National Highway connecting Thanjavur with Trichy.

• The library is paying homage to the Indian Parliament in New Delhi.

• The Karikalan Gallery, constructed at the event of World Tamil Conference is able to accommodate approximately 2000 people.

Q91. Answer: (a) Toycathon

The correct answer is "Toycathon".

Key Points

• The Toycathon 2021 aimed to conceptualize modern toys primarily based totally on the Indian fee gadget with the purpose to inculcate superb behavior and desirable fee for many children.

• Speaking at the occasion, Mr. Pokhriyal stated that Toycathon has been organized to expand India as the worldwide toy production hub.

• He said the size of the toy market in India is about one billion USD but unfortunately 80 per cent of the toys are imported.

• The release of Toycathon is an endeavour with the aid of using the authorities to create an environment for the home Toy enterprise and the local manufacturers, tapping the untapped assets and utilizing their potential.

• Recalling the vision of Prime Minister Narendra Modi of a 5 trillion-dollar economy and considering the huge potential of our toy market, Mr Nishank exhorted all to make India ‘Atmanirbhar’ in the Toy industry.

• The Toycathon will have 3 variants of tracks Junior Level, Senior Level and Start-up Level and will permit the participation of college students and instructors from schools, schools and universities aside from startups and toy experts.

• Participants can have alternatives for concept submission, they are able to publish thoughts for the posted hassle statements or under the novel toy principles category.

Additional Information

• Code Gladiators

• Code Gladiators is an annual coding opposition via way of means of TechGig, that attracts the quality and the brightest coding expertise from all elements of India.

• With more than one contest in rising technology and the coveted identity of Code Gladiators up for grabs, the opposition sees enthusiastic participation and has grown from power to power with every passing year.

• Great Indian Alexa Hackathon

• Amazon India announced a partnership with Bengaluru-based talent management start-up HackerEarth for its first virtual Artificial Intelligence (AI) hackathon for Alexa in the country.

• This precise hackathon is aimed toward constructing extra enticing talents for Alexa, that is the Cloud-primarily based totally voice assistant, consisting of Amazon Echo.

• Smart India Hackathon

• Smart India Hackathon is a national initiative to offer college students a platform to resolve a number of the urgent problems we are facing in our everyday lives, and hence inculcate a tradition of product innovation and a mindset of problem-solving.

• The previous edition of the hackathon saw over 5 million+ students from various engineering colleges compete for the top prize at 35+ locations.

Q92. Answer: (b) Railways

The correct answer is railways.

Key Points:

• The development of India's core infrastructure, including its ports, railroads, posts, and telegraphs, occurred during the colonial era, although not for the benefit of the general populace.

• The drawback of poorly constructed roads, particularly during the rainy season, was that they were unfit for use in contemporary India and could not connect rural communities.

• However, one of the most significant achievements made by the British in 1850 was the development of the railway system.

• In two ways, this project changed the Indian economy.

• First, it encouraged long-distance travel and let people cross geographical barriers.

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• Second, it commercialized Indian agriculture, which had a negative impact on the viability of the rural economy in India.

• The colonial government took attempts to strengthen the sea lanes and inland trade along with the development of roads and railways.

• Although it was a helpful contribution to society, it was still insufficient for postal services.

Additional Information:

• Highways:

• The Pashtun monarch of Northern India, Sher Shah Suri, constructed a significant route that crosses the Gangetic plain in the sixteenth century.

• It was called "Sadak-e-Azam" and used as a conduit for administrative communication between his enormous empire's outlying provinces.

• This road's length increased over the years as many kings added to it, eventually reaching Kabul, Multan, and Bangladesh.

• Later, British people gave it the new moniker "The Grand Trunk Road."

• Several National Highways will be built to connect numerous cities as part of the Golden Quadrilateral initiative.

• Airways:

• JRD founded Tata Airlines in 1932, the country's first commercial airline, to handle domestic mail and passenger transportation.

• At Juhu Airstrip in Bombay, the company had its headquarters in a modest hut with a palm-thatched roof (Mumbai).

• Ports:

• The first port in India, Calcutta Port, is closing in on 150 years of operation.

• The operational structure of the various riverine port facilities along the River Hooghly in Calcutta was formalized in 1870, becoming the first port authority in India.

Q93. Answer: (d) It displaces people in the upstream reservoir area.

The correct answer is It displaces people in the upstream reservoir area.

Key Points:

• Environmentalists and human rights advocates have been protesting the construction of dams across the Narmada River as part of the Narmada Bachao Andolan (NBA) social movement.

• Numerous well-known persons are involved in the movement and are fighting against the uprooting of the populace and for their rehabilitation.

• The construction of such a project will result in widespread violations of human rights and the eviction of the vulnerable and impoverished, according to the justification for the protest.

• The multipurpose Sardar Sarovar Project has a price because it impacts the locals who are being forcibly evicted.

• 245 villages from these states were predicted to be flooded during the dam's construction.

• About 2.5 lakh residents from these villages had to be relocated.

Additional Information:

• The Narmada Bachao Andolan, an Indian social movement led by local tribal people, farmers, environmentalists, and human rights advocates, has been protesting a number of huge dam projects across the Narmada River, which flows through the states: Gujarat, Madhya Pradesh, and Maharashtra.

• The Sardar Sarovar Dam in Gujarat, one of the largest dams on the river, was one of the movement's initial focal areas.

• It is a part of the Narmada Dam Project, which aims to provide irrigation and energy to the people of the aforementioned states.

• Legal actions, hunger strikes, protests, and soliciting the aid of well-known personalities in the film and art industries are just a few of NBA's campaign strategies.

• With notable spokespersons Medha Patkar and Baba Amte present, the NBA was presented with the Right Livelihood Award.

Q94. Answer: (c) Gandak

The correct answer is Gandak.

Key Points:

• The Yamuna travels through numerous states, including Haryana, Uttar Pradesh, Uttarakhand, and later Delhi.

• Along the journey, it encounters its tributaries, including Tons, Chambal, which is its longest tributary and has its own sizable basin, Sindh, the Betwa, and Ken.

• The river enters the state of Himachal Pradesh from Uttarakhand.

• Yamuna runs past Paonta Sahib, along the border of Uttar Pradesh and Haryana then leaves Haryana and continues to flow until it joins the Ganges at Sangam or Prayag in Allahabad (Uttar Pradesh).

• Between it and the Ganges in the Indo-Gangetic plain, it contributes to the formation of the extremely fertile alluvial Ganges-Yamuna Doab region.

Additional Information:

• One of the main rivers in Nepal and a left-bank tributary of the Ganges in India is the Gandaki River, sometimes referred to as the Narayani and the Gandak.
• 46,300 km² (17,900 sq mi) make up its whole catchment area, the majority of which is in Nepal.
• It is renowned for having a deep canyon in the Nepalese Himalayas.
• The Dhaulagiri, Manaslu, and Annapurna I mountains, which are all over 8,000 meters (26,000 feet), are all found in the basin.
• The Gandaki basin's highest point is Dhaulagiri.

Q95. Answer: (c) Tehri dam

The correct answer is Tehri dam.

Key Points:

• The Tehri Dam is the highest dam in India and the fourth-highest dam in the entire planet.
• It measures about 260.5 metres in height and 592 metres in length.
• It is a part of the Tehri Dam & Hydro Power Project, a multi-use river valley project created to take advantage of the vast potential for irrigation and hydropower offered by the River Ganga.
• It is located in Tehri district of Uttarakhand.

The Tehri dam's reservoir is filled with rock and earth.

• Its spillway system consists of three radial spillway gates on a chute spillway and four shaft spillways.

Additional Information:

• Chamera dam:
• The Chamera Dam blocks the River Ravi, aiding the neighborhood's hydroelectricity project.
• It is located close to the town of Dalhousie in the Chamba region in the Indian state of Himachal Pradesh.
• The reservoir for the dam is Chamera Lake.
• Its reservoir is situated in the Salooni subdivision of Chamba.
• Koyna dam:
• The Koyna Dam is one of Maharashtra, India's largest dams.
• It is a concrete and debris dam that was constructed on the Koyna River, which originates in the hill town of Mahabaleshwar in the Sahyadri highlands.
• It is located in Koyna Nagar, Satara district, in the Western Ghats, on the public highway that runs between Chiplun and Karad.
• Rihand dam:
• The Rihand Dam, also known as Govind Ballabh Pant Sagar, is the largest dam in India in terms of volume.
• The reservoir of the Rihand Dam, Govind Ballabh Pant Sagar, contains India's largest man-made lake.
• The Rihand Dam is a concrete gravity dam located at Pipri in the Sonbhadra District of Uttar Pradesh, India.

Q96. Answer: (a) Excellent

The correct answer is Excellent.

Key Points:

• The SDG India Index determines goal-wise scores for each State and Union Territory on the 16 SDGs.
• In order to assess the sub-national unit's overall performance across the 16 SDGs, overall State and UT scores are created using goal-wise scores.
• These scores range from 0-100, and if a State or UT receives a 100, it means it has met the 2030 targets.
• The closer a State/UT comes to achieving its goal, the higher its score.
• Following is a classification of States and Union Territories based on their SDG India Index scores:
• Aspirant: 0–49
• Performer: 50–64
• Front-Runner: 65–99
• Achiever: 100

Additional Information:

• The SDG India Index 2020-21, created in partnership with the UN in India, monitors the performance of all States and UTs on 115 indicators that are in line with the National Indicator Framework for MoSPI (NIF).
• The need to regularly benchmark performance, measure progress, and take into account the availability of the most recent SDG-related data for States and UTs have driven the initiative to hone and improve this crucial tool with each edition.
• Multiple talks with Union Ministries were conducted as part of the selection procedure for these 115 indicators.
• All States and UTs were asked for feedback, and as the primary audience and stakeholders for this localization tool, they were

crucial in creating the index by adding local knowledge and experience to the feedback process.

Q97. Answer: (c) President

The correct answer is President.

Key Points:

• The President's ability to enact laws is covered in Article 123.

• This authority is one of the numerous legislative ones that the president has.

• He may only enact the ordinance in the following situations:

• When neither of the houses or both, are in session.

• There are instances where the President decides it is important to take action before the houses have gathered.

• An ordinance may be made with a retroactive effect.

• An ordinance passed when both houses are in session is inherently invalid.

• The ordinance must be approved by the Parliament within six weeks after its reconstitution.

• Before the ordinance expires, actions taken and accomplished under it remain completely in effect.

Additional Information:

• Only when the Indian parliament is not in session may the President of India promulgate an ordinance as a law.

• On the union cabinet's advice, the president issues an ordinance.

• Similar to this, in Indian states with unicameral legislatures, the governor can only start an ordinance when the legislative assembly is not in session, and in states with bicameral legislatures when both the legislative assembly and the legislative council are not in session.

Q98. Answer: (b) Price discrimination

The correct answer is Price discrimination.

Key Points:

• Price discrimination is a marketing tactic where customers are charged differently for the same good or service depending on what the vendor believes they can persuade them to accept.

• When a company engages in pure price discrimination, they charge the most expensive amount that any given customer will pay.

• In more typical forms of price discrimination, the provider divides customers into groups based on particular characteristics and assigns a different price to each group.

• When a vendor discriminates on price, every consumer pays a different price for the same commodity or service.

• The corporation violates first-degree discrimination by obtaining the highest price for each consumed unit.

• Discounts on goods or services when purchased in quantity are seen as second-degree discrimination, whereas charging different rates to certain customer groups is regarded as third-degree discrimination.

Additional Information:

• Two Part Pricing:

• In two-part pricing, which is also known as the two-part tariff, customers are charged both an admission fee (set price) and a usage cost (per-unit price).

• A phone contract with a fixed monthly fee and a minute-by-minute use fee is an illustration of two-part pricing.

• Price mechanism:

• A price mechanism in economics is the way that profits from goods or services influence supply and demand, primarily through the price elasticity of demand.

• A price mechanism has an impact on price-haggling buyers and sellers.

• Price elasticity:

• The relationship between percentage change in product's quantity demanded and the percentage change in price is known as price elasticity of demand.

• It helps economists comprehend how supply and demand shift in response to the changes in product's price.

Q99. Answer: (a) Marginal product curve

The correct answer is Marginal product curve.

Key Points:

• A cost curve in economics is a graph that shows the production costs as a function of the overall quantity produced.

• Long-run average cost curves (LRAC) and short-run average total cost curves (SRAC) are both generally expressed as V-shaped curves.

• However, not all of the curves' shapes may be attributed to the same causes.

• Because an increase in output raises the returns and lowers the overall cost, the Marginal product curve is inverse-U-shaped.

• The output and returns are at their peak as the curve continues to slope lower and approach the phase of constant returns.

Additional Information:

• The slope of the total product curve, which represents the production function plotted against labour usage for a certain amount of capital input usage, is the marginal product of labour.

• The marginal output of labour is equal to the real pay according to the neoclassical theory of competitive markets.

• The marginal product of capital is equivalent to its rate of return in aggregate models of perfect competition when a single good is produced and used for both consumption and capital purposes.

Q100. Answer: (b) Rs. 3 lakhs

The correct answer is Rs. 3 lakhs.

Key Points:

• The Reserve Bank of India (RBI) removed the interest rate ceiling on the loans and raised the qualifying requirements for microfinance loans to households with annual incomes of up to Rs 3 lakh.

• Additionally, it requested that all lenders implement a board-approved pricing strategy.

• The RBI stated that it will examine the rates offered by the lenders to ensure that they do not charge usurious rates.

• The RBI also requested that the lenders set a cap on the cost of loans and associated expenses.

• The microfinance institutions are expected to provide a prospective borrower with a standardised simplified fact sheet that includes pricing-related information.

Additional Information:

• A banking service called microfinance provides unemployed or low-income individuals or groups with access to financial services that they would not otherwise have.

• Through microfinance, people can get respectable small business loans in a safe manner that abides by moral lending norms.

• The majority of microfinance transactions occur in developing nations including Uganda, Indonesia, Serbia, and Honduras.

• Like regular lenders, microlenders impose specific repayment schedules and apply interest to loans.

• The World Bank estimates that over 500 million people have benefited from microfinance-related ventures.

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