RRB Group D Previous Year Paper (Held on: 1 Sept 2022 Shift 1)

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

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CBT

Q1. Anthurium Festival is celebrated to promote farmers, flowers and horticulture in _____.

(a) Mizoram
(b) Assam
(c) Arunachal Pradesh
(d) Nagaland

Q2. Which of the following interchanges of numbers would make the given equation correct?

25 ÷ 5 × 2 + 25 - 11 = 24

(a) 11, 24
(b) 2, 5
(c) 5, 25
(d) 24, 25

Q3. Which of the following was added to the list of official languages of India in 1967?

(a) Manipuri
(b) Nepali
(c) Konkani
(d) Sindhi

Q4. The product of the LCM and HCF of two numbers is 48. If the two numbers differ by 13, then find the numbers.

(a) 3 and 16
(b) 11 and 24
(c) 4 and 17
(d) 12 and 25

Q5. Rani stitches a gown in 3 hours while Padma stitches an identical gown in 2 hours. Each of them works for 6 hours per day. If they have a bulk order of 52 such gowns to stitch, in how many days will they complete the task if they work on alternate days, starting with Rani?

(a) 10 days
(b) 11 days
(c) 21 days
(d) 20 days

Q6. The sum of the ages of Sarala and Kishore is 26 years. If 3 years ago, Kishore was 3/2 times as old as Sarala, then the present age of Sarala is:

(a) 12 years
(b) 10 years
(c) 9 years
(d) 11 years

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Q7. Select the option that is related to the fifth number in the same way as the second number is related to the first number and the fourth number is related to the third number.

5 : 13 :: 9 : 69 :: 13 : ?

(a) 174
(b) 147
(c) 157
(d) 175

Q8. The 'Revised Pradhan Mantri Jan Vikas Karyakram' is being implemented (w.e.f 2022-23) by the _____.

(a) Ministry of Rural Development
(b) Ministry of Tribal Affairs
(c) Ministry of Home Affairs
(d) Ministry of Minority Affairs

Q9. If 18% of 200 = x, then x = ?

(a) 36
(b) 27
(c) 72
(d) 63

Q10. If the manufacturer gains 12%, the wholesale dealer gains 15% and the retailer gains 20%, then find the cost of production of a table, the retail price of which is Rs. 15,456.

(a) Rs. 12,000
(b) Rs. 10,000
(c) Rs. 15,000
(d) Rs. 20,000

Q11. If the diameter and the height of a cylinder are 12 cm and 10.5 cm, respectively, then using π=22/7, find the volume of the cylinder.

(a) 1281 cm^3
(b) 1288 cm^3
(c) 1188 cm^3
(d) 1313 cm^3

Q12. The value of

(-5/3) ×(9/25)+(1/5-2)=

(a) -12/5
(b) 0
(c) -4/5
(d) 9/5

Q13. Find the LCM of 24, 42 and 56.

(a) 618
(b) 816
(c) 168
(d) 186

Q14. A, B, C, D, E, F and G were seven kings, sitting around a circular table, facing the centre. They were equidistant to one another. Only E was sitting between F and C. A was third to the left of G. Only D was sitting between A and B. G was sitting to the immediate left of C. Which king was sitting to the immediate left of G?

(a) F
(b) B
(c) D
(d) A

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Q15. P, Q, R, S, T and U are six siblings who passed their class tenth exam in different years viz. 2001, 2003, 2005, 2007, 2010 and 2012 but not necessarily in the same order.

P passed in one of the years before S and after R. Only Q passed before R. T passed in the year immediately after S. U passed in one of the years before P. Who passed their class tenth exam in the year 2007?

(a) U
(b) S
(c) P
(d) T

Q16. Which of the following is RHS of the equation

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

(a) cosec A
(b) tan A
(c) cos A + 1
(d) sec A + tan A

Q17. When sodium sulphide reacts with dilute hydrochloric acid, a gas with unpleasant smell is produced. This gas with unpleasant smell is:

(a) H2S
(b) SO3
(c) SO2
(d) H2

Q18. Identify the basic requirements that led scientists towards the classification of elements.

(i) Identification of some pattern in different properties of elements

(ii) Rearrangement of elements on the basis of their synthesis

(iii) To get overall idea of the colour of different elements

(a) (i) and (iii)
(b) Only (i)
(c) (ii) and (iii)
(d) (i), (ii) and (iii)

Q19. According to mirror formula, the focal length of a spherical mirror is equal to:

(a) (u v)/(u-v)
(b) (u v)/(u+v)
(c) (u-v)/(u v)
(d) (u+v)/(u v)

Q20. $CuSO4 + Mg \rightarrow MgSO4 + Cu$

In the above reaction Mg is the:

(a) oxidising agent
(b) dissolving agent
(c) reducing agent
(d) catalyst

Q21. To reach house B from house A, a person has to walk 30 m towards the south. Then he must take a left turn and walk 15 m. Then he must take a left turn again and walk 20 m. Again, he must take a left turn and walk 25 m. Then he must take a right turn and walk 10 m. Then he must take a left turn and walk 17 m to finally reach house B. How far and in which direction is house A from house B? (All turns are 90 degree turns only)

(a) 17 m, East
(b) 27 m, East
(c) 17 m, West
(d) 27 m, West

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Q22. What specialisations are found in the germ cells of sexually reproducing animals with complex body designs?

(a) Male germ cell - small with food store, Female - large and motile
(b) Male germ cell - small and motile, Female - large with food store
(c) Male germ cell - large and motile, Female - small with food store
(d) Male germ cell - large with food store, Female - small and motile

Q23. Select the option that represents the letters that, when placed from left to right in the same sequence in the blanks below, will complete the letter series.

I _ L O _ R U V X _ B _ G

(a) JPAD
(b) JPAG
(c) JPXD
(d) JRAD

Q24. Eight classmates D, E, F, G, H, I, J and K are sitting in a straight row, facing north. J is at the extreme right end of the row. D and I are immediate neighbours. There are only two classmates sitting between H and D. Only E sits between I and G. K sits to the immediate left of D. Who sits at the second position from the left end of the row?

(a) H
(b) F
(c) D
(d) K

Q25. Which of the following disciplines attempts to explain the concept of 'Temporal synthesis'?

(a) Geomorphology
(b) History
(c) Anthropology
(d) Philosophy

Q26. Which committee recommended that Fundamental Duties be included in the Constitution of India?

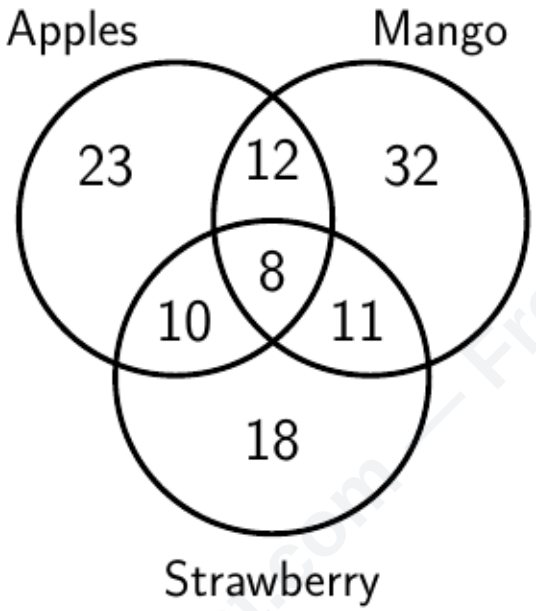
(a) Swaran Singh Committee
(b) JB Kripalani Committee
(c) HC Mookherjee Committee
(d) AV Thakkar Committee

Q27. A bulb filament is made of a _____ metal with ____melting point.

(a) strong, high
(b) low, strong
(c) low, weak
(d) high, weak

Q28. Study the given diagram carefully and answer the question. The numbers in different sections indicate the number of different types of juices containing different fruit flavours which are manufactured by a juice company.

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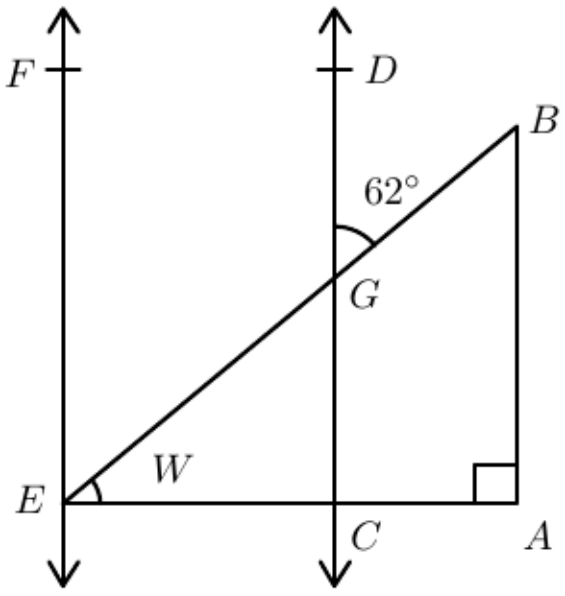
How many types of juices does the company make that contain both Apple and Strawberry flavours?

(a) 41
(b) 8
(c) 10
(d) 18

Q29. Simplify: $3(9x^3 - 6x^2 + 30) - 9(3x^3 - 2x + 30)$

(a) $18(x^2 + x + 10)$
(b) $18(x^2 + x - 18)$
(c) $18(x^2 + x - 10)$
(d) $-18(x^2 - x + 10)$

Q30. In the adjoining figure AB || CD and CD || EF. Also, EA perpendicular to AB. If angle BGD = 62°, then the value of w is:



(a) 28°
(b) 62°
(c) 108°
(d) 118°

Q31. Which of the following numbers will replace the question mark (?) in the given series?

3, 4, 10, 33, 136, ?

(a) 684
(b) 685
(c) 688
(d) 700

Q32. As per Union Budget of India 2022-23, 'One Station One Product' is an initiative taken by the Indian _____.

(a) Waterways
(b) Roadways
(c) Airways
(d) Railways

Q33. Who launched the beta version of 'Swarajability', India's first Artificial Intelligence based job platform for persons with disabilities?

(a) IIT Hyderabad
(b) IISc Bengaluru
(c) IIT Roorkee
(d) IIT Gandinagar

Q34. Which of the following numbers will replace the question mark (?) in the given series?

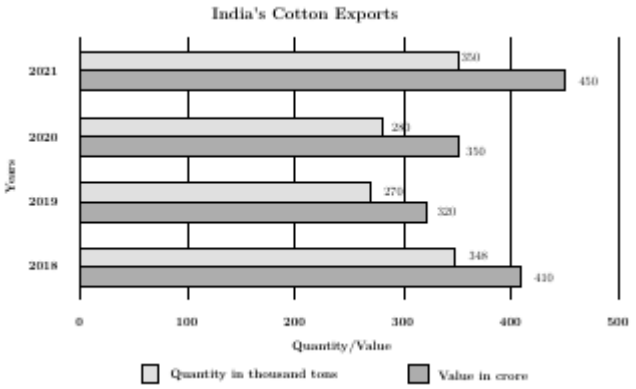
12, 14, 20, 34, 60, ?

(a) 108
(b) 100
(c) 102
(d) 104

Q35. Each of P, Q, R, S, T, U and V has an exam on a different day of a week starting from Monday and ending on Sunday of the same week. S's exam is immediately before R. Only three people have exams between U and Q. Q's exam is immediately before S. Only two people have exams between S and V. P's exam is on Tuesday. R's exam is on Sunday. Who among the following has exam on Monday?

(a) U
(b) T
(c) V
(d) Q

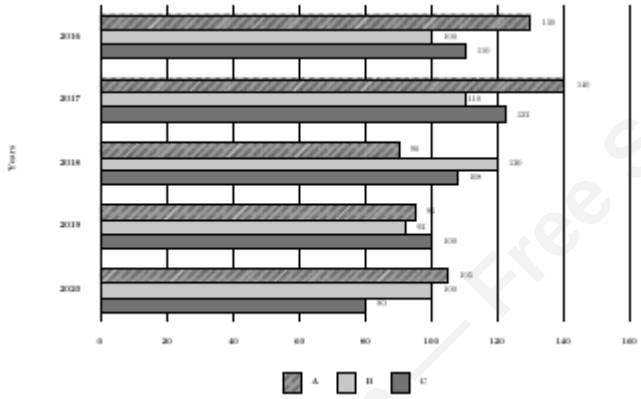
Q36. The given bar graph shows the data of cotton exports in India from years 2018 to 2021. Study the given bar graph and answer the question.



In which year was the value per thousand tons the minimum?

(a) 2020
(b) 2019
(c) 2021
(d) 2018

Q37. The given bar graph shows the data of the number of students who were called for an interview by a company 'XYZ' from three different institutes A, B and C over the years. Study the bar graph and answer the question.



What is the ratio of the average number of students called for an interview from institute C in the period 2018 to 2020 to the average number of students called for an interview from institute B in the same period?

(a) 1 : 3
(b) 13 : 12
(c) 12 : 13
(d) 14 : 15

Q38. Which player holds the record for most runs (6411) in Indian Premier League (IPL) (as of July 2022)?

(a) Suresh Raina
(b) Virat Kohli
(c) Rohit Sharma
(d) Shikhar Dhawan

Q39. In this question, a statement is followed by two conclusions. Which of the two conclusions is/are true with respect to the statement?

Statement: C = U < F ≤ H > G = I > R

Conclusions:

I. H > R

II. H > C

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

Q40. Who among the following appoints the Chief Justice of India?

(a) The Prime Minister of India
(b) The Supreme Court Judge of India
(c) The Attorney General of India
(d) The President of India

Q41. The 'Stree Manoraksha' Project launched in Bengaluru by the Government of India in March 2022 aims at improving _____ health of women in India.

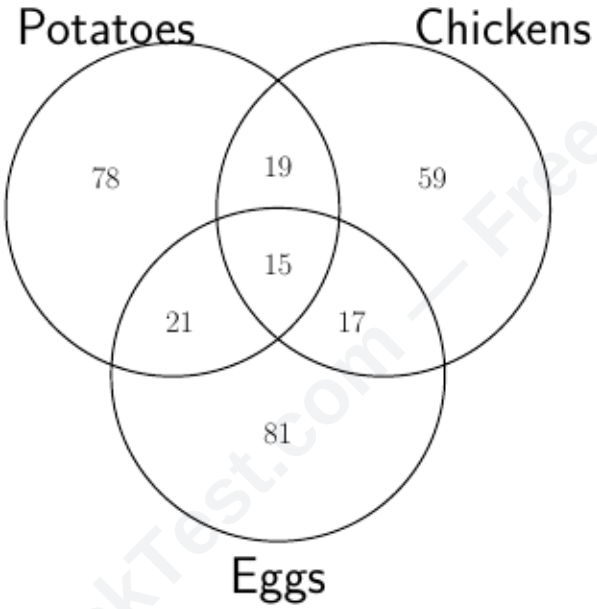
(a) mental
(b) physical
(c) social
(d) Spiritual

Q42. Which formula is used for the calculation of Ex Ante Aggregate Demand?

(a) C+I+c Y
(b) c Y-C+I
(c) C+I-c Y

(d) C+c Y

Q43. Study the given diagram carefully and answer the question. The numbers in different sections indicate the number of persons who eat a particular food for dinner every day.



How many people eat potatoes and eggs for dinner but NOT chickens?

(a) 36
(b) 21
(c) 15
(d) 81

Q44. In this question, a statement is followed by four conclusions. Find out which conclusion is true based on the given statement.

Statement:

B > Y ≤ Z = A < X > O

Conclusions:

1. B > X
2. Y < O
3. Y < X
4. A > O

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

Q45. The balanced reaction for the following chemical reaction is:

Hydrogen + Bromine → Hydrogen bromide

(a) $H_2 + Br_2 \rightarrow 2HBr$
(b) $H_2 + 2Br \rightarrow 2HBr$
(c) $2H + Br_2 \rightarrow 2HBr$
(d) $H + Br \rightarrow HBr$

Q46. Consider the following statements about magnetic field due to a current-carrying solenoid:

(a) The magnetic field inside the solenoid is in the form of parallel straight lines.

(b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of a magnetic material.

Which of the above statements is/are correct?

(a) Only (a)

(b) Neither (a) nor (b)
(c) Both (a) and (b)
(d) Only (b)

Q47. If John travels a distance of 90 km at a speed of 30 km/h and returns at a speed of 60 km/h, his average speed is:

(a) 40 km/h
(b) 45 km/h
(c) 60 km/h
(d) 30 km/h

Q48. Six houses, K, L, M, N, O and P, are located in the same colony. P is 400 m to the west of K. M is 200 m to the east of L. O is 300 m to the north of K. N is 150 m to the south of L. L is 250 m to the south of K. What is the straight distance between O and N?

(a) 400 m
(b) 600 m
(c) 700 m
(d) 350 m

Q49. A certain number of people are sitting in a row, facing north. P sits to the immediate left of Q. P sits second to the right of L. Z sits at one of the extreme ends of the row. Only one person sits to the right of S. K sits to the immediate right of D. L sits second to the right of D. Only two people sit between D and Z. Only one person sits between Q and S. If no other person is sitting in the row, what is the total number of persons seated?

(a) 12
(b) 13
(c) 15
(d) 14

Q50. GMT 3 is related to IPY 30 in a certain way. In the same way, EXP 5 is related to GAU 130. To which of the following is TXN 4 related following the same logic?

(a) VAU 68
(b) VAT 68
(c) VAT 70
(d) VAS 68

Q51. The following table shows different epithelial tissues in animals and their location in different parts. Identify the correct option.

	Epithelial Tissue		**Location**
A.	[figure]	i)	Respiratory tract
B.	[figure]	ii)	Skin
C.	[figure]	iii)	Lining of blood vessels
D.	[figure]	iv)	Ducts of salivary glands

(a) A - iii, B - iv, C - ii, D - i
(b) A - i, B - ii, C - iii, D - iv
(c) A - ii, B - iii, C - iv, D - i
(d) A - iii, B - iv, C - i, D - ii

Q52. Simplify $(5^3 \times 27 \times 10^3)/(5^6 \times 3^2 \times 4)$

(a) 6
(b) 3/2
(c) 8
(d) 1/2

Q53. Seven times a number reduced by 14 is equal to the sum of 5 times the number and 6. Find the number.

(a) 5
(b) 15
(c) 10
(d) 20

Q54. If 28 March 2017 was a Tuesday, then what day of the week was 12 February 2017?

(a) Saturday
(b) Thursday
(c) Friday
(d) Sunday

Q55. Refer to the following letter, number, symbol series and answer the question.

(Left) W # 2 ∞ D @ 4 Y 3 D Ω R 7 & S F @ 6 ^ < X 2 2 (Right)

How many such symbols are there each of which is immediately preceded by a letter and immediately followed by a number?

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

Q56. Arun borrowed a sum of Rs. 9,000 from Jayanthi at 10% rate of compound interest per annum, compounded annually. Find the total amount paid by Arun after 2 years to clear all dues.

(a) Rs. 10,098
(b) Rs. 10,890
(c) Rs. 10,089
(d) Rs. 10,980

Q57. What is the range of the annual average temperature in sub-tropical vegetation zones in India?

(a) 7°C to 17°C
(b) Above 24°C
(c) 17°C to 24°C
(d) Below 7°C

Q58. Which of the following is the chemical reaction involved in the baking soda preparation?

(a) NaHCO3 + H^+→ CO2 + H2O + Sodium salt of acid
(b) NaCl + H2O + CO2 + NH3 → NH4Cl + NaHCO3
(c) Ca(OH)2 + Cl2 → CaOCl2 + H2O
(d) 2NaCl (aq) + 2H2O(l) → 2NaOH (aq) + Cl2 (g) + H2 (g)

Q59. Which of the following statements is TRUE?

(a) Plastic bags should be used to keep food.
(b) We should not place waste in plastic bags and discard them.
(c) After use, we should dispose of plastic bags by burning them.
(d) Shopkeepers are required to use plastic bags by law.

Q60. A converging lens having focal length 50 cm is kept in contact with a diverging lens having focal length 20 cm. The power of combination of the two lenses is:

(a) +3D
(b) 8D
(c) -3D
(d) -8D

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Q61. A steady current I flows through an appliance of resistance R. The amount of heat produced by it in time t is:

(a) $(I^2t)/R$
(b) $I^2R\ t$
(c) $(It)/R$
(d) IRt

Q62. Which of the following ministries released the draft National Air Sports Policy, 2022, in the January 2022?

(a) Ministry of Defence
(b) Ministry of Culture
(c) Ministry of Youth Affairs and Sports
(d) Ministry of Civil Aviation

Q63. The catenation property shown by carbon refers to which of the following properties?

(a) Self-combining capacity to form a long chain of atoms
(b) Property of occurring as different allotropes
(c) Self-degeneration property
(d) Property of carbon to give combustive nature to its compounds

Q64. Coal and petroleum have their own advantages and disadvantages. Three of the statements regarding coal and petroleum are similar. Choose the one that is dissimilar.

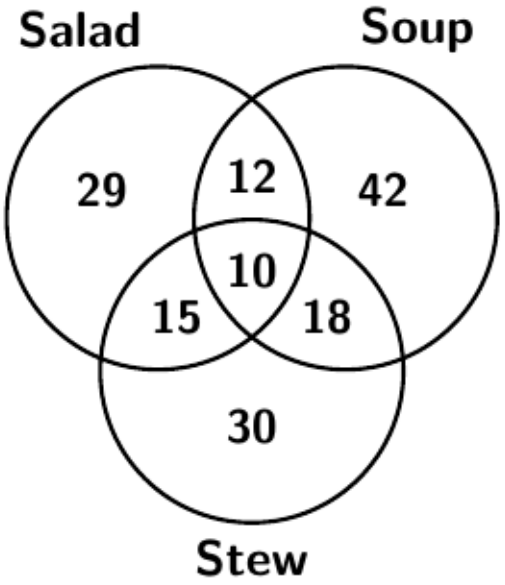
(a) Used to generate electricity in thermal plants and are cost effective
(b) When burnt produce CO_2, which causes global warming
(c) When burnt produce oxides of N and S that are poisonous and cause acid rain
(d) When burnt in insufficient O_2 produce carbon monoxide, which is a poisonous gas

Q65. Which of the following interchanges of signs would make the given equation correct?

$3 - 6 \div 9 + 6 \times 2 = 6$

(a) • and ×
(b) ÷ and +
(c) • and ×
(d) ÷ and ×

Q66. Study the given diagram carefully and answer the question. The numbers in different sections indicate the number of persons in a company with preference for different foods for lunch.



How many people prefer salads but NOT stew?

(a) 51
(b) 29

(c) 39
(d) 41

Q67. The sum of a two-digit number and the number obtained by reversing the digits is 99. If the digits of the number differ by 5, then the two-digit number can be:
(a) 83
(b) 18
(c) 27
(d) 16

Q68. Which of the following devices is NOT based on the concept of force on a current-carrying conductor in a magnetic field?

Loudspeaker, Voltmeter, Ammeter, Electric fuse

(a) Loudspeaker
(b) Ammeter
(c) Voltmeter
(d) Electric fuse

Q69. 8 men and 6 women can complete a piece of work in 5 days while 6 men and 8 women can also complete the same work in 5 days. In how many days will 7 men and 7 women complete the same work?
(a) 2 days
(b) 6 days
(c) 3 days
(d) 5 days

Q70. The roots of $(x - 5)^2 = 5x + 11$ are _____
(a) 2 and -13
(b) 5 and 7
(c) 1 and 14
(d) 3 and 12

Q71. Two numbers are in the ratio 5 : 8. If the first number increases by 40% and second number decreases by 15%, the new ratio becomes _____.
(a) 37 : 39
(b) 35 : 34
(c) 12 : 17
(d) 23 : 26

Q72. Which enzyme requires the presence of hydrochloric acid for its action in the process of digestion?
(a) Trypsin
(b) Pepsin
(c) Lipase
(d) Amylase

Q73. In March 2022, Union Cabinet of India approved the establishment of the World Health Organization Global Centre for Traditional Medicine (WHO GCTM) in Jamnagar, Gujarat. Under which ministry will this centre be set up?
(a) Ministry of AYUSH
(b) Ministry of Women and Child Development
(c) Ministry of Health and Family Welfare
(d) Ministry of Cooperation

Q74. An optical device X has a focal length of -30 cm. X can be:
(a) either concave lens or a convex mirror
(b) either a convex lens or a convex mirror
(c) either a convex lens or a concave mirror

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(d) either a concave lens or a concave mirror

Q75. The Balwant Rai Mehta Committee recommended in 1957 for the establishment of a ____ Panchayati Raj System in India.

(a) Four-tier
(b) Two-tier
(c) Three-tier
(d) Five-tier

Q76. Which of the following combinations is an example of the balanced meal?

(a) Rice, chips, cold drink
(b) Burger, chips, cold drink
(c) Roti, vegetables, cold drink
(d) Roti, pulses, vegetables

Q77. The following question is based on the given seven, 3-digit numbers.

(Left) 621, 443, 227, 316, 625, 118, 231 (Right)

(For example, 456 : 6 = digit in unit's place, 5 = digit in ten's place,4 = digit in hundred's place)

NOTE - All operations to be done from left to right.

If 5 is added to the digit in ten's place of each number and 1 is subtracted from the digit in unit's place of each number, which digit will be repeated the greatest number of times in the transformed number series thus formed?

(a) 7
(b) 4
(c) 2
(d) 6

Q78. A statement is given followed by two arguments I and II. Read the statement and the arguments carefully and select the appropriate answer from the given options.

Statement:

Use of re-usable cloth bags for shopping will help in reducing pollution caused by indiscriminate use of plastic bags.

Arguments:

I. The government has banned the use of single-use plastic from 1 July 2022.

II. Cloth bags are eco-friendly since they are re-usable and can be made from scrap fabric that would otherwise go to landfills.

(a) Both arguments I and II weaken the statement
(b) Both arguments I and II strengthen the statement
(c) Argument I weakens, while argument II strengthens the statement
(d) Argument II weakens, while argument I strengthens the statement

Q79. Mahindra & Mahindra Financial Services Limited is an Indian rural non-banking financial company headquartered in _____.

(a) Kerala
(b) Mumbai
(c) Goa
(d) Lucknow

Q80. In triangle ABC, if the angles are in the ratio 4 : 3 : 5, find the angles.

(a) 20°, 15°, 25°
(b) 20°, 50°, 70°
(c) 60°, 45°, 75°
(d) 40°, 30°, 50°

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Q81. What is the process of transport of soluble products of photosynthesis and other materials from the leaves to other tissues of the plant called?

(a) Guttation
(b) Translocation
(c) Transpiration
(d) Tropic movement

Q82. In this question, a group of letters is coded using numbers as per the table given below and the conditions which follow. The correct combination of codes following the conditions is your answer.

Letter	B	L	M	H	Y	O	C	E	N
Code	4	6	8	0	1	3	5	7	9

Conditions:

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

(ii) If the first element is a consonant and the last, a vowel, the first and last elements are to be coded as 2.

(iii) If both the second and the fourth elements are vowels, the fourth element is to be coded as the code for the Second element and vice-versa.

Question: LEMON

(a) 67839
(b) 63879
(c) 97836
(d) 23872

Q83. Which of the following quadratic equations satisfies that the roots are 3 and -2?

(a) x2 + x + 6 = 0
(b) x2 - x - 6 = 0
(c) x2 - x + 6 = 0
(d) x2 + x - 6 = 0

Q84. Study the given letter series and answer the question that follows.

L E A P K X O Z A E Y W U D O A D S L Y R K E V U L

How many consonants are immediately preceded and immediately followed by a vowel, and which consonant is repeated the most number of times in the series?

(a) 2, Y respectively
(b) 3, D respectively
(c) 2, K respectively
(d) 3, L respectively

Q85. Select the option that is related to the fifth number in the same way as the second number is related to the first number and the fourth number is related to the third number.

49 : 13 :: 56 : 11 :: 39 : ?

(a) 14
(b) 12
(c) 15
(d) 16

Q86. Identify the correct order if A, B C, D, E are the atomic numbers of the elements in positions of rows 1 to 4 of the periodic table of Groups 15, 16, 17 respectively, as specified in figure below

Group 15	Group 16	Group 17
A	C	•
•	•	•

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•	•	E
B	D	•

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

Q87. Powa Mecca situated on top of Garurachal Hill in the state of _____.
(a) Assam
(b) Himachal Pradesh
(c) Gujarat
(d) Kerala

Q88. Two resistors, A of 8 Ω and B of 12 Ω, are connected in series with a battery of 6 V. If V1 and V2 are the potential drops across A and B and I1 and I2 are the currents through them, respectively, then (V1/V2) and (I1/I2 are respectively
(a) (3/2) and (2/3)
(b) (3/2) and 1
(c) (2/3) and 1
(d) (2/3) and (3/2)

Q89. The shaggy horn wild ibex is found in _____ in India.
(a) Mangrove Forests
(b) Tropical Deciduous Forest
(c) Montane forests
(d) Thorn Forests

Q90. Find the value of x, if 6^(x+4)= 6^7.
(a) 2
(b) 3
(c) 4
(d) 5

Q91. India's first Christian missionary organisation, Serampore Mission, was founded by _____.
(a) Matteo Ricci
(b) Mother Teresa
(c) Hudson Taylor
(d) William Carey

Q92. Find the capacity of a spherical container of thickness 2 cm and external radius 9 cm. (Rounded off to 2 decimal places.)
(Use π=22/7)
(a) 1590.48 cm3
(b) 1050.67 cm3
(c) 1241.14 cm3
(d) 1437.33 cm3

Q93. X placed an order for 20 shirts marked for Rs. 750 each. The shopkeeper offered 20% discount on purchase of 20 shirts. He allowed a further discount of Rs. 500, as the payment was made in cash. Find the final selling price of each shirt, if the selling price of each shirt is the same?
(a) Rs. 575
(b) Rs. 650
(c) Rs. 550
(d) Rs. 625

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Q94. Which among the following is NOT a use of sodium hydroxide?

(i) Used in making soaps and detergents.

(ii) Used in the manufacture of paper.

(iii) Used for removing permanent hardness of water.

(a) Only iii
(b) Only ii
(c) Both ii and iii
(d) Only i

Q95. If 'A' means (×), 'B' means (+), C' means (-), and D' means (÷), then what will be the value of the following expression?

(102 D 17) B (5 A 3)

(a) 21
(b) 20
(c) 25
(d) 17

Q96. There are two sets of data A and B. The mean of both sets is same. The median of data B is twice the median of data A. The relation between the modes of sets A and B is

(a) Mode B - Mode A = (3/2) median A
(b) Mode B - Mode A = (3/4) median A
(c) Mode B - Mode A = 3 median A
(d) Mode B + Mode A = 3 median A

Q97. The food prepared by the leaves of the plants is transported by phloem to which parts of the plant?

(a) Only to seeds and growing regions
(b) Only to roots and fruits
(c) Only to roots and seeds
(d) To storage organs of roots, seeds, fruits and growing regions

Q98. Red colour is scattered the __ by fog or smoke because its wavelength is __ than the wavelength of other colour components of white light.

(a) least, less
(b) least, more
(c) most, more
(d) most, less

Q99. In this question, a group of letters is coded using numbers as per the table given below and the conditions which follow. The correct combination of codes following the conditions is your answer.

Letter/symbol	Y	T	V	R	I	G	E	A
Code	4	6	8	0	3	5	7	9

Conditions:

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

(ii) If the first element is a consonant and the last, a vowel, the first and last elements are to be coded as 2.

(iii) If both the third and the fifth elements are vowels, the fifth element is to be coded as the code for the third element and vice-versa.

GRAVITY

(a) 5603984
(b) 5309846
(c) 5098364
(d) 5038964

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Q100. Which branch of Physical Geography studies the earth's form and structure?

(a) Geomorphology
(b) Hydrology
(c) Biogeography
(d) Climatology

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) Mizoram

The correct answer is Mizoram.

Key Points

• Anthurium festival of Mizoram is one of the most popular festivals celebrated in the state.
• This festival is celebrated to promote tourism.
• The Anthurium Festival is organized annually by the Tourism Department in collaboration with the Horticulture Department.
• The Chapchar Kut is also regarded as the most popular spring festival for the people of the state.
• This festival is a public holiday in the state.
• Traditional bamboo dance - Cheraw and other dances were performed at the main event, attracting thousands of people.
• Mizoram:
• State Animal - Sumatran serow.
• State Bird - Mrs. Hume's pheasant.
• National Parks - Murlen National Park, Phawngpui National Park.

Additional Information

• Festivals of Assam:
• Bihu is the harvest festival of Assam.
• Bihu marks the end of the harvesting season.
• Bihu is a set of three important Assamese festivals.
• Rongali or Bohag Bihu in April.
• Kongali or Kati Bihu in October.
• Bhogali or Magh Bihu in January.
• Festivals of Manipur:
• Lai Haraoba.
• Kang Festival.
• Sangai Festival.
• Kut Festival.
• Cheiraoba Festival
• Festivals of Nagaland:

• Hornbill Festival.
• Sekrenyi.
• Tsukheneye.
• Aoleang.
• Naknyulem

Q2. Answer: (a) 11, 24

Given:
25 ÷ 5 × 2 + 25 - 11 = 24
Calculation:
By option Method:
Option I: After interchanging 11, 24
=> 25 ÷ 5 × 2 + 25 - 24 = 11
=> 5 × 2 + 25 - 24
=> 10 + 1
=> 11 = 11
This is correct the equation.
Option II: After interchanging 2, 5
=> 25 ÷ 2 × 5 + 25 - 11 = 24
=> 12.5 x 5 + 25 -11 = 24
=> 76.5 ≠ 24
This is not correct the equation.
Option III: After interchanging 5, 25
=> 25 ÷ 25 × 2 + 5 - 11 = 24
=> 1 × 2 + 5 - 11 = 24
=> - 5 ≠ 11
This is not correct the equation.
Option IV: After interchanging 24, 25
=> 25 ÷ 5 × 2 + 24 - 11 = 25
=> 5 × 2 + 24 -11 = 25
=> 23 ≠ 25
This is not correct the equation.
Therefore Interchanges (11,24) would make the given equation correct.

Q3. Answer: (d) Sindhi

The correct answer is Sindhi.
Key Points
• The Sindhi language was added to the list of languages in the Indian Constitution by the 21st Amendment in 1967.
• It was added to the 8th schedule by the 21st Amendment Act of 1967.
Additional Information
• There are 22 languages that have been recognized in the eighth schedule of the Indian constitution.
• Part XVII of the Indian constitution deals with the official languages of India from articles 343 to 351.
• Originally, only 14 languages were mentioned and later, after several amendments, the other languages were added.
• The Sindhi language was added to the 8th schedule by the 21st Amendment Act of 1967.
• Konkani, Manipuri and Nepali were added by the 71st Amendment Act of 1992.
• Bodo, Dongri, Maithili and Santhali were added by the 92nd Amendment Act of 2003.
• Of all the 22 official languages the Hindi language is spoken by most of Indians.

Q4. Answer: (a) 3 and 16

Shortcut Trick
Product of LCM and HCF = Product of the two numbers.
Product = 48 and Difference = 13.
Check options: 3 × 16 = 48 and 16 − 3 = 13. This satisfies both conditions.

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Therefore The correct answer is 3 and 16.

Alternate Method

Given:

LCM × HCF = 48

Difference (x − y) = 13

Formula Used:

Product of two numbers = LCM × HCF

Calculations:

=> Let the numbers be x and y.

=> x × y = 48

=> x − y = 13 => x = 13 + y

=> (13 + y) × y = 48

=> $y^2 + 13y - 48 = 0$

=> $y^2 + 16y - 3y - 48 = 0$

=> y(y + 16) − 3(y + 16) = 0

=> (y − 3)(y + 16) = 0

=> y = 3 (since numbers are positive)

=> x = 13 + 3 = 16

Therefore The correct answer is 3 and 16.

Additional Information

Fundamental Property of HCF and LCM

For any two positive integers a and b, HCF(a, b) × LCM(a, b) = a × b.

HCF as a Factor

The HCF of two or more numbers is always a factor of their LCM.

Co-prime Numbers

If two numbers are co-prime, their HCF is 1 and their LCM is equal to the product of the numbers.

Q5. Answer: (c) 21 days

Shortcut Trick

Work done by Rani in 1 day (6 hours) = 6 ÷ 3 = 2 gowns.

Work done by Padma in 1 day (6 hours) = 6 ÷ 2 = 3 gowns.

Alternate days cycle (2 days): 2 + 3 = 5 gowns.

In 10 cycles (20 days), work done = 10 × 5 = 50 gowns.

Remaining 2 gowns are stitched by Rani on the 21^(st) day.

Therefore The correct answer is 21 days.

Alternate Method

Given:

Time taken by Rani per gown = 3 hours.

Time taken by Padma per gown = 2 hours.

Daily working hours = 6 hours.

Total gowns to be stitched = 52 gowns.

Person	Gowns per Hour	Working Hours	Gowns per Day
Rani	1/3	6 hours	(1/3) × 6 = 2
Padma	1/2	(1/2) × 6 = 3	

Calculations:

=> Day 1 (Rani) = 2 gowns.

=> Day 2 (Padma) = 3 gowns.

=> Total gowns in 2 days = 2 + 3 = 5 gowns.

=> Total cycles of 2 days needed = 52 ÷ 5 = 10 cycles with 2 gowns remainder.

=> Days for 10 cycles = 10 × 2 = 20 days.

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=> Gowns completed in 20 days = 10 × 5 = 50 gowns.

=> Remaining gowns = 52 − 50 = 2 gowns.

=> On 21^(st) day, Rani stitches the remaining 2 gowns (since her capacity is 2 gowns/day).

=> Total time = 20 + 1 = 21 days.

Therefore The correct answer is 21 days.

Additional Information

Alternate Day Work

In alternate work, tasks are solved in cycles. If A and B work alternately, 1 cycle = 2 days, and work done per cycle = Efficiency(A) + Efficiency(B).

Work and Efficiency

Efficiency is inversely proportional to time. Total Work = Efficiency × Time. In this problem, efficiency is converted to gowns per day based on a 6-hour shift.

Q6. Answer: (d) 11 years

Shortcut Trick

Sum of ages 3 years ago = 26 − (3 × 2) = 20 years.

Ratio of Kishore to Sarala (3 years ago) = 3 : 2.

Total units = 3 + 2 = 5 units → 20 years.

1 unit = 4 years Therefore Sarala's age (3 years ago) = 2 × 4 = 8 years.

Present age of Sarala = 8 + 3 = 11 years.

Therefore The correct answer is 11 years.

Alternate Method

Given: Sum of Sarala (S) and Kishore (K) is 26. 3 years ago, K was 3/2 of S.

Formula: Ratio = Age1 / Age2

=> Let Sarala's present age be S.

=> Kishore's present age K = 26 − S.

=> 3 years ago: (K − 3) = 3/2 × (S − 3).

=> (26 − S − 3) = 3/2 × (S − 3).

=> 2 × (23 − S) = 3 × (S − 3).

=> 46 − 2S = 3S − 9.

=> 5S = 55.

=> S = 11.

Therefore The correct answer is 11 years.

Additional Information

Age Sum Property

If the sum of ages of 'n' persons is S now, then 't' years ago, the sum was S − (n × t).

Ratio of Ages

The difference between the ages of two people remains constant regardless of the number of years passed.

Linear Equations

For age problems, always define variables based on the Present Age to avoid calculation errors in final steps.

Q7. Answer: (c) 157

The logic is follows here is as,

Hence, 'option 3' is the correct answer.

Q8. Answer: (d) Ministry of Minority Affairs

The correct answer is Ministry of Minority Affairs.

Key Points

• The revised PMJVK will be implemented in all districts of the country including all the Aspirational Districts.

• The projects under PMJVK will be proposed in any area where the concentration of the minority population is more than 25% in the catchment area (15 KM radius).

• The revised PMJVK has been approved by the Government for continuation over the 15th Finance Commission Cycle i.e., during FY 2021-22 to 2025-26.

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• PMJVK will support the State/UTs in creating infrastructure to improve the quality of life of people and reduce the imbalances in the identified minority concentration areas to be at par with the rest of the country.

Additional Information

• The Cabinet Committee on Economic Affairs chaired by Prime Minister Narendra Modi on May 2, 2018, approved the proposal for renaming and restructuring of the Multi-sectoral Development Programme (MsDP) as Pradhan Mantri Jan Vikas Karyakram (PMJVK).

• The restructured program would provide better socio-economic infrastructure facilities to the minority communities, particularly in the field of education, health & skill development.

• The area to be covered under PMJVK would be 57% more as compared to the existing MsDP.

• The MsDP covered 196 districts of the country whereas PMJVK will cover 308 districts of the country.

Q9. Answer: (a) 36

Given:

x = 18% of 200

Calculation:

=>x = 18% of 200

=> x = 200 × 18/100

=> x = 36

The value of x is 36.

Q10. Answer: (b) Rs. 10,000

Shortcut Trick

Let the cost of production be x.

Final Price = x × (112 ÷ 100) × (115 ÷ 100) × (120 ÷ 100) = 15,456.

x × (28 ÷ 25) × (23 ÷ 20) × (6 ÷ 5) = 15,456.

x = (15,456 × 25 × 20 × 5) ÷ (28 × 23 × 6).

x = 10,000.

Therefore The correct answer is Rs. 10,000.

Alternate Method

Given: Retail Price = Rs. 15,456, Manufacturer Gain = 12%, Wholesale Gain = 15%, Retailer Gain = 20%.

Formulas: SP = CP × (100 + P%) ÷ 100.

=> Let Cost of Production = C.

=> Price after Manufacturer = C × 1.12.

=> Price after Wholesaler = (C × 1.12) × 1.15.

=> Price after Retailer (Retail Price) = (C × 1.12 × 1.15) × 1.20 = 15,456.

=> C × 1.5456 = 15,456.

=> C = 15,456 ÷ 1.5456 = 10,000.

Therefore The correct answer is Rs. 10,000.

Additional Information

Successive Percentage Changes

When a value changes by a%, then b%, then c% successively, the Effective Multiplier is (1 + a/100) × (1 + b/100) × (1 + c/100).

Chain Rule in Profit and Loss

In a chain of transactions, the Selling Price for one becomes the Cost Price for the next buyer in the sequence.

Q11. Answer: (c) 1188 cm^3

Shortcut Trick

Check for divisibility by 11 (since π = 22/7 involves a multiple of 11).

Volume = $\pi r^2 h$ = (22/7) × 6 × 6 × 10.5

Volume = 11 × 2 × 6 × 6 × 1.5 = 11 × 108 = 1188 cm^3.

Therefore The correct answer is 1188 cm^3.

Alternate Method

Given:

Diameter (d) = 12 cm => Radius (r) = 12 ÷ 2 = 6 cm

Height (h) = 10.5 cm
Formula Used:
Volume of a Cylinder = $\pi r^2 h$
Calculations:
=> Volume = (22 ÷ 7) × 6 × 6 × 10.5
=> Volume = (22 ÷ 7) × 36 × (21 ÷ 2)
=> Volume = 22 × 36 × (3 ÷ 2)
=> Volume = 11 × 36 × 3
=> Volume = 11 × 108
=> Volume = 1188 cm^3
Therefore The correct answer is 1188 cm^3.
Additional Information
Curved Surface Area (CSA)
The area of the side surface of a cylinder is given by $2\pi rh$.
Total Surface Area (TSA)
The sum of CSA and the area of two circular bases: $2\pi r(h + r)$.
Hollow Cylinder Volume
If R is outer radius and r is inner radius, Volume = $\pi(R^2 - r^2)h$.

Q12. Answer: (a) -12/5

Given:
x=(-5/3) ×(9/25)+(1/5-2)
Calculation:
=> (-5/3) ×(9/25)+(1/5-2)= x
=> x=(-3/5)+((1-10)/5)
=> x=((-3+1-10)/5)
=> x=((-12)/5)
The value of (-5/3) ×(9/25)+(1/5-2)=((-12)/5).

Q13. Answer: (c) 168

Shortcut Trick
To find the LCM of 24, 42, and 56, pick the largest number and check its multiples.
Largest number = 56
Multiples of 56: 56 (not div by 24, 42), 112 (not div by 24, 42), 168.
Check 168: 168 ÷ 24 = 7 and 168 ÷ 42 = 4.
Therefore The correct answer is 168.
Alternate Method
Given: Numbers are 24, 42, and 56.
Formula Used: Prime Factorization Method for finding LCM.
=> Prime factors of 24 = 2 × 2 × 2 × 3 = $2^3 \times 3^1$
=> Prime factors of 42 = 2 × 3 × 7 = $2^1 \times 3^1 \times 7^1$
=> Prime factors of 56 = 2 × 2 × 2 × 7 = $2^3 \times 7^1$
=> LCM = Product of the highest powers of all prime factors involved
=> LCM = $2^3 \times 3^1 \times 7^1$
=> LCM = 8 × 3 × 7
=> LCM = 168
Therefore The correct answer is 168.
Additional Information
LCM (Least Common Multiple)
The smallest positive integer that is divisible by each of the given numbers without leaving a remainder.
HCF and LCM Relation
For two numbers a and b, the product of the numbers is equal to the product of their HCF and LCM: a × b = HCF(a, b) × LCM(a,

b).

Division Method

A method where numbers are divided by common prime factors simultaneously until no further division is possible by a prime other than 1.

Q14. Answer: (b) B

Given:

A, B, C, D, E, F and G were seven kings, sitting around a circular table, facing the centre.

Solution :

(1) Only E was sitting between F and C.

(2) G was sitting to the immediate left of C. Case 2 is eliminated and only case 1 is possible.

(3) A was third to the left of G.

(4) Only D was sitting between A and B.

Here, king B was sitting to the immediate left of G.

Hence, 'option 2' is the correct answer.

Q15. Answer: (c) P

Given:

P, Q, R, S, T and U are six siblings who passed their class tenth exam in different years viz. 2001, 2003, 2005, 2007, 2010 and 2012 but not necessarily in the same order.

Solution:

(1) Only Q passed before R.

Year	Siblings
2001	Q
2003	R
2005	
2007	
2010	
2012	

(2) P passed in one of the years before S and after R.

(3) U passed in one of the years before P.

(4) T passed in the year immediately after S.

Year	Siblings
2001	Q
2003	R
2005	U
2007	P
2010	S
2012	T

Here, 'P' passed their class tenth exam in the year 2007.

Hence, 'option 3' is the correct answer.

Q16. Answer: (c) cos A + 1

Shortcut Trick

Substitute a standard angle value, say A = 60°.

LHS = $\sin^2 60° \div (1 - \cos 60°) = (3/4) \div (1 - 1/2) = (3/4) \div (1/2) = 1.5$.

Now check the options: $\cos 60° + 1 = 0.5 + 1 = 1.5$.

Since the values match, the expression simplifies to cos A + 1.

Therefore The correct answer is cos A + 1.

Alternate Method

Given: The trigonometric expression is $(\sin^2 A) \div (1 - \cos A)$.

Formula Used: Standard trigonometric identity $\sin^2 A + \cos^2 A = 1$ and algebraic identity $a^2 - b^2 = (a - b)(a + b)$.

=> From the identity, we know: $\sin^2 A = 1 - \cos^2 A$

=> The given expression becomes: $(1 - \cos^2 A) \div (1 - \cos A)$

=> Using $(a^2 - b^2)$ formula: $[(1 - \cos A) \times (1 + \cos A)] \div (1 - \cos A)$

=> Cancelling the common term $(1 - \cos A)$ from numerator and denominator:

=> Result = 1 + cos A

Therefore The correct answer is cos A + 1.

Additional Information

Pythagorean Identities

The three main identities are $\sin^2 \theta + \cos^2 \theta = 1$, $1 + \tan^2 \theta = \sec^2 \theta$, and $1 + \cot^2 \theta = \text{cosec}^2 \theta$.

Reciprocal Relations

Always keep in mind that sec A = 1/cos A and cosec A = 1/sin A for quick simplifications.

Factorization in Trigonometry

Expressions like $1 - \sin^2 A$ or $\sec^2 A - 1$ can often be factored as a difference of squares to cancel terms in fractions.

Q17. Answer: (a) H2S

The correct option is 'H2S'.

Key Points

• $Na2S+2HCl \rightarrow 2NaCl+H2S\uparrow$

• H2S

• Hydrogen sulfide is slightly denser or heavier than air but fairly soluble in water.

• Hydrogen sulphide is a colourless, poisonous gas that can lead to headaches even if it is inhaled in small quantities.

• It has a distinct rotten egg smell.

• Hydrogen sulfide is a flammable gas.

Q18. Answer: (b) Only (i)

The correct answer is Only (i).

Key-points

• According to Dobereiner, when Elements are arranged in Order of Increasing Atomic Mass, groups of three Elements (known as triads) that have Similar Chemical Properties are Obtained.

• The Atomic mass of the Middle Element was nearly equal to the Arithmetic Mean of the Other.

• Examples of triads of elements are as follows-

Element	Atomic Mass	Mean
Lithium	7	
Sodium	23	7+39/2 =23
Potassium	39	

• This classification was not widely accepted since only a few elements could be arranged into triads.

Additional Information

• Moseley's Modern periodic law

• According to Moseley's Modern periodic law, Elements are Arranged in a Tabular form based on their Atomic Numbers.

• it states that the Chemical and Physical Properties of Elements is a Periodic Function of their Atomic Number.

• Newland

• Newland arranged the Elements in the Order of Increasing Atomic Masses and found that the Properties of Every 8th Element are Similar to that of the 1st Element, Just like musical notes.

• Mendeleev

• Mendeleev arranged the Elements in the Increasing Order of their Atomic Mass.

• Mendeleev's Periodic table is based on the Chemical Properties of the Elements.

• It contains 7 Periods(horizontal rows) and 8 Groups (vertical columns).

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Q19. Answer: (b) (u v)/(u+v)

The correct answer is (u v)/(u+v).

Key Points

• Mirror Formula: The following formula is known as the mirror formula, which provided a relationship between focal length (f), image distance (v), and objects distant (u) as shown below

Since the plane mirror is a part of an infinitely large spherical mirror, therefore the radius of curvature and focal length of the plane mirror is Infinity. Spherical mirror formula relating an object distance ‘u’, image distance ‘v’ and focal length of mirror ‘f’ may be applied to a plane mirror when focal length goes to infinity.

=> 1/f = 1/v + 1/u

so f = (u v)/(u+v)

EXPLANATION:

Plane Mirror is a part of the infinitely large spherical mirror:

Additional Information

Sign convention in mirrors

• All distances are measured from the pole of the mirror.

• The distance measured from the pole (p) to the left side of the mirror is taken as negative.

• The distance measured from the pole (p) to the right side of the mirror is taken as positive.

• The heights measured upwards and perpendicular to the principal axis of the mirror is taken as positive.

• The heights measured downwards and perpendicular to the principal axis of the mirror is taken as negative.

Q20. Answer: (c) reducing agent

The correct answer is reducing agent.

Key-points

• a reducing agent (also known as a reductant, reducer, or electron donor) is a chemical species that "donate" an electron to an electron recipient (called the oxidizing agent, oxidant, oxidizer, or electron acceptor).

• CuII + 2 e- → Cu0 (reduction)

• Mg0 - 2 e- → MgII (oxidation)

• Reduction is the gain of electrons or a reduction in the oxidation state of an atom, ion, or certain atoms in a molecule.

• Mg + CuSO4 = Cu + MgSO4 is a redox reaction where Mg is oxidized and Cu is reduced.

• Mg is a reducing agent (i.e. it lost electrons) and CuSO4 is an oxidizing agent (i.e. it gained electrons).

Additional information

• Oxidizing agent

• An oxidizing agent (often referred to as an oxidizer or an oxidant) is a chemical species that tends to oxidize other substances, i.e. cause an increase in the oxidation state of the substance by making it lose electrons.

• Dissolving agent

• A solvent is a dissolving agent and is the liquid portion of a solution.

• The molecules that dissolve in the solvent are called solutes.

• Catalyst

• A catalyst is a substance that speeds up a chemical reaction or lowers the temperature or pressure needed to start one, without itself being consumed during the reaction.

• Catalysis is the process of adding a catalyst to facilitate a reaction.

Q21. Answer: (b) 27 m, East

Drawing figure as per given information,

• To reach house B from house A, a person has to walk 30 m towards the south.

• Then he must take a left turn and walk 15 m.

• Then he must take a left turn again and walk 20 m.

• Again, he must take a left turn and walk 25 m.

• Then he must take a right turn and walk 10 m.

• Then he must take a left turn and walk 17 m to finally reach house B.

Here, 27 m, East direction is house A from house B.

Hence, 'option 2' is the correct answer.

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Q22. Answer: (b) Male germ cell - small and motile, Female - large with food store

The correct answer is Male germ cell - small and motile, Female - large with food store.

Key-points

Here's a table that explains the characteristics of male germ cells (sperm cells) and female germ cells (oocytes):

Characteristic	Male Germ Cell (Sperm)	Female Germ Cell (Oocyte)
Size	Small	Large
Motility	Motile	Non-motile
Food Store	Limited	Abundant

• Explanation:

• Size:

• Male germ cells, or sperm cells, are generally small in size.

• They are specialized for mobility and reaching the egg for fertilization.

• In contrast, female germ cells, known as oocytes or eggs, are comparatively larger due to the presence of abundant cytoplasm to support the developing embryo.

• Motility:

• Sperm cells are highly motile, equipped with a whip-like tail called a flagellum, which propels them toward the egg.

• Their motility allows them to swim through the female reproductive tract to reach the site of fertilization.

• On the other hand, oocytes are non-motile and remain stationary within the ovaries until they are released during ovulation.

• Food Store:

• Male germ cells (sperm cells) have a limited food store.

• They primarily carry genetic material necessary for fertilization but rely on the female reproductive tract for nourishment.

• In contrast, female germ cells (oocytes) possess a substantial food store in the form of yolk or nutrient-rich cytoplasm.

• This food supply is crucial for supporting the early stages of embryo development until it can establish its own nutrient supply.

Q23. Answer: (a) JPAD

Given : I _ L O _ R U V X _ B _ G

By checking options and substituting accordingly.

(1): JPAD → I J L / O P R / U V X / A B D / G

Here, each word is formed with three alphabets. In which gap between 2nd and 3rd alphabet is one alphabet while gap between last alphabet and first alphabet of next word is two alphabets .As given in below figure,

(2): JPAG → I J L / O P R / U V X / A B G / G (No pattern Followed)

(3): JPXD → I J L / O P R / U V X / X B D / G (No pattern Followed)

(4): JRAD → I J L /O R R / U V X / A B D / G (No pattern Followed)

Hence, ‘JPAD ’ is the correct answer.

Q24. Answer: (b) F

Given:

Eight classmates D, E, F, G, H, I, J and K are sitting in a straight row, facing north.

Solution:

(1) There are only two classmates sitting between H and D.

(2) K sits to the immediate left of D.

(3) D and I are immediate neighbours.

(4) J is at the extreme right end of the row.

(5) Only E sits between I and G.

• Only case 1 is possible.

(6) unoccupied seat will be filled by F.

Here, F sits at the second position from the left end of the row.

Hence, 'option 2' is the correct answer.

Q25. Answer: (b) History

The correct answer is History.

Key Points

• Temporal synthesis is defined as the automated construction of a system whereby we develop a temporary specification and then try to prove it.

• It is done in history as a discipline.

• It refers to the comparisons made with respect to the passage of time.

• Here, if a process is temporally extended, it means that it happens over a period of time.

• If the occurrence of two events differs temporally, then they happened at different points in time.

Additional Information

• Spatial synthesis is attempted by Geography.

• It includes any of the formal techniques which study entities using their topological, geometric, or geographic properties.

• Geomorphology:

• Geomorphology is the scientific study of the origin and evolution of topographic and bathymetric features created by physical, chemical or biological processes operating at or near Earth's surface.

• Spatial synthesis is the subject matter in Geomorphology.

• Anthropology:

• Anthropology is the study of the origin and development of human societies and cultures.

• Culture is the learned behaviour of people, including their languages, belief systems, social structures, institutions, and material goods.

• Both Spatial and temporal synthesis are the subject matter in Anthropology.

• Philosophy:

• Philosophy is the systematized study of general and fundamental questions, such as those about existence, reason, knowledge, values, mind, and language.

• Philosophical methods include questioning, critical discussion, rational argument, and systematic presentation.

• Existential synthesis is the subject matter in Philosophy.

Q26. Answer: (a) Swaran Singh Committee

The correct answer is Swaran Singh Committee.

Key Points

• The Fundamental Duties were incorporated in Part IV-A of the Indian Constitution through the 42nd Constitutional Amendment Act, 1976.

• At present, there are eleven fundamental duties under Article 51 A of the constitution.

• The idea of Fundamental Duties has been borrowed from the erstwhile USSR.

• Originally the duties were ten in number, later on through 86th Amendment Act, 2002, the eleventh Fundamental duty was added.

• Fundamental duties are non-enforceable in nature.

• Swaran Singh Committee recommended the inclusion of Fundamental Duties in the Indian Constitution.

Additional Information

• JB Kripalani Committee:

• This was the Fundamental Rights sub-committee. It was headed by J.B. Kriplani.

• He suggested that:

• Fundamental Rights are the basic human rights guaranteed to the citizens of India by the Constitution.

• There are six fundamental rights Nine major committees were appointed by the Constituent Assembly to deal with different tasks of constitution-making.

• The advisory committee on Fundamental Rights, Minorities, and Tribal and Excluded Areas had a subcommittee.

• HC Mookherjee Committee:

• The Chairman of Minorities Sub Committee was H.C Mookherjee during 1946.

• He was the VicePresident of the Constituent Assembly of India for drafting the Constitution of India before the partition of India.

• AV Thakkar Committee:

• He was appointed the chairman of "Excluded and Partially Excluded Areas (Other than Assam), a sub committee of the constituent assembly.

• Mahatma Gandhi would call him 'bapa'.

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• In one of his appeals in 1939 Mahatma Gandhi called him "Father of Harijans".

Q27. Answer: (a) strong, high

The correct answer is strong, high.

Key-points

• Tungsten metal is used for making the filament of electric bulbs.

• Tungsten is used to making an electrical bulb filament for the following properties:

• It has a very high melting point being an alloy.

• It has very high resistance, so it does not burn easily at room temperature.

• The lamp glows at high temperatures.

• Tungsten filament does not melt even though a significant amount of heat is generated due to the passing of the current through the filament (through the heating effect of the current).

Additional Information

• An incandescent light bulb is an electrical light with a wire filament that is heated until it glows.

• The filament is wrapped in a bulb of glass to shield the filament from oxidation. Current is supplied to the filament by means of terminals or wires inserted in the glass.

• The incandescent bulb has been commonly used in household and commercial lighting, for portable lightings such as car headlamps, table lamps and flashlights, and for decorative and advertisement lighting.

Q28. Answer: (d) 18

• The shaded part represents types of juices does the company make that contain both Apple and Strawberry flavours

• The number representing types of juices does the company make that contain both Apple and Strawberry flavours = 10 + 8 = 18

Hence, '18' is the correct answer.

Q29. Answer: (d) -18(x² - x + 10)

Shortcut Trick

Observe the x^3 terms: $(3 \times 9x^3) - (9 \times 3x^3) = 27x^3 - 27x^3 = 0$.

Combine the x^2 and x terms: $3(-6x^2) + (-9 \times -2x) = -18x^2 + 18x$.

Combine the constants: $(3 \times 30) - (9 \times 30) = 90 - 270 = -180$.

The resulting expression is $-18x^2 + 18x - 180$.

Factor out −18: $-18(x^2 - x + 10)$.

Therefore The correct answer is $-18(x^2 - x + 10)$.

Alternate Method

Given: $3(9x^3 - 6x^2 + 30) - 9(3x^3 - 2x + 30)$

Method: Apply the Distributive Law a(b + c) = ab + ac and then group like terms.

=> $(3 \times 9x^3 + 3 \times (-6x^2) + 3 \times 30) - (9 \times 3x^3 + 9 \times (-2x) + 9 \times 30)$

=> $(27x^3 - 18x^2 + 90) - (27x^3 - 18x + 270)$

=> $27x^3 - 18x^2 + 90 - 27x^3 + 18x - 270$

=> $(27x^3 - 27x^3) - 18x^2 + 18x + (90 - 270)$

=> $-18x^2 + 18x - 180$

=> $-18(x^2 - x + 10)$

Therefore The correct answer is $-18(x^2 - x + 10)$.

Additional Information

Distributive Property

This property states that multiplying a sum by a number is the same as multiplying each addend by the number and then adding the products: a(b + c) = ab + ac.

Combining Like Terms

To simplify algebraic expressions, we group terms with the same variables and exponents together (e.g., all x^3 terms together).

BODMAS Rule

Always simplify expressions following the BODMAS order: Brackets, Orders (powers), Division, Multiplication, Addition, and Subtraction.

Factoring

The process of finding the Highest Common Factor (HCF) and rewriting the expression as a product, which is the reverse of distribution.

Q30. Answer: (a) 28°

Shortcut Trick

In parallel lines AB || CD || EF, the transversal BE creates equal angles.

Given angle BGD = 62°, then angle ABG = 62° (Alternate Interior Angles).

Since AB || EF, angle BEF = angle ABG = 62° (Alternate Interior Angles).

Given EA perpendicular to AB and AB || EF, it implies angle AEF = 90°.

Therefore, w = angle AEF − angle BEF = 90° − 62° = 28°.

Therefore The correct answer is 28 °.

Alternate Method

Given: AB || CD, CD || EF, EA perpendicular to AB, and angle BGD = 62°.

Formula Used: Sum of interior angles on the same side of a transversal is 180°; alternate interior angles are equal; corresponding angles are equal.

=> AB || CD and CD || EF Therefore AB || EF (Lines parallel to the same line are parallel to each other).

=> EA perpendicular to AB (Given) => angle EAB = 90°.

=> Since AB || EF and EA is a transversal: angle EAB + angle AEF = 180° (Co-interior angles).

=> 90° + angle AEF = 180° => angle AEF = 90°.

=> Since CD || EF, angle BGD and angle GEF are Alternate Interior Angles or Corresponding Angles depending on position.

=> In the transversal BE, angle GEF = angle BGD = 62° (Alternate interior angles).

=> Now, angle AEF = angle AEG + angle GEF.

=> 90° = w + 62°.

=> w = 90° − 62° = 28°.

Therefore The correct answer is 28 °ree;.

Additional Information

Alternate Interior Angles

When two parallel lines are cut by a transversal, the pairs of angles on opposite sides of the transversal and between the parallel lines are equal.

Transitivity of Parallel Lines

If line L1 is parallel to L2 and L2 is parallel to L3, then L1 is parallel to L3.

Perpendicular Transversal Theorem

In a plane, if a line is perpendicular to one of two parallel lines, then it is perpendicular to the other line as well.

Q31. Answer: (b) 685

The logic follows here is as,

Hence, '685' is the correct answer.

Q32. Answer: (d) Railways

The correct answer is Railways.

Key Points

• Finance Minister Nirmala Sitharaman announced, while presenting the India’s budget 2022, the innovative idea of ‘one station, one product’ for the country’s extensive railway network, one of the longest in the world.

• The idea is to better promote supply chain of local product using the railways and making each railway station a promotional hub and showcase destination for a local product.

• This will help develop more efficient logistics for farmers and agri-enterprises and present unique regional products to a wide audience, i.e. railway travellers, passing through the stations.

• One station, one product takes forward the ‘one district, one product’ programme of the government which has successfully started promoting unique products from every district of India.

Additional Information

• Budget 2023-24 (ODOP)

• One District District One Product Product (ODOP) is a theme introduced by the government of India that aims to reap the benefit of scale in terms of procurement of inputs, availing common services, and marketing of products.

• ODOP for the scheme provides the framework for value chain development and alignment of support infrastructure.

• Districts as Export Hubs is the first such initiative of the Government of India which aims to target export promotion, manufacturing, and employment generation at the grass-root level and has made States and Districts accountable for the export growth from the districts in the country.

Q33. Answer: (a) IIT Hyderabad

The correct answer is IIT Hyderabad.

Key Points

• Swarajability, India's first AI-based job portal for persons with disabilities, has been launched to widen their opportunities with tech applications.

• The platform aids people with disabilities like visual, hearing impairment, and locomotive disorders in seeking employment.

• IIT-Hyderabad provided expertise for the Artificial Intelligence component.

• The project is funded by Kotak Mahindra Bank.

Important Points

• It is developed in both web and mobile app versions for maximum reach.

• Visual Quest India is the developer and Youth4Jobs offered its experience in skilling, disability, and job linkages.

• It is a one-stop-shop for organisations that want to hire persons with disabilities.

• Also, it supports NGOs, educational institutions, and governments in their efforts to promote diversity and inclusion.

Q34. Answer: (c) 102

Explanation:

Q35. Answer: (a) U

Given:

Each of P, Q, R, S, T, U and V has an exam on a different day of a week starting from Monday and ending on Sunday of the same week.

solution:

(1) P's exam is on Tuesday.

(2) R's exam is on Sunday.

(3) S's exam is immediately before R.

(4) Q's exam is immediately before S.

(5) Only two people have exams between S and V.

(6) Only three people have exams between U and Q

(7) Now, T has exam on Thursday.

Hence, 'U' has exam on Monday.

Q36. Answer: (d) 2018

Given :

In year 2018

• The value of India's cotton export in year 2018 = 410 crores

• The Quantity of India's cotton export in year 2018 = 348 thousand ton

In year 2019

• The value of India's cotton export in year 2019 = 320 crores

• The Quantity of India's cotton export in year 2019 = 270 thousand ton

In year 2020

• The value of India's cotton export in year 2020 = 350 crores

• The Quantity of India's cotton export in year 2020 = 280 thousand ton

In year 2021

• The value of India's cotton export in year 2021 = 450 crores

• The Quantity of India's cotton export in year 2021 = 350 thousand ton

Calculation:

1. The value per thousand tons of year 2018 =(410/348) = 1.178 crores per thousand ton

2. The value per thousand tons of year 2019 =(320/270) = 1.185 crores per thousand ton

3. The value per thousand tons of year 2020 = (350/280) = 1.250 crores per thousand ton

4. The value per thousand tons of year 2021 = (450/350) = 1.280 crores per thousand ton

Hence, The value per thousand tons the minimum in year 2018.

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Q37. Answer: (c) 12 : 13

Given:

For institute B,

• The number of students called for an interview in year 2018 is 120

• The number of students called for an interview in year 2019 is 92

• The number of students called for an interview in year 2020 is 100

For institute C,

• The number of students called for an interview in year 2018 is 108

• The number of students called for an interview in year 2019 is 100

• The number of students called for an interview in year 2020 is 80

Calculation :

The average number of students called for an interview from institute B in the period 2018 to 2020 = 120+92+100 over 3 = 104

The average number of students called for an interview from institute C in the period 2018 to 2020 = 108+100 +80 over 3 = 96

Now,

The ratio of the average number of students called for an interview from institute C in the period 2018 to 2020 to the average number of students called for an interview from institute B in the same period is 96:104 = 12 : 13.

That is, The Required ratio is 12:13.

Q38. Answer: (b) Virat Kohli

The correct answer is Virat Kohli.

Key Points

• The flamboyant and fearless, top-order Indian batsman Virat Kohli gets 1st place in terms of scoring the most runs in IPL, with 6411 runs in 216 Matches (208 innings).

• Making his IPL debut for Royal Challengers Bangalore in 2008, Kohli has played all IPL games for RCB so far and averaged 36.43 in the event.

• The modern-day great also holds the record of amassing the most runs in a single IPL season, 973 runs in 16 matches in 2016.

• Unfortunately, despite being one of the best, Virat Kohli is yet to win an IPL trophy.

Additional Information

• WPL 2023 Highlights:

• Recently WPL 2023 was organized by BCCI the final match of the tournament was played at Brabourne Stadium in Mumbai.

• Mumbai Indians defeated Delhi Capitals and won the first tournament title.

• Orange Cap Award (For Most Runs) – Meg Lanning (Delhi Capitals)

• Purple Cap Award (for most wickets) – Hayley Mathews (Mumbai Indians)

• The mascot of the WPL: a tiger.

• Sponsored: The Tata Group

• WPL had organized for the first time in the year 2023.

• Men’s IPL started in the year 2008.

• The Women’s Premier League was hosted at DY Patil Stadium and closed at Barabourne Stadium in Mumbai.

• A total of 5 teams have been included in the Women’s Premier League.

• Gujarat Giant – Adani

• Mumbai Indians – Relines

• Royal Challenger Bangalore – Diageo

• Delhi Capital – JSW

• UP Warrior – Capri Global

Q39. Answer: (a) Both conclusions I and II are true

Given Statements: C = U < F ≤ H > G = I > R

Conclusions:

I. H > R → True (as H > G = I > R → as H is greater than G,I and I is greater than R.)

II. H > C → True (as in C = U < F ≤ H → as C is equal to U and less than F. F is less than H. hence, H is greater than C.)

Hence, 'Both conclusions I and II are true'.

Q40. Answer: (d) The President of India

The correct answer is The President of India.

Key Points

• The Chief Justice of India (CJI) is appointed by the President of India under clause (2) of Article 124 of the Constitution.

• The chief justice is appointed by the president after consultation with such judges of the Supreme Court and high courts as he deems necessary.

• The other judges are appointed by the president after consultation with the chief justice and such other judges of the Supreme Court and the high courts as he deems necessary.

• Consultation with the chief justice is obligatory in the case of the appointment of a judge other than the Chief justice.

Additional Information

• The basic procedure to be followed for the appointment of CJI is:

• Appointment to the office of the Chief Justice of India should be of the senior-most Judge of the Supreme Court considered fit to hold the office.

• The Union Minister of Law, Justice and Company Affairs would, at the appropriate time, seek the recommendation of the outgoing Chief Justice of India for the appointment of the next Chief Justice of India.

• Whenever there is any doubt about the fitness of the senior-most Judge to hold the office of the Chief Justice of India, consultation with other Judges as envisaged in Article 124 (2) of the Constitution would be made for the appointment of the next Chief Justice of India.

• After receipt of the recommendation of the Chief Justice of India, the Union Minister of Law, Justice and Company Affairs will put up the recommendation to the Prime Minister who will advise the President on the matter of appointment.

Q41. Answer: (a) mental

The correct answer is mental.

Key Points

• The Ministry of Women and Child Development (MoWCD) and NIMHANS Bengaluru launched a Project' in March 2022 with the goal of improving women's mental health in India.

• The increasing ability of OSC (One-Stop Center) officials in terms of tools and procedures for One-Stop Centers, particularly those who have experienced violence and distress, with compassion and care.

• One-Stop Center performed admirably during the COVID time.

• There are already over 700 One-Stop Centers operating across the country.

• People who work in these one-stop shops will be taught how to appropriately operate the Self Defense Shaheed Women helpline and counsel.

• The advanced training programme will be delivered in all of the regional languages that they want to be able to com website dedicated to this, which contains a wealth of information on training.

Additional Information

• Ministry of Women and Child Development:

• The Department of Women and Child Development was set up in the year 1985 as a part of the Ministry of Human Resource Development to give the much-needed impetus to the holistic development of women and children.

• With effect from 30 January 2006, the Department has been upgraded to a Ministry.

• The Ministry of Women and Child Development, a branch of the Government of India, is an apex body for the formulation and administration of the rules and regulations and laws relating to women and child development in India.

• The current minister for the Ministry of Women and Child Development is Smriti Irani having held the portfolio since 31 May 2019.

Q42. Answer: (a) C+I+c Y

The correct answer is ' C+I+c Y '.

Key Points

• In an economy without a government, the ex-ante aggregate demand for final goods is the sum total of the ex-ante consumption expenditure and ex-ante investment expenditure on such goods, viz. AD = C + I.

• Aggregate demand for final goods can be written as

AD = C+I+c Y

• If the final goods market is in equilibrium this can be written as

Y = C+I+c Y

• where Y is the ex-ante, or planned, output of final goods.

• This equation can be further simplified by adding up the two autonomous terms, C and I, making it

Y = A + c.Y

• Where A = C + I is the total autonomous expenditure in the economy.

• In reality, these two components of autonomous expenditure behave in different ways.

• C, representing the subsistence consumption level of an economy, remains more or less stable over time.

• However, I have been observed to undergo periodic fluctuations.

Q43. Answer: (b) 21

• The shaded part represents people eat potatoes and eggs for dinner but NOT chickens.

• The number representing people eat potatoes and eggs for dinner but NOT chickens = 21.Hence, '21' is the correct answer.

Q44. Answer: (a) 3

Given Statements: B > Y ≤ Z = A < X > O

Conclusions:

I. B > X → False (as B > Y ≤ Z = A < X → clear relation between B and X cannot be determined).

II. Y < O → False (as in Y ≤ Z = A < X > O → clear relation between Y and O cannot be determined).

III. Y < X → True (as in Y ≤ Z = A < X → Because X is greater than A. A is equal to Z. Z is greater than Y. Hence X is greater than Y).

IV. A > O → False (as in A < X > O → clear relation between A and O cannot be determined).

Here, Only the conclusion III follows.

Hence, 'Option 1' is the correct answer.

Q45. Answer: (a) $H_2 + Br_2 \rightarrow 2HBr$

The correct answer is $H_2 + Br_2 \rightarrow 2HBr$.

Key-points:

• The balanced chemical reaction for the reaction between hydrogen and bromine to form hydrogen bromide can be represented as follows:

• $H_2 + Br_2 \rightarrow 2HBr$

• Explanation:

• The reaction you provided involves the combination of hydrogen gas (H_2) and bromine gas (Br_2) to produce hydrogen bromide gas (HBr).

• In the reaction, two molecules of hydrogen gas (H_2) react with one molecule of bromine gas (Br_2) to produce two molecules of hydrogen bromide gas (HBr).

• Let's break down the reaction step by step:

• Hydrogen gas (H_2): Hydrogen gas is a diatomic molecule, meaning it consists of two hydrogen atoms bonded together.

• Bromine gas (Br_2): Bromine gas is also a diatomic molecule, comprising two bromine atoms bonded together.

• Balanced Equation:

• To balance the equation, we need to ensure that the number of atoms of each element is the same on both sides of the equation.

• In this case, we have two hydrogen atoms on the left side (2H) and two hydrogen atoms on the right side (2H), as well as two bromine atoms on the left side (Br_2) and two bromine atoms on the right side (2HBr).

• Thus, the equation is balanced.

Q46. Answer: (c) Both (a) and (b)

The correct answer is Both (a) and (b).

Key-points

• Magnetic field: The region around a magnet in which its force can be experienced.

• Solenoid: A long, thin loop of wire, often wrapped around a metallic core, which produces a magnetic field when an electric current is passed through it.

• Explanation:

Magnetic field due to a long solenoid carrying current I:

• The magnetic field around a solenoid is similar to that around a bar magnet.

• The magnetic field lines move from south to north inside the solenoid and north to south outside the solenoid. Thus, forming closed loops.

• Inside the solenoid, the magnetic field lines move parallel to each other. Thus, it is uniform inside the solenoid.

• The magnetic field is strongest inside the solenoid.

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Q47. Answer: (a) 40 km/h

Shortcut Trick

When the distance traveled is the same for both journeys, use the harmonic mean formula.

Average Speed = (2 × x × y) ÷ (x + y)

Average Speed = (2 × 30 × 60) ÷ (30 + 60)

Average Speed = 3600 ÷ 90 = 40 km/h.

Therefore The correct answer is 40 km/h.

Alternate Method

Given:

Distance (one way) = 90 km

Forward Speed (v1) = 30 km/h

Return Speed (v2) = 60 km/h

Formula Used:

Average Speed = Total Distance ÷ Total Time

Time = Distance ÷ Speed

Calculations:

=> Time taken for forward journey (t1) = 90 ÷ 30 = 3 hours

=> Time taken for return journey (t2) = 90 ÷ 60 = 1.5 hours

=> Total Distance = 90 + 90 = 180 km

=> Total Time = 3 + 1.5 = 4.5 hours

=> Average Speed = 180 ÷ 4.5 = 40 km/h

Therefore The correct answer is 40 km/h.

Additional Information

Average Speed (Equal Distances)

If an object covers equal distances at speeds u and v, the average speed is (2uv) ÷ (u + v). This is independent of the actual distance.

Average Speed (Equal Time)

If an object travels for equal time intervals at speeds u and v, the average speed is the arithmetic mean: (u + v) ÷ 2.

Relative Speed

For objects moving in the same direction, relative speed is |u − v|. For objects moving in opposite directions, it is (u + v).

Q48. Answer: (c) 700 m

Drawing figure as per given information,

• P is 400 m to the west of K.

• M is 200 m to the east of L.

• O is 300 m to the north of K.

• N is 150 m to the south of L.

• L is 250 m to the south of K.

Straight distance between O and N = 300 + 250 + 150 = 700

Hence, '700 m' is the correct answer.

Q49. Answer: (a) 12

Given:

A certain number of people are sitting in a row, facing north.

Solution:

(1) Z sits at one of the extreme ends of the row.

(2) Only one person sits to the right of S.

(3) Only one person sits between Q and S.

(4) Only two people sit between D and Z. This is possible only in Case 1.

(5) P sits to the immediate left of Q.

(6) P sits second to the right of L.

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(7) K sits to the immediate right of D.
(8) L sits second to the right of D.
So here, 12 is the total number of persons seated.
Hence, '12' is the correct answer.

Q50. Answer: (d) VAS 68

The logic follows here is as,
Similarly,
Hence, 'option 4' is the correct answer.

Q51. Answer: (d) A - iii, B - iv, C - i, D - ii

The correct answer is A - iii, B - iv, C - i, D - ii.
Key-points
• Based on the descriptions given, the epithelial tissues can be matched to their corresponding locations in the body as follows:
• Pseudostratified Columnar Epithelium - Respiratory Tract
• Stratified Squamous Epithelium - Skin
• Simple Squamous Epithelium - Lining of Blood Vessels
• Simple Cuboidal Epithelium - Ducts of Salivary Glands
Additional Information
• Pseudostratified Columnar Epithelium (Respiratory Tract):
• This is a single-layered tissue with nuclei at different levels, making it appear stratified.
• It lines the trachea and bronchi, where it secretes and moves mucus using its cilia.
• Stratified Squamous Epithelium (Skin):
• This multi-layered tissue is found in areas exposed to friction like the skin.
• The cells on the surface are flat, while those underneath can be cuboidal or columnar.
• This tissue protects underlying tissues from injury, infection, and dehydration.
• Simple Squamous Epithelium (Lining of Blood Vessels):
• This is a single layer of flat cells that allows rapid diffusion or transport of substances.
• Found in the lining of blood vessels, it reduces friction for the flowing blood.
• Simple Cuboidal Epithelium (Ducts of Salivary Glands):
• Consisting of a single layer of cube-shaped cells, this tissue is involved in secretion, absorption, and excretion.
• Found in glands and their ducts like salivary glands, it helps in transporting saliva to the mouth.

Q52. Answer: (a) 6

Given :
$(5^3 \times 27 \times 10^3)/(5\text{^}6 \times 3^2 \times 4)$
Concept Used
Indices law

Multiplication rule with same base	**pn ? pm = pm + n**
Multiplication rule with same indices	pn ? yn = (p ? y)n
Division rule with same base	pm / pn = pm - n
Division rule with same indices	xn / ym = (x / y)n
Power rule	(an)m = an.m
Negative power rule	p-n = 1 / pn

Calculation :
$(5^3 \times 27 \times 10^3)/(5\text{^}6 \times 3^2 \times 4)$
$\Rightarrow (5^3 \times 3^3 \times (5\times2)^3)/(5\text{^}6 \times 3^2 \times 2^2)$
$\Rightarrow (5\text{^}((3-6))\times 3\text{^}((3-20)) \times 5^3 \times 2^3)/(2^2)$
$\Rightarrow 5\text{^}((-3))\times 3\text{^}((1)) \times 5^3 \times 2\ \text{^}((3-2))$
$\Rightarrow 5\text{^}((-3 +3))\times 3\text{^}((1))\times 2^1$

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=>6

The required value of $(5^3 \times 27 \times 10^3)/(5^6 \times 3^2 \times 4)$ is 6.

Q53. Answer: (c) 10

Shortcut Trick

Subtract the coefficients of the variable: 7 − 5 = 2 units.

Add the constants (since one is reduced and one is added): 14 + 6 = 20.

Equate the differences: 2 units = 20.

Therefore, 1 unit = 20 ÷ 2 = 10.

Therefore The correct answer is 10.

Alternate Method

Given:

Let the unknown number be x.

Seven times the number = 7x

Reduced by 14 = 7x − 14

Sum of five times the number and 6 = 5x + 6

Calculations:

=> 7x − 14 = 5x + 6

=> 7x − 5x = 6 + 14

=> 2x = 20

=> x = 20 ÷ 2

=> x = 10

Therefore The correct answer is 10.

Additional Information

Linear Equations in One Variable

An equation of the form ax + b = cx + d where x is the variable and its highest power is 1.

Transposition Rule

When a term is moved from one side of the equation to the other, its sign changes (+ becomes −, and − becomes +).

Verification of Roots

Substitute the value back into both sides: LHS = 7(10) − 14 = 56 | RHS = 5(10) + 6 = 56. Since LHS = RHS, the solution is correct.

Q54. Answer: (d) Sunday

Given:

28 March 2017 was a Tuesday.

Concept used:

Divide the number of days into seven to determine the odd days. After division, we are left with the remainder which are specified as odd days for the particular number.

2017 is not a leap year so days in February will be 28 days.

Consider,

Monday= 1, Tuesday = 2, Wednesday = 3, Thursday = 4, Friday = 5, Saturday = 6, Sunday = 7 or 0

Calculation:

Number of odd days after 12 February 2017 to 28 February 2017 = 28 - 12 = 16 = 2 odd days

Number of odd days from 1st march till 28th march, 2017 = 28 = 0 odd days

Total number of odd days from 12 February 2017 till 28th March 2017 = 2 + 0 = 2

odd days = 2 odd days

So, the day on 12 February 2017 = Tuesday - 2 = 0 means Sunday.

Hence, 'Sunday' is the correct answer.

Q55. Answer: (c) 3

Given :

W # 2 ∞ D @ 4 Y 3 D Ω R 7 & S F @ 6 ^ < X 2 2

The logic follows here is as,

• Letter → Symbol → Number

here, there are 3 symbols each of which is immediately preceded by a letter and immediately followed by a number.

Hence, 'option 3' is the correct answer.

Q56. Answer: (b) Rs. 10,890

Shortcut Trick

For a rate of 10% and time of 2 years, the effective Compound Interest rate is 10 + 10 + (10 × 10)/100 = 21%.

Total Amount percentage = 100% + 21% = 121%.

Total amount paid = 121% of Rs. 9,000

=> 1.21 × 9000 = Rs. 10,890.

Therefore The correct answer is Rs. 10,890.

Alternate Method

Given:

Principal (P) = Rs. 9,000

Rate of Interest (R) = 10% per annum

Time (n) = 2 years

Formula Used:

Amount (A) = $P(1 + R/100)^n$

Calculations:

=> $A = 9000 \times (1 + 10/100)^2$

=> $A = 9000 \times (110/100) \times (110/100)$

=> $A = 9000 \times (11/10) \times (11/10)$

=> $A = 9000 \times 121 / 100$

=> $A = 90 \times 121$

=> $A = 10890$

Therefore The correct answer is Rs. 10,890.

Additional Information

Compound Interest (CI)

CI = Amount − Principal. It is the interest calculated on the initial principal and also on the accumulated interest of previous periods.

SI and CI Difference for 2 Years

The difference between Simple Interest and Compound Interest for 2 years is given by: $D = P \times (R/100)^2$.

Half-Yearly Compounding

When interest is compounded half-yearly, the rate is halved (R/2) and the time is doubled (2n) in the formula $A = P(1 + R/200)^{2n}$.

Q57. Answer: (c) 17°C to 24°C

The correct answer is '17°C to 24°C'.

Key Points

• Climatic conditions:

• Mean annual rainfall is 75 cm to 125 cm.

• The average annual temperature is 17°-24°C.

• Humidity is 80 per cent.

• Distribution:

• Eastern Himalayas to the east of 88°E longitude at altitudes varying from 1000 to 2000 m.

Additional Information

• Characteristics Forests of evergreen species.

• Commonly found species are evergreen oaks, chestnuts, ash, beech, sales and pines.

• Climbers and epiphytes [a plant that grows non-parasitically on a tree or other plant] are common.

• These forests are not so distinct in the southern parts of the country.

• They occur only in the Nilgiri and Palni hills at 1070-1525 metres above sea level.

• It is a “stunted rainforest” and is not so luxuriant as the true tropical evergreen.

• The higher parts of the Western Ghats such as Mahabaleshwar, the summits of the Satpura and the Maikal Range, the highlands of Bastar and Mt. Abu in the Aravali Range carry sub-types of these

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Q58. Answer: (b) NaCl + H2O + CO2 + NH3 → NH4Cl + NaHCO3

The correct answer is NaCl + H2O + CO2 + NH3 → NH4Cl + NaHCO3.

Key-points

• The Chemical Reaction:

• NaCl + H2O + CO2 + NH3 → NH4Cl + NaHCO3

• In this reaction, the ammonia (NH3) combines with the water (H2O) and the carbon dioxide (CO2) to form ammonium bicarbonate (NH4HCO3).

• This ammonium bicarbonate then reacts with the sodium chloride (NaCl) in a double displacement reaction, forming ammonium chloride (NH4Cl) and sodium bicarbonate (NaHCO3).

• This reaction occurs in a solution and can be influenced by conditions such as temperature, pressure, and pH. Under certain conditions, this reaction could be used to capture and neutralize CO2, a greenhouse gas, potentially contributing to climate change mitigation strategies.

Additional information

• Reactants:

• Sodium chloride (NaCl) - Sodium chloride is a salt composed of sodium ions (Na+) and chloride ions (Cl-). It's a common compound, which, among many other uses, is well-known as table salt.

• Water (H2O) - Water is a simple inorganic compound that is a crucial life-sustaining molecule. It's a solvent for many ionic compounds like salts.

• Carbon dioxide (CO2) - Carbon dioxide is a linear molecule with a central carbon atom double bonded to two oxygen atoms. It's a waste product in organisms during respiration, but it's also used in various industrial processes.

• Ammonia (NH3) - Ammonia is a compound of nitrogen and hydrogen. It's a colorless gas with a pungent smell. It's used in several industries, including agriculture (as a fertilizer), pharmaceuticals, and cleaning supplies.

• Products:

• Ammonium chloride (NH4Cl) - Ammonium chloride is a product of ammonia (NH3) and hydrochloric acid (HCl). It's used in various applications such as a nutrient in yeast fermentation and as an ingredient in cough medicine.

• Sodium bicarbonate (NaHCO3) - Sodium bicarbonate, also known as baking soda, is a white crystalline powder. It's used in baking as a leavening agent, in medicine to soothe heartburn and acid indigestion, and in cleaning products.

Q59. Answer: (b) We should not place waste in plastic bags and discard them.

The correct answer is We should not place waste in plastic bags and discard them.

Key Points

• The major impact of plastic bags on the environment is that it takes many years for them to decompose.

• In addition, toxic substances are released into the soil when plastic bags perish under sunlight and, if plastic bags are burned, they release a toxic substance into the air causing ambient air pollution.

• Waste from plastic bags poses a serious environmental danger to human and animal health. Thus, we should not place waste in plastic bags and discard them.

• If plastic bags are not properly disposed of, they can impact the environment by causing littering and stormwater drain blockages.

• Animals may also get tangled and drown in plastic bags.

• Animals often confuse the bags for food and consume them, therefore blocking their digestive processes.

Hence statement 2 is correct.

• Plastic bags when used to keep food release toxic chemicals into them, which directly harm us and our digestive system.

• Burning of plastic bags releases a lot of greenhouse gases which harms the environment as well as our health.

• By law, shopkeepers are restricted from using plastic bags, instead, they are bags by law.

Hence the statement 1, 3, and 4 are incorrect.

Q60. Answer: (c) -3D

The correct answer is '-3D'.

Key-points:

• Converging lens has positive focal length f1 = 50 cm

• Diverging lens has negative focal length f2 = -20 cm

• The focus of the combination of two lenses is given by

1/f=1/f1+1/f2

1/f=1/50+1/(-20)

f=100/(-3)

• The power of any lens is given by P=100/f

• P = -3 D

Q61. Answer: (b) I^2R t

The correct answer is 'I2R t'.

Key-points:

• Generally

Energy produced = Power × Time

• Heat energy = Electrical Power × time

= P × t

= VI × t

H = VIt

• By Ohm's law (V = IR)we can write

H = IR × It

H = I2R t

Additional information:

• Ohm's Law

• Ohm’s law states that the voltage across a conductor is directly proportional to the current flowing through it, provided all physical conditions and temperatures remain constant.

• V = IR

Q62. Answer: (d) Ministry of Civil Aviation

The correct answer is Ministry of Civil Aviation.

Key Points

• The Minister of Civil Aviation Shri Jyotiraditya M. Scindia launched National Air Sport Policy 2022 (NASP 2022).

• NASP 2022 lays out the vision of making India one of the top sports nations by 2030, by providing a safe, affordable, accessible, enjoyable and sustainable air sports ecosystem in India.

• The NASP 2022, is a step toward providing safe and affordable sustainable air sports.

• It has been drafted based on the inputs received from policymakers, air sports practitioners and the public at large and will ensure the establishment of good quality infrastructure, equipment, instructors and services.

• The main ministry in India for developing national policies and initiatives for the growth and regulation of civil aviation is the Ministry of Civil Aviation.

• It develops and puts into action plans for the country's civil aviation industry's orderly expansion.

• Its duties also include controlling airport infrastructure, managing air traffic, and transporting people and things by air.

Additional Information

• Ministry of Defence:

• India's defence, in its entirety, is the responsibility of the Indian government.

• The President has full authority over the armed forces.

• The Cabinet is in charge of overseeing national defence.

• This is done through the Ministry of Defence, which gives the Armed Forces the resources and the policy framework they need to carry out their duties in the context of national defence.

• The Ministry of Defence is led by the Defence Minister.

• The current Defence Minister of India is Rajnath Singh.

• Ministry of Culture:

• India's unique culture serves as a metaphor for the nation's diversity.

• The Ministry of Culture's mandate centres on tasks like protecting and promoting all forms of art and culture, both tangible and ethereal, as well as preserving and conserving our cultural legacy.

• The Ministry's job is to establish and maintain strategies for ensuring that people's aesthetic and creative sensitivities are alive and well.

• The current Minister of Culture is G. Kishan Reddy.

• Ministry of Youth Affairs and Sports:

• Throughout the year, the Minister of State (Independent Charge) for Youth Affairs & Sports provided overall leadership to the Ministry of Youth Affairs & Sports.

• The Department of Youth Affairs and the Department of Sports in India are both under the control of the Ministry of Youth Affairs

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and Sports, a division of the Indian government.

• The current Minister of Youth Affairs and Sports is Anurag Thakur, who is succeeded by Nisith Pramanik as his deputy.

Q63. Answer: (a) Self-combining capacity to form a long chain of atoms

The correct answer is 'Self-combining capacity to form a long chain of atoms'.

Key-points:

• Catenation:

• Catenation refers to the property of self–linking of atoms of an element.

• It depends upon bond energy, size, and bond length between the atoms of the same element.

• Thus, the element capable of forming stronger and shorter self – linking bonds will have the best catenation property.

Additional information:

• Property of occurring as different allotropes

• The property of some metals and alloys that exhibit different crystalline lattices at different temperatures is called allotropy.

• Self-degeneration property

• Degeneracy is thus a relational property that requires comparing the behavior of two or more components.

• Property of carbon to give combustive nature to its compounds

• When carbon burns in the presence of oxygen, it produces heat and light.

• This process of burning carbon and its compounds to release energy is known as combustion.

Q64. Answer: (a) Used to generate electricity in thermal plants and are cost effective

The correct answer is Used to generate electricity in thermal plants and are cost effective.

Key Points

• Fossil Fuel:

• There are three major types of fossil fuels, they are coal, petroleum and natural gas.

• Coal is a hard substance which is black in colour and composed of carbon, hydrogen, nitrogen, oxygen and sulphur.

Additional Information

• Advantages of Fossil Fuel

• Fossil fuels have the ability to create a huge amount of electricity at a single location.

• Moreover, they are found easily and also cost-effective.

• Further, we can easily transport oil and gas through pipelines.

• Over time, they have become safer. Besides, most of our infrastructure is designed to operate through the use of fossil fuels.

• Finally, even though it is a finite resource, it is available in abundance.

• Disadvantages of Fossil Fuel

• They emit carbon dioxide, a major greenhouse gas, on burning, which is also a major source of pollution and contributes to global warming.

• When we burn coal and oil, it releases sulfur dioxide that can cause breathing problems and acid rain.

• Most importantly, we cannot replace them.

• Further, when we burn them, they make the environment more acidic due release of nitrogen and sulphur.

• Being nonrenewable energy resources, their limited supply means we will run out eventually.

• Moreover, harvesting them results in fatal diseases like coal miners suffer from Black Lung Disease sometimes and natural gas drillers are exposed to chemicals which is also dangerous health-wise.

Q65. Answer: (a) • and ×

Given:

3 - 6 ÷ 9 + 6 × 2 = 6

Calculation:

By option Method:

Option I: After interchanging - and ×

=> 3 × 6 ÷ 9 + 6 - 2 = 6

=> 2 + 6 - 2 = 6

=> 6 = 6

This is correct the equation.

Option II: After interchanging ÷ and +
=> 3 - 6 + 9 ÷ 6 × 2 = 6
=> 3 - 6 + 3 = 6
=> 0 ≠ 6
This is not correct the equation.
Option III: After interchanging + and ×
=> 3 - 6 ÷ 9 × 6 + 2 = 6
=> 3 - 4 + 2 = 6
=> 1 ≠ 6
This is not correct the equation.
Option IV: After interchanging ÷ and ×
=> 3 - 6 x 9 + 6 ÷ 2 = 6
=> 3 - 0.66 + 3 = 6
=> 5.33 ≠ 6
This is not correct the equation.
Therefore Interchanges (-, x) would make the given equation correct.

Q66. Answer: (d) 41

• The shaded part represents the people prefer salads but NOT stew.
• The number representing the people prefer salads but NOT stew = 29 + 12 = 41
Hence, '41' is the correct answer.

Q67. Answer: (c) 27

Shortcut Trick
Sum of digits of the number = (Sum of number and its reverse) ÷ 11 = 99 ÷ 11 = 9.
Difference between the digits is given as 5.
Larger digit = (Sum + Difference) ÷ 2 = (9 + 5) ÷ 2 = 7.
Smaller digit = (Sum − Difference) ÷ 2 = (9 − 5) ÷ 2 = 2.
Possible two-digit numbers are 72 or 27.
Therefore The correct answer is 27.
Alternate Method
Given: Sum of number and its reverse = 99, Difference between digits = 5.
Formula Used: Let the two-digit number be 10x + y, where x is the tens digit and y is the units digit.
=> (10x + y) + (10y + x) = 99
=> 11x + 11y = 99
=> 11(x + y) = 99
=> x + y = 9 ... (Eq. 1)
=> Case 1: x − y = 5 ... (Eq. 2)
=> Adding (Eq. 1) and (Eq. 2): 2x = 14 => x = 7, y = 2. Number = 72.
=> Case 2: y − x = 5 ... (Eq. 3)
=> Adding (Eq. 1) and (Eq. 3): 2y = 14 => y = 7, x = 2. Number = 27.
Therefore The correct answer is 27.
Additional Information
Sum of Reversed Digits Rule
The sum of a 2-digit number and the number formed by reversing its digits is always 11 × (sum of its digits).
Difference of Reversed Digits Rule
The difference between a 2-digit number and the number formed by reversing its digits is always 9 × (difference of its digits).
Linear Equations for Digits
When the sum (S) and difference (D) of two values are known, the values are (S+D)÷2 and (S−D)÷2.

Q68. Answer: (d) Electric fuse

The correct answer is 'Electric fuse'.
Key Points

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• A fuse consists of a piece of wire made of a metal or an alloy of an appropriate melting point, for example, aluminum, copper, iron, lead etc.
• If a current larger than the specified value flows through the circuit, the temperature of the fuse wire increases.
• This melts the fuse wire and breaks the circuit.

Additional Information
• Loudspeaker
• Every amplifier (speaker) has an electrical current.
• When the current is changing, it produces a magnetic field.
• To make the cone (or panel) of the speaker move, magnets are used to create an opposing magnetic field which creates vibrations.
• These vibrations are the sound we hear.
• Ammeter and Voltmeter
• When an electric current passes through the coil, the electromagnetic field created around it reacts against the permanent magnetic field producing a deflecting torque that causes it to move.
• A pointer or needle attached to the coil indicates the amount of deflection.

Q69. Answer: (d) 5 days

Shortcut Trick
Since 8 men + 6 women and 6 men + 8 women take the same 5 days, their total efficiency is equal.
Total persons in Case 1 = 8 + 6 = 14 persons | Total persons in Case 2 = 6 + 8 = 14 persons.
Since 14 persons take 5 days, then 7 men + 7 women (which is also 14 persons) will take the same time.
Therefore The correct answer is 5 days.
Alternate Method
Given: Case 1 = (8M + 6W) × 5 | Case 2 = (6M + 8W) × 5
Formula Used: Total Work = Efficiency × Time

Group	Days	Total Work	Efficiency
8M + 6W	5	(8M + 6W) × 5	8M + 6W
6M + 8W	5	6M + 8W	

=> (8M + 6W) × 5 = (6M + 8W) × 5
=> 8M + 6W = 6M + 8W
=> 2M = 2W → 1 Man = 1 Woman
=> Total Work = (8M + 6M) × 5 = 14M × 5 = 70M units
=> Efficiency of (7M + 7W) = 7M + 7M = 14M units/day
=> Time required = 70M ÷ 14M = 5 days
Therefore The correct answer is 5 days.
Additional Information
Man-Day Formula
M1D1H1/W1 = M2D2H2/W2, where M is number of workers, D is days, H is hours, and W is work done.
Efficiency and Time Relationship
Efficiency is inversely proportional to the time taken to complete a task. If efficiency doubles, time is halved.
Work & Wages
Wages are always distributed in the ratio of the work done by individuals, which is usually the ratio of their efficiencies.

Q70. Answer: (c) 1 and 14

Shortcut Trick
Convert the equation into standard form $x^2 - 15x + 14 = 0$.
Identify Sum of roots $(-b/a) = 15$ and Product of roots $(c/a) = 14$.
Check which option satisfies both conditions: 1 + 14 = 15 and 1 × 14 = 14.
Only the values 1 and 14 satisfy these conditions simultaneously.
Therefore The correct answer is 1 and 14.

Alternate Method

Given: $(x - 5)^2 = 5x + 11$

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

=> $(x - 5)^2 = 5x + 11$

=> $x^2 - 10x + 25 = 5x + 11$

=> $x^2 - 10x - 5x + 25 - 11 = 0$

=> $x^2 - 15x + 14 = 0$

=> $x^2 - 14x - x + 14 = 0$

=> $x(x - 14) - 1(x - 14) = 0$

=> $(x - 1)(x - 14) = 0$

=> $x = 1$ or $x = 14$

Therefore The correct answer is 1 and 14.

Additional Information

Quadratic Formula

For a quadratic equation $ax^2 + bx + c = 0$, the roots are given by $x = [-b \pm \sqrt{(b^2 - 4ac)}] / 2a$.

Nature of Roots

The discriminant $D = b^2 - 4ac$ determines the nature: if $D > 0$, roots are real and distinct; if $D = 0$, roots are real and equal; if $D < 0$, roots are imaginary.

Relation between Roots and Coefficients

If α and β are the roots, then sum $(\alpha + \beta) = -b/a$ and product $(\alpha\beta) = c/a$.

Q71. Answer: (b) 35 : 34

Shortcut Trick

Multiply the ratio terms directly by their respective percentage change factors.

New First Number = 5 × 140% = 7.0

New Second Number = 8 × 85% = 6.8

New Ratio = 7.0 : 6.8 → 70 : 68 = 35 : 34.

Therefore The correct answer is 35 : 34.

Alternate Method

Given:

Initial Ratio of two numbers = 5 : 8

Percentage Increase in first number = 40%

Percentage Decrease in second number = 15%

Formula Used:

New Value = Original Value × (100 ± Change%)/100

Calculations:

Let the two numbers be 50x and 80x respectively.

=> First number after 40% increase = 50x × (140/100) = 70x

=> Second number after 15% decrease = 80x × (85/100) = 68x

=> New Ratio = 70x : 68x

=> New Ratio = 70 : 68

=> Dividing both terms by 2:

=> New Ratio = 35 : 34

Therefore The correct answer is 35 : 34.

Additional Information

Concept of Multiplier

For an increase of x%, multiply the base value by (1 + x/100). For a decrease of x%, multiply by (1 − x/100).

Simplifying Ratios

A ratio a : b remains unchanged if both terms are multiplied or divided by the same non-zero constant k.

Successive Percentage Change

If a value changes by a% and then by b%, the net change is [a + b + (a × b)/100]%.

Q72. Answer: (b) Pepsin

The correct answer is 'Pepsin'.

Key Points

• Gastric juice contains three substances: hydrochloric acid, enzyme pepsin, and mucus.

• Hydrochloric acid in the stomach is used to make the medium acidic to facilitate the action of the enzyme pepsin and to kill germs if any.

• Enzyme pepsin digests proteins and converts them into peptones.

Additional Information

• Trypsin

• Trypsin is an enzyme that is essential for your body to digest protein, a critical component for building and repairing tissue including bones, muscles, cartilage, skin, and blood.

• When combined with chymotrypsin, trypsin can help in injury recovery.

• Lipase

• Lipase is an enzyme the body uses to break down fats in food so they can be absorbed in the intestines.

• Lipase is produced in the pancreas, mouth, and stomach.

• Amylase

• Amylase is responsible for the breaking of the bonds in starches, polysaccharides, and complex carbohydrates into easier-to-absorb simple sugars.

• Salivary amylase is the first step in the chemical digestion of food.

Q73. Answer: (a) Ministry of AYUSH

The correct answer is 'Ministry of AYUSH'.

Key Points

• Prime Minister Shri Narendra Modi laid the foundation stone of the WHO Global Centre for Traditional Medicine (GCTM) in Jamnagar, Gujarat.

• A groundbreaking ceremony was attended by the Prime Minister of Mauritius Shri Pravind Kumar Jugnauth and Dr Tedros Ghebreyesus, Director-General, of the World Health Organization (WHO).

• The Ministry of Ayush and the World Health Organization (WHO) is establishing the world’s first and only Global Centre for Traditional Medicine (WHO GCTM) in Jamnagar, Gujarat.

• Speaking on this occasion the Prime Minister said, “The WHO Global Centre for Traditional Medicine is recognition of India's contribution and potential in this field.

• India’s traditional medicine system is not limited only to treatment.

• India takes this partnership as a huge responsibility for serving the entire humanity.”

Additional Information

• Ministry of Women and Child Development:

• The Department of Women and Child Development, Government of India, came into existence as a separate Ministry with effect from 30th January 2006, earlier since 1985 it was a Department under the Ministry of Human Resources Development.

• The Ministry was constituted with the prime intention of addressing gaps in State action for women and children to promote inter-Ministerial and inter-sectoral convergence to create gender-equitable and child-centred legislation, policies and programmes.

• Ministry of Health and Family Welfare:

• On August 7, 2014, vide extraordinary Gazette notification on Thursday, August 7, 2014, the Department of AIDS Control has been merged with the Department of Health & Family Welfare and is now known as National AIDS Control Organization (NACO).

• As per the amendment in the allocation of business rules vide the Cabinet secretariat’s Notification on December 8, 2014, the Department of AYUSH has been made Ministry of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy (AYUSH) with focused attention on the development of education and research in Ayurveda, Yoga & naturopathy, Unani, Siddha and Homoeopathy systems.

• Now Ministry of Health and Family Welfare comprises the following two departments, each of which is headed by a Secretary to the Government of India.

• Ministry of Cooperation:

• The Union Ministry of Cooperation is a ministry under the Government of India which was formed in July 2021.

• The ministry provides a separate administrative, legal and policy framework for strengthening the cooperative movement in the country.

• The ministry's creation was announced on 6 July 2021 along with its vision statement of "Sahkar se Samriddhi".

• Before the creation of this ministry, the objectives of this ministry were looked after by the Ministry of Agriculture.

Q74. Answer: (a) either concave lens or a convex mirror

The correct answer is "either a concave lens or a concave mirror".

Key Points

• In contrast to convex mirrors and convex lenses, concave mirrors and concave lenses produce larger pictures.

• A hollow spherical can be made into a mirror by cutting it into pieces, painting the exterior of each piece, and then polishing the interior to reflect light.

• A convex lens, which is thicker in the center and gets thinner as we move toward the edges, condenses a straight beam of light.

• Images are magnified using a concave mirror and convex lens.

Additional Information

• A concave lens is a lens that bends a direct light beam away from the source into a cropped, upright virtual image.

• Both actual and virtual images can be created using it. At least one internal surface of concave lenses is curved.

• Since it is rounded at the center and bulges outward at the borders, a concave lens is also known as a diverging lens because it causes the light to diverge.

• Since they make distant objects appear smaller than they actually are, they are used to cure myopia.

Q75. Answer: (c) Three-tier

The correct answer is Three-tier.

Key Points

• Balwant Rai Mehta Committee was appointed to examine the working of the community development program and the national extension service.

• Balwant Rai Mehta Committee was appointed in 1957.

• Balwant Rai Mehta was the chairman of this committee.

• The Balwant Rai Mehta Committee recommended establishing a three-tier Panchayati Raj structure.

• The Balwant Rai Mehta committee suggested that the structure of the Panchayati Raj should consist of the village, the block, and the district level.

• Gram Panchayat at the village level.

• Panchayat Samiti at the block level.

• Zila Parishad at the district level.

• The National Development Council approved the committee's recommendations in 1958.

Additional Information

• Other committees related to Panchayati raj:

• Ashok Mehta Committee:

• In December 1977, the Janata Government appointed a committee on Panchayati raj institutions under the chairmanship of Ashok Mehta.

• It submitted its report in August 1978 and made 132 recommendations to revive and strengthen the declining Panchayati raj system in the country.

• Due to the collapse of the Janata Government before the completion of its term, no action could be taken on the recommendations of the Ashok Mehta committee at the central level.

• However, the three states of Karnataka, West Bengal and Andhra Pradesh took steps to revitalise the Panchayati raj, keeping in view some of the recommendations of the Ashok Mehta Committee.

• L. M. Singhvi Committee-

• In 1986, the Rajiv Gandhi government appointed a committee to prepare a concept paper on ‘Revitalisation of Panchayati Raj Institutions for Democracy and Development’ under the chairmanship of L M Singhvi.

• G. V. K. Rao Committee:

• The Committee to review the existing Administrative Arrangements for Rural Development and Poverty Alleviation Programmes under the chairmanship of G.V.K. Rao was appointed by the Planning Commission in 1985.

Q76. Answer: (d) Roti, pulses, vegetables

The correct answer is "Roti, pulses, vegetables".

Key Points

• A healthy diet is one that enhances or maintains general health.

• The body receives the key nutrients it needs from a balanced diet, including proper amounts of hydration, macronutrients like protein, micronutrients like vitamins, and fibre.

• Fruits, vegetables, whole grains, and little to no processed food or beverages with added sugar can all be found in a healthy diet.

• A combination of plant-based and animal-based foods can satisfy dietary needs, though vegans must obtain their vitamin B12 from sources other than plants.

Additional Information

• By consuming roughly the same number of calories that your body requires, you can maintain a healthy weight.

• Limit your fat intake to no more than 30% of your total daily calories, and choose unsaturated fats over saturated fats. Avoid trans fats.

• Consume 400 grams or more of fruits and vegetables every day (not counting potatoes, sweet potatoes, cassava and other starchy roots). Nuts, whole grains, and legumes (such as lentils and beans) are also components of a balanced diet.

Q77. Answer: (d) 6

Given:

621, 443, 227, 316, 625, 118, 231

By applying operation of,

5 is added to the digit in ten's place of each number and 1 is subtracted from the digit in unit's place of each number. We got,

Here, 6 digit will be repeated the greatest number of times (Five times) in the transformed number series thus formed.

Hence, '6' is the correct answer.

Q78. Answer: (b) Both arguments I and II strengthen the statement

Statement:

Use of re-usable cloth bags for shopping will help in reducing pollution caused by indiscriminate use of plastic bags.

Arguments:

I. The government has banned the use of single-use plastic from 1 July 2022. → strengthen the statement

• Banning of single-use plastic help in reducing pollution. As It control proliferation of plastic bags. So the Argument I is supporting the statement. Hence it is True and strengthen the statement.

II. Cloth bags are eco-friendly since they are re-usable and can be made from scrap fabric that would otherwise go to landfills. → strengthen the statement

• As reusable Cloth bags which biodegrade in very less time that can break down naturally and there disposition also very easy as ether go for landfill or fire burning. So the Argument II is supporting the statement. Hence it is True and strengthen the statement.

Hence, Both arguments I and II strengthen the statement.

Q79. Answer: (b) Mumbai

The correct answer is Mumbai.

Key Points

• Mahindra & Mahindra Financial Services Limited (MMFSL) is an Indian rural non-banking financial company headquartered in Mumbai.

• It is amongst the top tractor financers in India, with 1000+ offices across the country.

• Mahindra Finance started on 1 January 1991, as Maxi Motors Financial Services Limited.

• They received the certificate of commencement of business on 19 February 1991.

• On 3 November 1992, Mahindra Finance changed its name to Mahindra & Mahindra Financial Services Limited.

• Mahindra Finance is registered with the Reserve Bank of India as an asset finance, deposit-taking NBFC.

Additional Information

• The National Institute for the Visually Handicapped(NIVH) is situated at Dehradun, Uttarakhand.

• This organization works under the administrative control of the Department of Empowerment of Persons with Disabilities (Divyangjan), Ministry of Social Justice and Empowerment, Government of India.

• NIVH is engaged in training visually challenged persons and is also engaged in the production of Braille literature, Aids, and Appliances for the visually handicapped.

• National Institute for Orthopaedically Handicapped, Kolkata.

• Providing services to the Orthopaedically Handicapped population under the training of Physiotherapists, Occupational Therapists, Orthotists & Prosthetists, Employment & Placement Officers, and Vocational Counsellor, etc.

• Conduct and funded research in all aspects related to the rehabilitation of the Orthopaedically handicapped.

• The National Institute of Mentally Handicapped is located in Hyderabad.

• The Institute was established in 1978.

• The objective of the institute is "Human Resource Development to develop manpower for providing services to the Orthopaedically Handicapped population".

• The Ali Yavar Jung National Institute for Hearing Handicapped, in Mumbai, has its regional centres in New Delhi, Kolkata, Hyderabad and Bhubaneswar.

• These centres will be able to give details about the programmes available in the country. The Rehabilitation Council of India in New Delhi also can be contacted to get the details.

• The Welfare departments in the states and the Rehabilitation Centres run by the states can be contacted to find out about the facilities available in a particular area.

Q80. Answer: (c) 60°, 45°, 75°

Shortcut Trick

Sum of ratio parts = 4 + 3 + 5 = 12 units.

Total sum of angles in a triangle = 180°.

1 unit = 180° ÷ 12 = 15°.

Angles = (4 × 15°), (3 × 15°), (5 × 15°) = 60°, 45°, 75°.

Therefore The correct answer is 60°, 45°, 75°.

Alternate Method

Given: The angles of triangle ABC are in the ratio 4 : 3 : 5.

Formula Used: Sum of all interior angles of a triangle = 180°.

Let the three angles be 4x, 3x, and 5x.

=> 4x + 3x + 5x = 180°

=> 12x = 180°

=> x = 180° ÷ 12

=> x = 15°

=> First angle = 4 × 15° = 60°

=> Second angle = 3 × 15° = 45°

=> Third angle = 5 × 15° = 75°

Therefore The correct answer is 60°, 45°, 75°.

Additional Information

Angle Sum Property

The sum of all interior angles of any triangle is always 180&

Q81. Answer: (b) Translocation

The correct answer is "Translocation".

Key Points

• Translocation is the transport of substances within the plant from leaves to other tissues.

• While photosynthesis allows plants to manufacture carbohydrates (sugars) in their leaves, other organic and inorganic substances are also needed by nonphotosynthetic plant components.

• Because of this, nutrients are moved from sources (areas with a surplus of carbohydrates, typically mature leaves) to sinks (regions where the carbohydrate is needed).

Additional Information

• Roots, flowers, fruits, stems, and emerging leaves are a few significant sinks.

• As sources later, when they are roughly halfway developed, leaves are particularly fascinating because they are sinks while they are young.

Q82. Answer: (b) 63879

Given:

Letter	B	L	M	H	Y	O	C	E	N
Code	4	6	8	0	1	3	5	7	9

Rule no	Conditions	Results
1.	the first element is a vowel and the last a consonant	the codes for these two (the first and the last elements) are to be interchanged.
2.	the first element is a consonant and the last a vowel	the first and last elements are to be coded as 2

3.	both the second and the fourth elements are vowels	the fourth element is to be coded as the code for the third element and vice-versa.

Given code - LEMON

Here, the Rule number 3 is applied in the given code. i.e. If both the second and the fourth elements are vowels, the fourth element is to be coded as the code for the third element and vice-versa.

Hence, code for LEMON is “63879”.

Q83. Answer: (b) x2 - x - 6 = 0

Shortcut Trick

A quadratic equation with roots α and β is formed as: x^2 − (Sum of Roots)x + (Product of Roots) = 0.

Sum of roots = 3 + (−2) = 1.

Product of roots = 3 × (−2) = −6.

Plugging in the values: x^2 − (1)x + (−6) = 0 => x^2 − x − 6 = 0.

Therefore The correct answer is x^2 − x − 6 = 0.

Alternate Method

Given: The roots of the required quadratic equation are 3 and −2.

Method: If x = 3 and x = −2 are the roots, then (x − 3) and (x + 2) must be the linear factors of the quadratic expression.

=> (x − 3)(x + 2) = 0

=> x(x + 2) − 3(x + 2) = 0

=> x^2 + 2x − 3x − 6 = 0

=> x^2 − x − 6 = 0

Therefore The correct answer is x^2 − x − 6 = 0.

Additional Information

Standard Quadratic Form

The general form of a quadratic equation is ax^2 + bx + c = 0, where a, b, and c are constants and a ≠ 0.

Relationship between Coefficients and Roots

For the equation ax^2 + bx + c = 0, Sum of roots = −b/a and Product of roots = c/a.

Discriminant and Nature of Roots

The term D = b^2 − 4ac determines the nature of roots: if D > 0, roots are real and distinct; if D = 0, roots are real and equal; if D < 0, roots are imaginary.

Q84. Answer: (d) 3, L respectively

Given:

L E A P K X O Z A E Y W U D O A D S L Y R K E V U L

The logic follows here is as,

• Vowel → Consonant → Vowel

=> Y repeated = 2 times

=> D repeated = 2 times

=> K repeated = 2 times

=> L repeated = 3 times

Here, consonants are immediately preceded and immediately followed by a vowel, and consonant is repeated the most number of times in the series are 3, L respectively.

Hence, 'Option 4' is the correct answer.

Q85. Answer: (b) 12

The logic follows here is as,

Addition of digits of first number = second number

Hence, '12' is the correct answer.

Q86. Answer: (d) D > B > E > C > A

The correct answer is 'D > B > E > C > A'.

Key Points

• A modern periodic table arranges the elements in increasing order of their atomic numbers and groups atoms with similar

properties in the same vertical column (Figure).

• Each box represents an element and contains its atomic number, symbol, average atomic mass, and (sometimes) name.

• The elements are arranged in seven horizontal rows, called periods or series, and 18 vertical columns, called groups.

Now here,

Group 15	Group 16	Group 17
Nitrogen (A)	Oxygen (B)	•
•	•	•
•	•	Bromine (C)
Antimony (D)	Tellurium(E)	•

So the order is,

Tellurium > Antimony > Bromine > Oxygen > Nitrogen.

Q87. Answer: (a) Assam

The correct answer is 'Assam'.

Key Points

• Powa Mecca Hajo Assam :

• The Muslim place of pilgrimage in Hajo is Powa Mecca Mosque.

• The name of the mosque means one-quarter of Mecca, which is the holiest city for Muslims situated in Arab.

• It is said that by offering prayers in this mosque, devotees gain one-fourth of the good grace that they would have gotten in the real Mecca.

• On the top of Garurachal Hill, the Powa Mecca mosque stands.

• This is the tomb of the pioneer of the Muslim religion in this area, Pir Ghiyasuddin Auliya.

• In 1657 AD, Sujauddin Muhammad Shah built this mosque. At that time Shah Jahan was the ruling Mughal emperor of India.

• The mosque is situated on the hill over the banks of the Brahmaputra River and is only 24 kms away from Guwahati.

Additional Information

• Important Hills Station:

• Leh Ladakh – Land of the High Passes.

• Nainital, Uttarakhand – The Hill Station of Lakes.

• Manali, Himachal Pradesh – Valley of the Gods.

• Mussoorie, Uttarakhand – The Queen of the Hill Stations.

• Gulmarg, Jammu and Kashmir – Popular Hill Station and Skiing Destination.

• Darjeeling, West Bengal - Land of the Celestial Thunderbolt.

Q88. Answer: (c) (2/3) and 1

The correct answer ' (2/3 and 1) '.

Key Points

• According to Ohm's Law, the potential drop (V) across a resistor is given by V = IR, where I is the current passing through the resistor and R is its resistance.

• For resistor A:

• V1 = I1 * R1 = I1 * 8 Ω

• For resistor B:

• V2 = I2 * R2 = I2 * 12 Ω

• Currents through resistors:

• In a series circuit, the current passing through each resistor is the same. Therefore, I1 = I2 = I.

• Battery voltage:

• The total voltage provided by the battery is equal to the sum of the potential drops across the resistors in a series circuit.

• V_total = V1 + V2

• 6 V = V1 + V2

• Now, we can use these equations to find the ratios (V1/V2) and (I1/I2):

• (V1/V2) = (I1 * 8 Ω) / (I2 * 12 Ω)

• (I1/I2) = I1 / I2 (since I1 = I2 = I)

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• Let's substitute I2 with I1 in the first equation:
• (V1/V2) = (I1 * 8 Ω) / (I1 * 12 Ω)
• (V1/V2) = 8 Ω / 12 Ω
• (V1/V2) = 2/3
• (I1/I2) = I1 / I2 = 1 (since I1 = I2 = I)
• Therefore, (V1/V2) = 2/3 and (I1/I2) = 1.

Q89. Answer: (c) Montane forests

The correct answer is 'Montane forests'.

Key Points

• Montane forests:
• Montane forests are found on mountain slopes. Montane Forest is a type of mountain ecosystem.
• It is influenced by the colder climate at moderate elevations.
• Dense forests are common in these areas.
• Rainfall and a temperate climate cause natural vegetation to change in the Mountain Forest.
• The forests found in the mountains are known as montane forests.
• Wet temperate forests are found between 1000 and 2000 metres in elevation.
• Temperate forests and grasslands give way to Alpine vegetation at high altitudes, generally more than 3,600 metres above sea level.
• Tibetan antelope, yak, spotted deer, wild sheep, snow leopard, squirrels, Kashmir stag, jackrabbit, Shaggy horned wild ibex, bear and rare red panda, sheep and goats with thick hair are common animals found in this forest.

Additional Information

• Mangrove Forests:
• A Mangrove is a small tree or shrub that grows along coastlines, taking root in salty sediments, often underwater.
• The word ‘mangrove’ may refer to the habitat as a whole or to the trees and shrubs in the mangrove swamp.
• Mangroves are flowering trees, belonging to the families Rhizophoraceae, Acanthaceae, Lythraceae, Combretaceae, and Arecaceae.
• The major mangroves in India are found at:
• Sundarban Groves.
• Mahanadi Mangroves.
• Krishna Godavari Mangroves.
• Cauvery Deltaic Mangroves.
• Krishan-Godavari Mangrove.
• Andaman- Nicobar Mangrove.
• Tropical Deciduous Forests:
• Tropical Deciduous Forests are one of the five types of natural vegetation found in India.
• Being a tropical country (a country that lies in the zone between the Tropic of Cancer and the Tropic of Capricorn), the tropical deciduous forest is the most widespread forest in India, around 65.6% of the total forest is covered in tropical deciduous forests.
• On the basis of the availability of precipitation, the tropical deciduous forests in India are classified into two types:
• moist deciduous forests
• dry deciduous forests.
• The trees and shrubs of the tropical deciduous forest in India shed their leaves during the dry season (mostly in autumn) in order to conserve water.
• In India, the tropical deciduous forests are found: Madhya Pradesh, Uttar Pradesh, Odisha, Chhattisgarh, Jharkhand, and, Some parts of Maharashtra.
• Thorn Forests:
• The trees are low (6 to 10 metres maximum) and widely scatteredly distributed. Acacias and Euphorbias are very prominent flora.
• Rajasthan, southwestern Punjab, western Haryana, Kachchh and neighbouring parts of Saurashtra.
• Here they degenerate into desert type in the Thar desert.
• Such forests also rised on the leeside of the Western Ghats and expand in large areas of Maharashtra, Karnataka, Telangana, Andhra Pradesh and Tamil Nadu.
• The important flora species are neem, babul, cactii, etc.

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Q90. Answer: (b) 3

Given:

6x+4 = 67

Concept used:

If x^a = x^b

Then a=b

Calculations:

6x+4 = 67

x+4 = 7

x = 7 - 4

x = 3

Thus the correct option is '3'.

Q91. Answer: (d) William Carey

The correct answer is William carey.

Key Points

• Serampore Mission (1800-1845):

• It was India's first Christian missionary organization.

• William Carey and his two associates established this mission on 10 January 1800.

• The Mission started preaching the message of Jesus from two places in the Hughli district.

• The first Catholic Church in this district was established at Bandel in 1599. About two hundred years later a Protestant Church was built in Serampore (1800).

• William Carey established this Church and the mission on 17 August 1761.

• It was through his initiative that the Baptist Missionary Society was formed. On 24 April 1800, the Serampore Mission Church was inaugurated.

• Carey became the Chief Priest of the Church, while Marshman and Ward were made Assistant Priests.

• This Mission was self-supportive.

• The cost of the missionary activities was borne by Joshua Marshman, William Ward, and William Carey from their own earnings; Marshman from the schools, Ward from the Press, and Carey from his teaching job at Fort William College.

Q92. Answer: (d) 1437.33 cm3

Shortcut Trick

Internal radius r = External radius − Thickness = 9 − 2 = 7 cm.

Capacity = (4/3) × (22/7) × 7^3 = (4/3) × 22 × 49.

Capacity = 4312 ÷ 3 = 1437.33 cm^3.

Therefore The correct answer is 1437.33 cm^3.

Alternate Method

Given:

External radius (R) = 9 cm

Thickness (t) = 2 cm

Formula Used:

Internal radius (r) = R − t

Volume of Sphere = $(4/3)\pi r^3$

Calculations:

=> Internal radius (r) = 9 − 2 = 7 cm

=> Capacity = (4/3) × (22/7) × 7 × 7 × 7

=> Capacity = (4/3) × 22 × 1 × 49

=> Capacity = (88 × 49) ÷ 3

=> Capacity = 4312 ÷ 3

=> Capacity ≈ 1437.333...

Therefore The correct answer is 1437.33 cm^3.

Additional Information

Volume of a Hollow Sphere

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The material volume of a hollow sphere is given by $V = (4/3)\pi(R^3 - r^3)$, where R is external and r is internal radius.

Surface Area of a Sphere

The total surface area of a solid sphere is $4\pi r^2$.

Volume of a Hemisphere

The capacity of a hemispherical bowl is exactly half of a sphere: $V = (2/3)\pi r^3$.

Q93. Answer: (a) Rs. 575

Shortcut Trick

Total Marked Price = 20 × 750 = Rs. 15,000.

Successive Discounts: First 20% then flat Rs. 500.

Price after 20% discount = 15,000 × (80 ÷ 100) = Rs. 12,000.

Final Total SP = 12,000 − 500 = Rs. 11,500.

Final SP per shirt = 11,500 ÷ 20 = Rs. 575.

Therefore The correct answer is Rs. 575.

Alternate Method

Given → Quantity = 20, Marked Price (MP) per unit = Rs. 750, Percentage Discount = 20%, Cash Discount = Rs. 500.

Formulas: Total MP = MP per unit × Quantity | SP = MP × (100 − D%) ÷ 100 | Final SP = SP after % discount − Flat Discount.

=> Total MP = 20 × 750 = Rs. 15,000.

=> SP after 20% discount = 15,000 − (20% of 15,000) = 15,000 − 3,000 = Rs. 12,000.

=> Final Total SP after Rs. 500 cash discount = 12,000 − 500 = Rs. 11,500.

=> Final SP per shirt = 11,500 ÷ 20 = Rs. 575.

Therefore The correct answer is Rs. 575.

Additional Information

Marked Price & Selling Price

Marked price is the price printed on the label. Discount is always calculated on the Marked Price unless stated otherwise. SP = MP − Discount.

Successive Discounts

When multiple discounts are applied, the second discount is applied to the value obtained after the first discount. In this case, a percentage discount was followed by a flat cash discount.

Q94. Answer: (a) Only iii

The correct answer is 'Only iii'.

Key Points

• Sodium hydroxide is a highly versatile substance and is a co-product of chlorine production.

• It is also known as caustic soda. It is represented as NaOH.

• It is one of the common alkalis or bases.

• It is used for various purposes in daily life, as it is a strong base.

Additional Information

• Uses of sodium hydroxide:

• It is used in the manufacturing of detergents and soaps.

• It is used in the production of bleach-like chlorine.

• It is used in drain cleaners.

• It is used in the removal of heavy metals from the water by the municipal water treatment facility.

• It is used in food preservatives to prevent bacteria and mould growth.

• It is used for canning.

• It is used in papermaking and paper recycling.

Q95. Answer: (a) 21

Decoding the information,

Sign	A	B	C	D
Means	×	•	•	÷

Given:

(102 D 17) B (5 A 3)

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

= (102 ÷ 17) + (5 x 3)

= 6 + (5 x 3)

= 6 + 15

= 21

Hence, “21” is the correct answer.

Q96. Answer: (c) Mode B - Mode A = 3 median A

Shortcut Trick

The empirical relation is Mode = 3 Median − 2 Mean.

Since the Mean is the same for both sets, the difference in Modes depends only on the difference in Medians.

Difference in Modes = 3 × (Difference in Medians) − 2 × (Difference in Means)

Mode B − Mode A = 3 × (Median B − Median A) − 0

Mode B − Mode A = 3 × (2 Median A − Median A) = 3 Median A

Therefore The correct answer is Mode B − Mode A = 3 median A.

Alternate Method

Given:

Mean A = Mean B = X

Median B = 2 × Median A

Formula used: Mode = 3 Median − 2 Mean

=> Mode A = 3 Median A − 2X

=> Mode B = 3 Median B − 2X

=> Substitute Median B = 2 Median A in the equation for Mode B:

=> Mode B = 3(2 Median A) − 2X = 6 Median A − 2X

=> Subtracting Mode A from Mode B:

=> Mode B − Mode A = (6 Median A − 2X) − (3 Median A − 2X)

=> Mode B − Mode A = 6 Median A − 3 Median A − 2X + 2X

=> Mode B − Mode A = 3 Median A

Therefore The correct answer is Mode B − Mode A = 3 median A.

Additional Information

Empirical Relationship

For a moderately skewed distribution, the relationship between measures of central tendency is given by: Mode = 3 Median − 2 Mean.

Symmetric Distribution

In a perfectly symmetrical distribution (like the Normal Distribution), the Mean, Median, and Mode are all equal (Mean = Median = Mode).

Positively Skewed Distribution

In a positively skewed distribution, the values usually follow the order: Mean > Median > Mode.

Negatively Skewed Distribution

In a negatively skewed distribution, the values usually follow the order: Mean < Median < Mode.

Q97. Answer: (d) To storage organs of roots, seeds, fruits and growing regions

The correct answer is 'To storage organs of roots, seeds, fruits and growing regions'.

Key Points

• In plant transport system no heart, no blood, and no other circulatory system, but plants do need a transport system to move food, water, and minerals around.

• They use two different systems then xylem moves water and solutes from the roots to the leaves and phloem moves food substances from leaves to the rest of the plant (roots, seeds, fruits and growing regions), then phloem is the transporting system of food to the plants.

Additional Information

• The phloem transports food materials to the following parts of the plant:

• Roots:

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• Sugars and other organic compounds produced in the leaves are transported to the roots through the phloem.
• These nutrients are essential for the growth and metabolism of root tissues.
• Shoots and Stems:
• Phloem carries sugars and other organic substances from the leaves to the stems and shoots of the plant.
• These nutrients are utilized for growth, maintenance, and various metabolic processes in these plant parts.
• Flowers:
• Phloem transports sugars and other necessary compounds to the developing flowers.
• These nutrients are crucial for flower development and the production of seeds and fruits.
• Fruits:
• As the fruits develop, the phloem transports sugars from the leaves to the fruiting structures.
• This process ensures the availability of energy and nutrients for fruit growth and maturation.

Q98. Answer: (b) least, more

The correct answer is 'least, more'.

Key Points

• When light passes through a medium like fog or smoke, it interacts with particles present in the medium.
• This interaction can cause scattering of the light.
• The extent of scattering depends on the wavelength of the light.
• In general, shorter wavelengths (such as blue and violet) are scattered more easily than longer wavelengths (such as red and orange).
• This phenomenon is known as Rayleigh scattering.
• The scattering of shorter wavelengths is responsible for the blue color of the sky during the day.

Additional Information

• In the case of fog or smoke, which consist of tiny particles.
• The shorter wavelengths (blue and violet) are scattered more efficiently.
• While the longer wavelengths (red and orange) are scattered less.
• As a result, the red color appears less scattered and can penetrate through fog or smoke more effectively than other colors.

Q99. Answer: (d) 5038964

Given:

Letter/symbol	Y	T	V	R	I	G	E	A
Code	4	6	8	0	3	5	7	9

Rule no	Conditions	Results
1.	the first element is a vowel and the last, a consonant	the codes for these two (the first and the last elements) are to be interchanged.
2.	the first element is a consonant and the last a vowel	the first and last elements are to be coded as 2
3.	both the third and the fifth elements are vowels,	the fifth element is to be coded as the code for the third element and vice-versa

Given code - GRAVITY

Here the Rule number 3 is applied in the given code. i.e. If both the third and the fifth elements are vowels, the fifth element is to be coded as the code for the third element and vice-versa.

Hence, code for GRAVITY is “5038964”.

Q100. Answer: (a) Geomorphology

The correct answer is Geomorphology.

Key Points

• Geomorphology (study of earth’s form and structure):
• Geomorphology is the scientific study of the origin and evolution of topographic and bathymetric features created by physical, chemical or biological processes operating at or near Earth's surface.

• Geomorphologists seek to understand why landscapes look the way they do, to understand landform and terrain history and dynamics and to predict changes through a combination of field observations, physical experiments and numerical modeling.

Additional Information

• Branches in Physical Geography are numerous but they can be broadly categorized into five which are:

• Biogeography (study of plant and animal life and processes)

• Climatology (study of long-term weather called climate and its effects on life)

• Hydrology (study of all forms of water underground, over-ground and in the cloud)

• Pedology (the study of soils)

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