RRC Group D Previous Year Paper 61 (Held On: 26 Sept 2018 Shift 3)

RRB Group D • 2018 • 100 questions • 90 minutes • Answer key and solutions

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CBT

Q1. When sodium sulphate solution is mixed with barium chloride solution, then

(a) there is no reaction
(b) sulfur dioxide is formed
(c) barium chloride is formed
(d) barium sulfate is formed

Q2. 52 ÷ [36 – {24 – (32 – 54 ÷ 9 × 3)}] = ?

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

Q3. What are the special features of the following group of elements?

1. All these elements are metals
2. All these elements react with water to form hydrogen gas
3. All these elements have a valency 1

(a) Halogen group
(b) Alkali metal group
(c) Alkaline earth metal group
(d) Alkali Metals and Halogen Groups

Q4. Janki and Mansi, working separately, can paint a wall in 45 and 72 days respectively. They started working together but Janki left the work 33 days before the completion of the work. In total, how many days did it take to complete the work?

(a) 49
(b) 48
(c) 46
(d) 47

Q5. Which of the following novels by Salman Rushdie was released in 2017?

(a) The Golden House
(b) The sellout
(c) The Satanic Verses
(d) Midnight children

Q6. Find the next number in the following series?

10, 30, 29, 49, _____

(a) 36
(b) 48

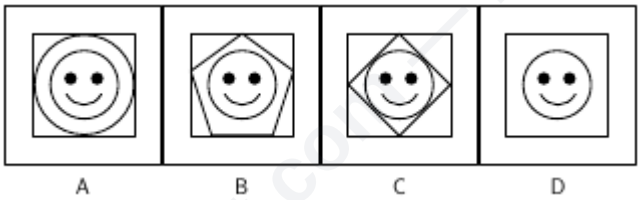
(c) 37
(d) 35

Q7. Find the next number in the following series?

320, 290, 260, _____

(a) 190
(b) 230
(c) 170
(d) 200

Q8. Identify the odd one out:



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

Q9. In a real sense, free fall only occurs in:

(a) Sea
(b) Vacuum
(c) Wind
(d) Atmosphere

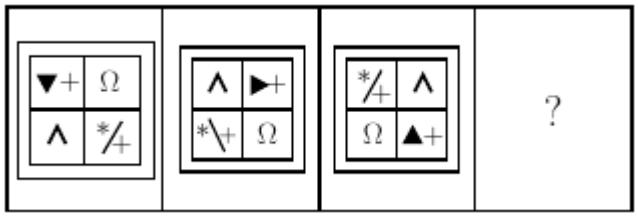
Q10. -7 [60 ÷ {6 - (-4)}] ÷ [(-2){19 - (-2) × (-6)}] = ?

(a) 0
(b) 2
(c) 1
(d) 3

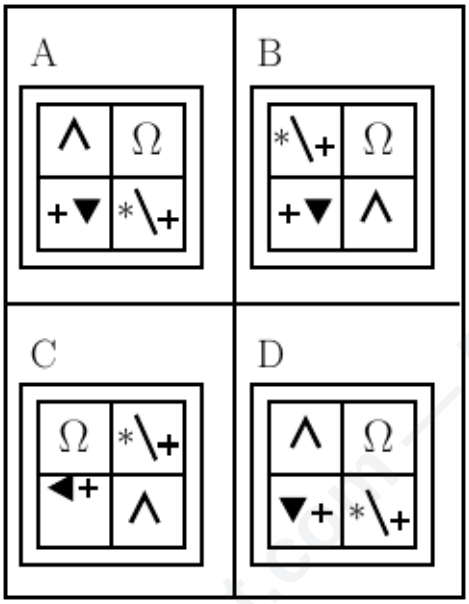
Q11. In a circuit resistors are connected in series, the value of current through the circuit is:

(a) remains the same
(b) increases
(c) decreases
(d) becomes half

Q12. Study the pattern of the following figures and decide which figure will be the next one.



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

Q13. Which the first film made in the dialect of Himachal has gained international recognition for the first time, winning the Best Feature Film award at the International Borrego Springs Film Festival in California, USA in the year 2017?

(a) Saaransh
(b) Samjhauta
(c) Samay
(d) Saanjh

Q14. Which of the following is India's indigenously designed and developed long-range subsonic cruise missile?

(a) Helena
(b) Pinaka
(c) Naag
(d) Nirbhay

Q15. Who was honored with the Dadasaheb Phalke Award for the year 2016?

(a) K.J. Yesudas
(b) S.S. Rajamouli
(c) K. Vishwanath
(d) K. Bala Chander

Q16. The following statement is followed by two arguments. You have to decide which of the arguments are strong with respect to the statement.

Question:

Is there any solution to avoid noise pollution in urban areas?

Argument:

I. Yes, residential areas should be separated from commercial areas such as hotels, restaurants and wedding halls.

II. No, it is part and parcel of urbanization, we cannot escape it.

(a) Arguments I and II both are strong
(b) Only argument I is strong
(c) Only argument II is strong
(d) Neither argument I nor argument II is strong

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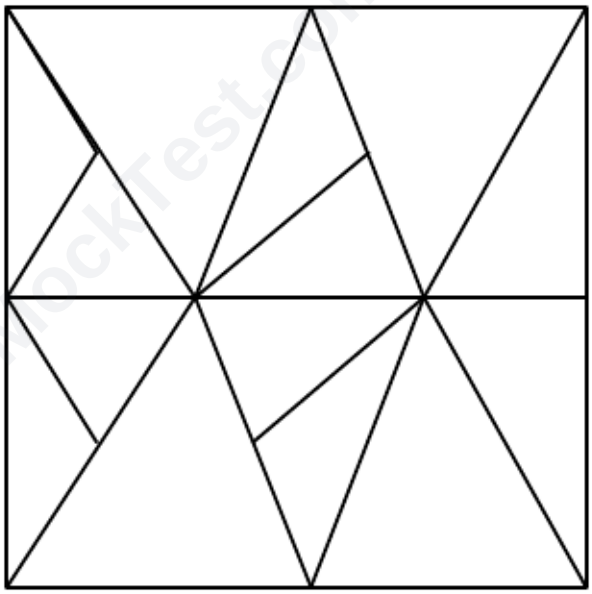
Q17. The mean score of a group of 12 members was 10 while the mean score of another group with n members was 12. If the combined average of both is 11.2 then what was the value of n?

(a) 18
(b) 30
(c) 16
(d) 24

Q18. Sharda is the granddaughter of Surya and Kiran is the only son of Surya, then how is Sharda related to Kiran?

(a) Aunt
(b) Daughter
(c) Mother
(d) Cousin Sister

Q19. How many triangles are there in this figure?



(a) 19
(b) 17
(c) 18
(d) 20

Q20. _____ is essential for the synthesis of thyroxine.

(a) Iron
(b) Iodine
(c) Sodium
(d) Calcium

Q21. What is the full form of FICCI?

(a) Federal Indian Chamber of Commerce
(b) Federation of Indian Chamber of Commerce and Industry
(c) Free India Chamber of Commerce International
(d) Federation of Indian Committee for Conciliation India

Q22. Mendel's laws apply only when:

(a) Parents are pure breeding
(b) Parent is codominant
(c) Characters are recessive
(d) Characters are linked

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Q23. _____ softens the bone surface at the joint.

(a) Cartilage
(b) Areolar
(c) Tendon
(d) Bondage

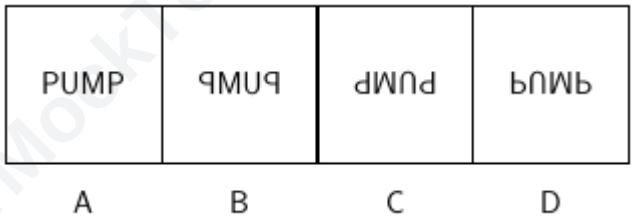
Q24. Calcium sulfate hemihydrate is also known as:

(a) Baking powder
(b) Baking soda
(c) Washing soda
(d) Plaster of Paris

Q25. (12 – 1) of (16 + 15) × (119 + 113 – 16) = ?

(a) 73656
(b) 73660
(c) 73600
(d) 73650

Q26. What will be the horizontal mirror image of 'PUMP'?



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

Q27. In a computer game, a builder can build a wall in 5 hours while a destroyer can completely destroy it in a total of 7 hours. The builder and the destroyer begin work together on level ground. But after 3.5 hours, the destroyer is put out of work. What is the total time (in hours) required to build the wall?

(a) 7.5
(b) 8.5
(c) 17.5
(d) 12

Q28. A statement is followed by two arguments. You have to decide which of the arguments are/are strong with respect to the statement.

Statements:

Should doctors suggest walking as an alternative medicine exercise for diabetics?

Arguments:

I. Yes, it has been proved that by walking regularly, good hormones are produced in sufficient quantity which keep diseases away.

II. No, because due to the busy schedule, not everyone may be able to go out for a walk in the morning.

(a) Both I and II are strong
(b) Only argument I is strong
(c) Neither I nor II is strong
(d) Only argument II is strong

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Q29. Deepu wants to reduce the consumption of milk in the ratio 9 : 5. His present milk consumption is 18 liters. Find his lesser consumption.

(a) 16 liters
(b) 1 liters
(c) 14 liters
(d) 10 liters

Q30. An object travels 24 meters in 4 seconds and then another 15 meters in 2 seconds. What is the average speed of the object?

(a) 6.5 m
(b) 6.5 ms^(–1)
(c) 6.7 ms^(–1)
(d) 6.67 s^(–1)

Q31. What was the real name of Sher Shah Suri or Sher Khan?

(a) Farid
(b) Jamaal
(c) Jalal-Ud-Din
(d) Abul-Fath

Q32. The current-voltage graph of ohmic devices is of the form:

(a) Parabolic curve
(b) Bi-linear curve
(c) Non-linear curve
(d) Linear curve

Q33. Morris used to spend 25% of his income on food. He got an increment of one thousand rupees, but he did not increase his expenditure on food items. As a result, his expenditure on food fell to 20%. What was his initial income?

(a) Rs. 6500
(b) Rs. 6000
(c) Rs. 5000
(d) Rs. 4000

Q34. Rs. 88 is divided between Jayati and Prateek in the ratio of 5 : 6. How much money did Jayati get?

(a) Rs. 40
(b) Rs. 48
(c) Rs. 56
(d) Rs. 52

Q35. There are 7 periods and 18 groups in the _____ classification.

(a) Mendeleev's periodic table
(b) Modern periodic table
(c) Newland's Octavus
(d) Dobereiner's triad

Q36. The mines of Jaduguda are famous for _____.

(a) Uranium
(b) Copper
(c) Gold
(d) Iron

Q37. _____ is the lightest metal.

(a) Ca
(b) Li
(c) P

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(d) He

Q38. _____ is the main component of cement.

(a) MgOH
(b) CaCO3
(c) SiO2
(d) MnO

Q39. An element with electronic frequency 2, 8, 8 is placed in the group _____ in the modern periodic table.

(a) 8
(b) 2
(c) 18
(d) 17

Q40. The change in the speed of light when enter to denser medium is:

(a) Dispersion index
(b) Refractive index
(c) Angle of incidence
(d) Reflective index

Q41. Neha bought a book at 30% discount for Rs. 1300 and sold it at 30% profit. How much did she earn?

(a) Rs. 273
(b) Rs. 390
(c) Rs. 780
(d) Rs. 0

Q42. Who was honoured with the Padma Bhushan award in the field of art music from Maharashtra in 2018?

(a) S.P. Balasubramaniam
(b) A. R. Rahman
(c) Arvind Parikh
(d) Ilayaraja

Q43. Which Indian boxer was honoured with the 'Legend Award' by the Amateur International Boxing Association (AIBA)?

(a) Mandeep Jangda
(b) Sarjubala Devi
(c) MC Mary Kom
(d) Shiv thapa

Q44. A statement is followed by two arguments. Decide which of the arguments is/are strong with respect to the statement.

Statements:

It is better to buy a double door refrigerator

Arguments:

I. Yes, it provides separate space for freezer and refrigerator.

II. No, it is too expensive and consumes more power

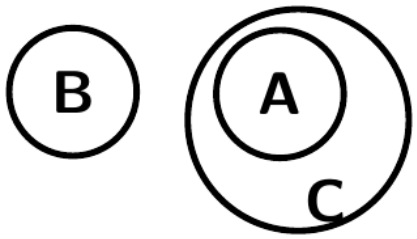
(a) Neither I nor II is strong
(b) Only logic I is strong
(c) Either I or II is strong
(d) Only logic II is strong

Q45. Which of the following Venn diagrams correctly depicts the relationship between the following classes?

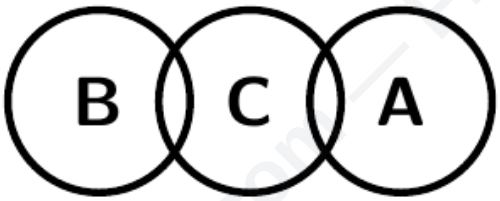
A) Biscuit B) Rice Pakoras C) Baking

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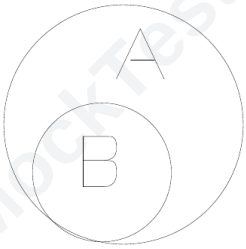
(a)



(b)



(c)



(d)



Q46. If EGG is coded as 577, then what will be the code for TELL?

(a) 2051313
(b) 2051212
(c) 2061212
(d) 2051213

Q47. Rani is two years older than Ragini, whose age is twice the age of Nag. If the sum of ages of Rani, Ragini and Nag is 27 years, then what is the age of Ragini?

(a) 9
(b) 8
(c) 10
(d) 7

Q48. Which of the following former or present Chief Minister of India was a priest of the first temple?

(a) Yogi Adityanath
(b) Vijay Rupani
(c) Manohar Parrikar
(d) Mayawati

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Q49. A rectangle whose dimensions are 4 cm and 2 cm is bent to form an equilateral triangle. What will be the area of the equilateral triangle so formed?

(a) 4 √3 cm²
(b) 6 √3 cm²
(c) 9/4√3 cm2
(d) 2 √3 cm2

Q50. On an average, Pramod uses 10% of his monthly salary to fill petrol in his car. The remaining 80% is spent on domestic work and 10% saves salary.

If, on a monthly basis, he spends on domestic work is Rs. 24000, then what is his annual income?

(a) Rs. 360000
(b) Rs. 160000
(c) Rs. 80000
(d) Rs. 240000

Q51. tan 34 tan 42 tan 48 tan 56 + tan 60 cot 30 – cosec 30 sec 60 = ?

(a) 0
(b) 1.5
(c) 1
(d) 2

Q52. The square root of 6724 is:

(a) 78
(b) 76
(c) 82
(d) 74

Q53. _____ compound has –OH as a functional group.

(a) Carboxylic acid
(b) Ethanoic acid
(c) Acetic acid
(d) Alcohol

Q54. Which organization has established Govardhan Ecological Village in Maharashtra?

(a) ISH Foundation
(b) R.A.S.
(c) Gaudiya Math
(d) Iskcon

Q55. 392 - 39.2 - 3.92 - 0.392 = ?

(a) 346.468
(b) 346.508
(c) 348.488
(d) 348.468

Q56. Which of the following Bollywood actress has won the Best Actress award at the International Film Festival of Australia and Awards (IFFA) in March 2017?

(a) Priyanka Chopra
(b) Aishwarya Rai
(c) Vidya balan
(d) Alia Bhatt

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Q57. Madhu points to a picture and says, "This is my mother's sister's daughter." How is the lady in the picture related to Madhu?

(a) Wife
(b) Cousin sister
(c) Daughter in law
(d) Daughter

Q58. The sum of two fractions is 7/6. One of the fraction is 3/4. The second fraction will be:

(a) 4/12
(b) 5/12
(c) 4/2
(d) 1/12

Q59. The compound using the proven formula CH2O has a vapor density of 90. The molecular formula of the compound is:

(a) C6H12O6
(b) C6H10O4
(c) C6H10O6
(d) C6H12O4

Q60. Who among the following won the World Billiards Championship title in 2017?

(a) Pankaj Advani
(b) Saurav Kothari
(c) Michael Ferreira
(d) Geet Sethi

Q61. If secθ + tanθ = 1.25 ,, then secθ - tanθ = ?

(a) 1
(b) 0.80
(c) 0.75
(d) 0.25

Q62. Which of the following does not belong to the group.

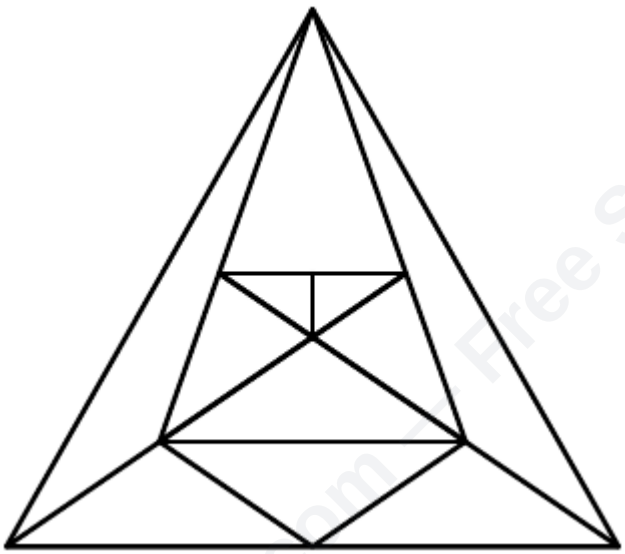
(a) Oregano
(b) Cauliflower
(c) Salad
(d) Meat

Q63. The Mughal Emperor _____ adopted the title 'Alamgir'.

(a) Aurangzeb
(b) Akbar
(c) Jahangir
(d) Shahjahan

Q64. How many triangles are there in this figure?

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(a) 17
(b) 23
(c) 18
(d) 19

Q65. An object of mass 30 kg is being moved with a uniform velocity of 10 ms^(–1). The kinetic energy of the object is:
(a) –150 J
(b) 1500 J
(c) –1500 J
(d) 150 J

Q66. Study the statement given below and decide which of the following is implicit in the assertion.

Statement:

The teacher told the students, "Water is a valuable resource."

Assumption:

I. She wants children to understand the importance of water

II. She wants them to understand that water should not be wasted.

(a) Both assumptions I and II are implicit.
(b) Only assumption II is implicit.
(c) Only assumption I is implicit.
(d) Neither assumption I nor II is implicit.

Q67. What is the largest 3 digit number which is exactly divisible by 10, 8 and 12?
(a) 940
(b) 960
(c) 999
(d) 980

Q68. (2sin 30°)/(1 + cos 30°) + (1 + cos 30°)/(sin 30°) = ?
(a) 4
(b) 8
(c) 4 – 2 √3
(d) 6 – √3

Q69. The smaller of the two angles between the hour hand and the minute hand at 3:52 pm in a clock will be:
(a) 165°
(b) 166°
(c) 164°

(d) 162°

Q70. Roots, stems and leaves of some plants develop into new plants through the process of _____.

(a) Fragmentation
(b) Multiple fragmentation
(c) Vegetative propagation
(d) Uplift

Q71. Tropical rainforest can be found in the Silent Valley of _____.

(a) Kerala
(b) Rajasthan
(c) Delhi
(d) Meghalaya

Q72. Complete the number series by choosing the missing number from the alternatives.

1, 4, 9, 25, 49, (__), (__), 289, 361

(a) 121, 169
(b) 112, 169
(c) 131, 139
(d) 121, 136

Q73. The Indian Railways has planned to build _____ in Jammu and Kashmir by the year 2016, which will be the world's highest railway bridge.

(a) Wular bridge
(b) Jhelum Bridge
(c) Beas bridge
(d) Chenab Bridge

Q74. A sports showroom has various sporting goods. 50% of sales in the store are swimming accessories. 40% of sales are outdoor game accessories and 10% indoor game accessories.

If, in a particular month, the store sells Rs 10000, then what is the approximate figure for the sale of outdoor games?

(a) Rs. 8000
(b) Rs. 5000
(c) Rs. 3000
(d) Rs. 4000

Q75. The image for a plane mirror is:

(a) virtual and laterally inverted
(b) real and laterally vertical
(c) real and vertical
(d) virtual and laterally vertical

Q76. A bus passes two persons cycling in the same direction as the bus with speeds of 9.6 km/hr and 12 km/hr respectively in 4.5 sec and 9 sec respectively. What is the length of the bus?

(a) 6 m
(b) 8 m
(c) 7 m
(d) 4 m

Q77. Vinay is the grandson of Vinod and Vishal is the grandson of Vedant. Vinod and Vedant are brothers. How is Vishal's father related to Vinay's father?

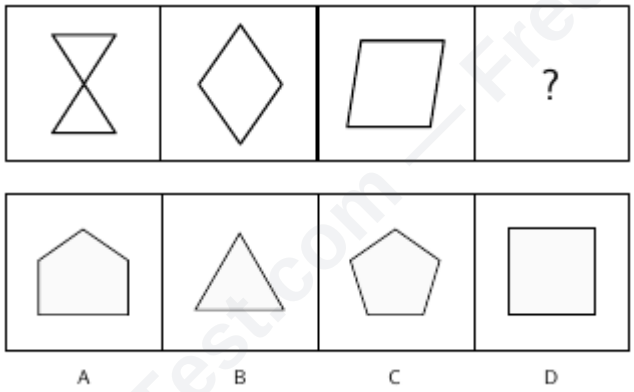
(a) Cousin brother
(b) Father
(c) Maternal Uncle
(d) Brother

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Q78. The weight of Ram and Shyam is 55 kg. Ram takes 5 minutes to climb the stairs while Shyam takes 3 minutes to climb the same steps. Who does more work?

(a) Ram and Shyam do equal work.
(b) Ram does more work than Shyam.
(c) Shyam does more work than Ram.
(d) Ram and Shyam do not do any work.

Q79. Select the alternative which can replace the question mark ? in the given figure.



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

Q80. Who is the Chief Minister of Gujarat as of March 2017?

(a) Shankar Singh Vaghela
(b) Narendra Modi
(c) Vijay Rupani
(d) Keshubhai Patel

Q81. Find the next number in the series given below.

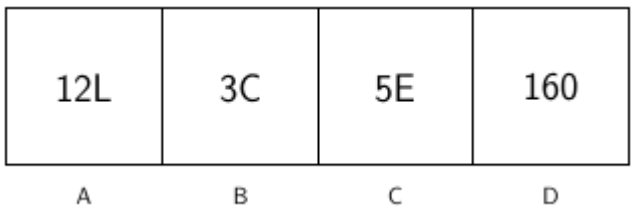
2, 16, 128, ____

(a) 548
(b) 1000
(c) 524
(d) 1024

Q82. In the code language, PAINT is written as 15081319. What is the code for COLOUR?

(a) 21412142017
(b) 21411142017
(c) 21511152017
(d) 21311132017

Q83. Identify the odd one out:



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

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(d) C

Q84. Two football teams, Team A and Team B, played in the tournament and scored the following goals in 6 matches.

Game	Goals by Team A	Goals by Team B
Game 1	2	3
Game 2	1	0
Game 3	0	1
Game 4	4	5
Game 5	3	2
Game 6	2	1

What can we conclude on the basis of average goals?

(a) Team A and Team B have the same average score.
(b) The average score of team A is higher than that of B.
(c) Team A is more compatible than Team B.
(d) The average score of team B is higher than that of team A.

Q85. M and P leave from their house for market. They both walk 700 m towards West and then take a right turn, walk 100 m and then take a 45° anticlockwise turn to reach the market. In which direction is the market with respect to his house?

(a) In the south-east
(b) In the south-west
(c) In the north-west
(d) In the north-east

Q86. An outer circular path is built around a circular garden. If the outer and inner perimeter of the path are 220 m and 44 m respectively, then find the area of the path.

(a) 3960 m^2
(b) 3696 m2
(c) 3069 m2
(d) 3096 m2

Q87. Which of the following sportsperson was awarded Padma Shri in 2017?

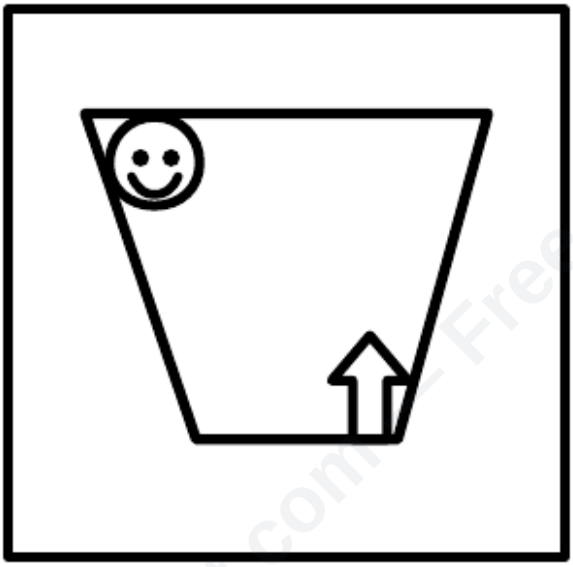
(a) Geeta Phogat
(b) Babita Kumari
(c) Sakshi Malik
(d) Deepika Kumari

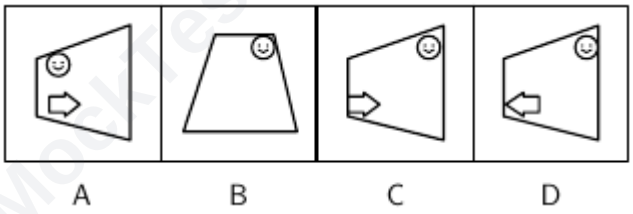
Q88. An athlete runs a distance of 500 m in 25 second. The average speed of an athlete is _____.

(a) 20 ms^(–2)
(b) 20 ms^(–1)
(c) 20 ms^1
(d) 20 ms^2

Q89. Which pattern resembles the following figure?

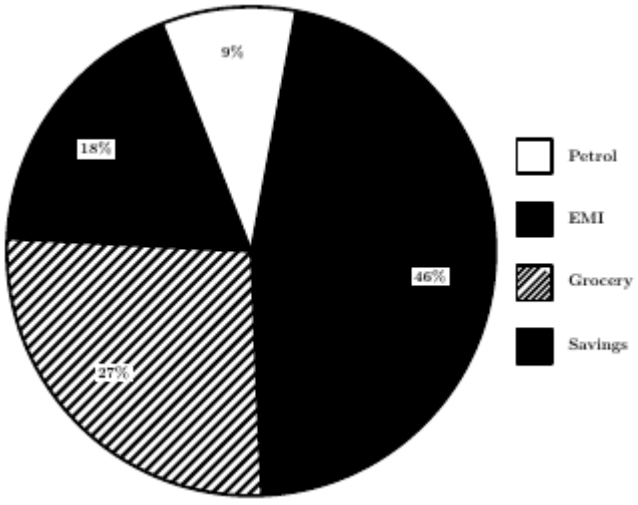
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(a) A
(b) C
(c) B
(d) D

Q90. Following is the percentage distribution of Ramu's monthly income in four sections. If he gets Rs. 55000 per month, then what is the EMI to be paid by him in each month?



(a) Rs. 25300
(b) Rs. 24000
(c) Rs. 26300
(d) Rs. 25000

Q91. Two pipes can fill a cistern in 3.9 hrs and 5.2 hrs respectively while a third pipe can empty a cistern in 10.4 hrs. When the tank 1/12 is full, all the three pipes are opened simultaneously. How long will it take to fill the tank completely?

(a) 2 hours 45 minute

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(b) 2 hours 10 minute
(c) 2 hours 11
(d) 2 hours 36 minute

Q92. The product of mass and velocity is _____.
(a) stress
(b) momentum
(c) force
(d) pressure

Q93. _____ tissue makes up the inner lining of our mouth.
(a) ciliated columnar epithelium
(b) simple squamous epithelium
(c) stratified squamous epithelium
(d) columnar epithelium

Q94. Which of the following does not belong to this group?
(a) Milk
(b) Can
(c) Oil
(d) Petrol

Q95. A statement is followed by two arguments. Decide which of the arguments is/are strong with respect to the statement.
Statements:
Should there be opinion polls before elections?
Argument:
I. Yes, the general public gets an opportunity to understand the overall election scenario.
II. No, these polls are generally biased.
(a) Both I and II are strong
(b) Neither I nor II is strong
(c) Only Argument I is Strong
(d) Only Argument II is Strong

Q96. 131/255+2/5+5-17/3 = ?
(a) 121/255
(b) 117/255
(c) 63/255
(d) 131/255

Q97. Professor Amartya Sen is famous in the field of _____.
(a) Political Science
(b) Medical
(c) Economics
(d) Theatrical art

Q98. Which is the capital city of France?
(a) Paris
(b) Kathmandu
(c) Berlin
(d) London

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Q99. An object travels 25 m in 3 seconds and then 15 m in 2 seconds. What is the average speed of the object?

(a) 6.67s^(–1)
(b) 6.67 ms^(–1)
(c) 8.0 ms^(–1)
(d) 8.0 m

Q100. If $x^2 + 1.5kx + 4.5k = 0$ lies in the recurrent root, then what will be the satisfactory value of k:

(a) k = 8 Only
(b) k < 0 or k > 8
(c) k = 8 or k = 0
(d) 0 < k < 8

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) barium sulfate is formed

The correct answer is barium sulfate is formed.

• When sodium sulphate solution is mixed with barium chloride solution, then barium sulfate is formed.

Key Points

• When barium chloride combines with sodium sulfate in the form of their aqueous solution a white precipitate of barium sulphate is formed which is insoluble in water.

• The reaction also creates sodium chloride (salt) which remains dissolved in water and cannot be seen.

• BaCl2+ Na2SO4→ BaSO4 + 2NaCl

Q2. Answer: (a) 2

Given:

52 ÷ [36 – {24 – (32 – 54 ÷ 9 × 3)}]

Concept used:

Calculation:

52 ÷ [36 – {24 – (32 – 54 ÷ 9 × 3)}]

=> 52 ÷ [36 – {24 – (32 – 6 × 3)}]

=> 52 ÷ [36 – {24 – (32 – 18)}]

=> 52 ÷ [36 – {24 – 14}]

=> 52 ÷ [36 – 10]

=> 52 ÷ 26

=> 2

Therefore Required answer is 2

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Q3. Answer: (b) Alkali metal group

The correct answer is Alkali metal group.

Key Points

• Alkali Metals:

• Group 1 of the periodic table consists of namely, lithium (Li), sodium (Na), potassium (K), rubidium (Rb), caesium (Cs), and francium (Fr).

• Properties of Alkali metals:

• They have high thermal and electrical conductivity, lustre, ductility, and malleability.

• All these elements react with water to form hydrogen gas.

• Each of these, alkali metal atoms has a single electron in its outermost shell. Hence, their valency is 1.

Q4. Answer: (b) 48

Shortcut Trick

Assume Total Work = 360 units (LCM of 45 and 72).

Efficiency of Janki = 8 units/day; Efficiency of Mansi = 5 units/day.

If Janki had stayed for the last 33 days, she would have done 33 × 8 = 264 units more.

Adjusted Total Work = 360 + 264 = 624 units.

Total Days = 624 ÷ (8 + 5) = 624 ÷ 13 = 48 days.

Therefore The correct answer is 48 days.

Alternate Method

Given:

Time taken by Janki = 45 days

Time taken by Mansi = 72 days

Formula Used:

Total Work = Efficiency × Time

Person	Days	Total Work	Efficiency
Janki	45	360	8
Mansi	72	5	

Calculations:

=> Let the total time to complete the work be x days.

=> Janki worked for (x − 33) days and Mansi worked for x days.

=> 8 × (x − 33) + 5 × x = 360

=> 8x − 264 + 5x = 360

=> 13x = 360 + 264

=> 13x = 624

=> x = 624 ÷ 13 = 48 days.

Therefore The correct answer is 48 days.

Additional Information

Work Completion Logic

When a person leaves before completion, add their potential work (Efficiency × Days left) to the Total Work to find the duration.

Time & Work Relation

Efficiency is inversely proportional to the time taken. If time ratio is a:b, efficiency ratio is b:a.

Pipes & Cisterns

Follows the same LCM logic where inlet pipes have positive efficiency and outlet pipes have negative efficiency.

Q5. Answer: (a) The Golden House

The correct answer is The Golden House.

• The novel The Golden House by Salman Rushdie was released in 2017.

Key Points

• The Golden House, a novel by Salman Rushdie was released in 2017.

• Salman Rushdie:

• He is a British-American novelist and essayist of Indian descent.
• He won the Booker Prize in 1981 for his novel Midnight's Children.
• His book The Satanic Verses came into a lot of controversies.
Additional Information
• Some of his notable writings are The Ground Beneath Her Feet, Imaginary Homelands: Essays, Midnight's Children, The Moor's Last Sigh.

Q6. Answer: (b) 48

The logic followed here is:-
Hence, "option 2" is the correct answer.

Q7. Answer: (b) 230

The logic followed here is:-
Hence, " option 2" is the correct answer.

Q8. Answer: (d) D

The logic followed here is:-
• inside the circle and square in figure A,
• inside pentagon and square in the figure B,
• inside the square and square in the figure C,
• but
inside only square in figure D.
Figure D is different from others.
Hence, "option 4" is the correct answer.

Q9. Answer: (b) Vacuum

The correct answer is Vacuum.
• In a real sense, free-fall only occurs in Vacuum.
Key Points
• Free-fall is a state of a body where it falls in the presence of gravity.
• A fall is considered as freefall if only force acting on it is gravity.
• As the vacuum contains no matter there is no positive force against the free fall due to gravity.
Additional Information
• Gravity:
• The acceleration due to gravity is the rate of increase of velocity of a body falling freely towards the earth.
• The value of g at the surface of the earth is 9.8 m/s^2.
• Variation in g:
• The value of g decreases with height or depth from the earth’s surface.
• g is maximum at poles.
• g is minimum at the equator.
• g decreases due to the rotation of the earth.
• g decreases if the angular speed of earth increases and increases if the angular speed of earth decreases

Q10. Answer: (d) 3

Given:
$(–7)[60 ÷ \{6 – (–4)\}] ÷ [(–2)\{19 – (–2) × (–6)\}]$
Concept used:
Calculation:
$(–7)[60 ÷ \{6 – (–4)\}] ÷ [(–2)\{19 – (–2) × (–6)\}]$
$=> (–7)[60 ÷ \{6 + 4\}] ÷ [(–2)\{19 – 12\}]$
$=> (–7)[60 ÷ 10] ÷ (– 14)$
$=> – 42 ÷ (– 14)$
$=> 3$
Therefore Required answer is 3

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Q11. Answer: (a) remains the same

The correct answer remains the same.

• In a circuit resistors are connected in series, the value of current through the circuit remains the same.

Key Points

• Resistance:

• The opposition offered by a conductor to the flow of current through it is called resistance.

• Its SI unit is the ohm.

• Resistors in series:

• When resistors are connected in series, the current through each resistor remains the same.

• The total voltage across all the resistors is equal to the sum of the voltages across each resistor.

Additional Information

• Resistors in Parallel:

• When resistors are connected in parallel,

• The voltage across remains the same.

• The supply current is equal to the sum of the currents through each resistor.

Q12. Answer: (d) C

The logic followed here is:-

• Triangle (

) rotates 900 anticlockwise directions in each step.

• Symbol (Ω) rotates one place in the clockwise direction in each step.

• Symbol (^) rotates one place in the clockwise direction in each step.

• The symbol "*/+" rotates one place in the clockwise direction in each step. Also, "/" symbol changes to "\" in alternate figures.

• So, the next image of the given series is:-

Hence, "option 4" is the correct answer.

Q13. Answer: (d) Saanjh

The correct answer is Saanjh.

• Saanjh film made in the dialect of Himachal has gained international recognition for the first time, winning the Best Feature Film award at the International Borrego Springs Film Festival in California, USA in the year 2017.

Key Points

• Saanjh:

• Saanjh is the first movie in the Himachali language released all over India.

• The film is produced and directed by Ajay Sakhlani.

• The film shows the story of people who migrated from their ancestral village.

• The film the Best Feature Film award at the International Borrego Springs Film Festival in California, the USA in the year 2017.

Q14. Answer: (d) Nirbhay

The correct answer is Nirbhay.

• Nirbhay is India's indigenously designed and developed long-range subsonic cruise missile.

Key Points

• Nirbhay Missile:

• It is a long-range, all-weather, subsonic cruise missile that is designed and developed indigenously by the Aeronautical Development Establishment (ADE).

• It can be launched from multiple platforms and is capable of carrying conventional and nuclear warheads.

Additional Information

• Helena and NAG are anti-tank guided missiles.

• Pinaka is a multiple rocket launcher system.

Q15. Answer: (c) K. Vishwanath

The correct answer is K. Vishwanath.

• K. Vishwanath was honoured with the Dadasaheb Phalke Award for the year 2016.

Key Points

• K. Vishwanath is a Telugu film director, screenwriter and actor.

• He was given the Padma Shri award in the year 1992.

• He was given the Dadasaheb Phalke Award in the year 2016.

• • Dada Saheb Phalke Award:

• Dadasaheb Phalke Award is India's highest award in cinema.

• It is presented annually at the National Film Awards ceremony by the Directorate of Film Festivals (an organisation set up by the Ministry of Information and Broadcasting).

• The award prize consists of a golden lotus, a cash prize of Rs. 10 lakh and a shawl.

• The award is given to people for their outstanding contribution to the growth and development of Indian cinema.

• It was first presented in 1969.

• The first recipient of the award was actress Devika Rani, “the first lady of Indian cinema.

Q16. Answer: (b) Only argument I is strong

The question asks for ways to avoid noise pollution in urban areas.

• Argument I suggests a fair idea, by segregating noisy zones from residential i.e. calm zones, noise pollution can be avoided. So, argument I is strong.

• Since there are ways to avoid noise pollution in urban areas, argument II is not correct.

Hence the correct answer is option 2.

Q17. Answer: (a) 18

Shortcut Trick

Apply Alligation Method on the mean scores:

Ratio of number of members = (Higher Mean − Combined Mean) : (Combined Mean − Lower Mean)

=> 12 : n = (12 − 11.2) : (11.2 − 10) = 0.8 : 1.2 = 2 : 3

Since 2 units → 12 members, then 1 unit → 6 members.

Value of n (3 units) = 3 × 6 = 18.

Therefore The correct answer is 18.

Alternate Method

Given:

Group 1 (n1) = 12 members, Mean (x1) = 10

Group 2 (n2) = n members, Mean (x2) = 12

Combined Average (X_(avg)) = 11.2

Formula Used:

Combined Mean = (n1x1 + n2x2) ÷ (n1 + n2)

Calculations:

=> 11.2 = (12 × 10 + n × 12) ÷ (12 + n)

=> 11.2 × (12 + n) = 120 + 12n

=> 134.4 + 11.2n = 120 + 12n

=> 134.4 − 120 = 12n − 11.2n

=> 14.4 = 0.8n

=> n = 14.4 ÷ 0.8

=> n = 18

Therefore The correct answer is 18.

Additional Information

Weighted Average

It calculates the average of a dataset where each point contributes differently to the final result, calculated as Σ(w_ix_i) ÷ Σw_i.

Alligation Rule

A faster way to find the ratio in which two quantities with different concentrations (or averages) must be mixed to get a desired average: (Quantity 1) ÷ (Quantity 2) = (Value 2 − Mean) ÷ (Mean − Value 1).

Net Deviation Method

In any average problem, the sum of deviations from the mean is always zero. Sum(n_i × (x_i − Mean)) = 0.

Q18. Answer: (b) Daughter

The family tree is given below:-

Sharda is the daughter of Kiran.

Hence, "option 2" is the correct answer.

Q19. Answer: (d) 20

The triangles are as follows:-

The total number of triangles is 20.

Hence, "option 4" is the correct answer.

Q20. Answer: (b) Iodine

The correct answer is Iodine.

• Iodine is essential for the synthesis of thyroxine.

Key Points

• Iodine is a necessary and limiting substrate for the thyroid gland.

• It helps in the synthesis of thyroxine.

• The deficiency of Iodine can cause hypothyroidism, developmental brain disorders and goiter.

Q21. Answer: (b) Federation of Indian Chamber of Commerce and Industry

The correct answer is the Federation of Indian Chamber of Commerce and Industry.

• The full form of FICCI is the Federation of Indian Chamber of Commerce and Industry.

Key Points

• Federation of Indian Chamber of Commerce and Industry (FICCI):

• It is a non-governmental trade association.

• It was established in the year 1927.

• It was founded by Ghanshyam Das Birla and Purshottamdas Thakurdas.

• Its members are from the corporate sector, both private and public, including SMEs and MNCs.

• Its headquarters is in New Delhi.

Q22. Answer: (a) Parents are pure breeding

The correct answer is Parents are pure breeding.

• Mendel's laws apply only when parents are pure breeding.

Key Points

• Gregor Mendel, through his experiments on pea plants, discovered the fundamental laws of inheritance.

• He deduced three laws from his experiments and these laws are applicable when parents are pure breeding.

• The three laws of inheritance proposed by Mendel include:

• Law of Dominance

• Law of Segregation

• Law of Independent Assortment

Q23. Answer: (a) Cartilage

The correct answer is cartnon-vascularilage.

• Cartilage softens the bone surface at the joint.

Key Points

• Cartilage is the tissue that softens the bone surface at joints.

• It is a flexible connective tissue that differs from the bone.

• It is a type of supporting connective tissue and is found throughout the body.

Additional Information

• The areolar tissue is found under the dermis layer.

• A tendon is a fibrous connective tissue that attaches muscle to bone.

Q24. Answer: (d) Plaster of Paris

The correct answer is plaster of Paris.

• Calcium sulphate hemihydrate is also known as plaster of Paris.

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Key Points

• Plaster of Paris

• It is chemically calcium sulphate hemihydrate, i.e. $CaSO_4 . 1/2 H_2O$.

• It is formed from gypsum, that is, $CaSO_4 . 2H_2O$.

• It is used to plaster fractured bones, for making toys, materials for decoration, and for making surfaces smooth.

Additional Information

• Washing Soda

• Its chemical name is sodium carbonate decahydrate ($Na_2CO_3.10H_2O$).

• It is used in glass, soap, and paper industries and for removing the permanent hardness of the water.

• Baking Soda

• It is sodium hydrogen carbonate ($NaHCO_3$).

Q25. Answer: (a) 73656

Given:

(12 – 1) of (16 + 15) × (119 + 113 – 16)

Concept used:

Calculation:

(12 – 1) of (16 + 15) × (119 + 113 – 16)

=> (12 – 1) of (16 + 15) × (232 – 16)

=> 11 of 31 × 216

=> 11 × 31 × 216

=> 73656

Therefore Required answer is 73656

Q26. Answer: (d) C

The horizontal mirror image is given below:-

Hence, "option 4" is the correct answer.

Q27. Answer: (a) 7.5

Shortcut Trick

Net efficiency of Builder and Destroyer = 1/5 − 1/7 = 2/35 per hour.

Work done in 3.5 hours = (2/35) × 3.5 = 1/5 of the wall.

Remaining work = 1 − 1/5 = 4/5.

Time taken by Builder alone for remaining work = (4/5) × 5 = 4 hours.

Total time = 3.5 + 4 = 7.5 hours.

Therefore The correct answer is 7.5 hours.

Alternate Method

Given: Builder time = 5 hours, Destroyer time = 7 hours.

Person	Time (Hrs)	Total Work	Efficiency
Builder (B)	5	35 units	+7
Destroyer (D)	7	−5	

=> Combined efficiency (B + D) = 7 − 5 = 2 units/hr.

=> Work done in 3.5 hours = 2 × 3.5 = 7 units.

=> Remaining work = 35 − 7 = 28 units.

=> Time taken by Builder to finish 28 units = 28 ÷ 7 = 4 hours.

=> Total time required = 3.5 + 4 = 7.5 hours.

Therefore The correct answer is 7.5 hours.

Additional Information

Negative Work Concept

When a person destroys or empties (like a leak in a tank), their efficiency is taken as negative in the net work calculation.

Pipes and Cisterns Analogy

This problem is identical to an inlet pipe filling a tank and an outlet pipe emptying it; Net Rate = Inlet Rate − Outlet Rate.

Time and Efficiency

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

Q28. Answer: (b) Only argument I is strong

The question is whether doctors should suggest walking as an alternative medicine for diabetics.

• Argument I agrees to it and justifies by stating that there is proof that walking is good for health. Thus, argument I is strong.

• Argument II suggests an excuse that due to busy schedules people may not be able to go walking in the morning but the doctors are not specifically suggesting morning walks. It could be walking at any time of the day. So, argument II is not strong.

Hence the correct answer is option 2.

Q29. Answer: (d) 10 liters

Shortcut Trick

Initial consumption ratio : Final consumption ratio = 9 : 5

Given, 9 units = 18 liters

=> 1 unit = 18 ÷ 9 = 2 liters

=> 5 units = 5 × 2 = 10 liters

Therefore The correct answer is 10 liters.

Alternate Method

Given:

Present consumption = 18 liters

Ratio of reduction = 9 : 5

Calculations:

=> Let the initial consumption be 9x and the reduced consumption be 5x.

=> 9x = 18

=> x = 18 ÷ 9

=> x = 2

=> Reduced consumption = 5x = 5 × 2

=> Reduced consumption = 10 liters

Therefore The correct answer is 10 liters.

Additional Information

Ratio and Proportion

If a quantity increases or decreases in the ratio a : b, then the new quantity = (b/a) × original quantity.

Direct Proportion

When two quantities are related such that an increase in one causes a proportional increase in the other, they are in direct proportion (x/y = k).

Unitary Method

Finding the value of a single unit first and then multiplying by the required number of units to find the total value.

Q30. Answer: (b) 6.5 ms^(–1)

Shortcut Trick

Average Speed = Total Distance ÷ Total Time

Total Distance = 24 + 15 = 39 m

Total Time = 4 + 2 = 6 s

Average Speed = 39 ÷ 6 = 6.5 ms^(−1)

Therefore The correct answer is 6.5 ms^(−1).

Alternate Method

Given:

First distance (d1) = 24 m, First time (t1) = 4 s

Second distance (d2) = 15 m, Second time (t2) = 2 s

Formula Used:

Average Speed = (d1 + d2) ÷ (t1 + t2)

Calculations:

=> Total distance covered by the object = 24 m + 15 m = 39 m

=> Total time taken = 4 s + 2 s = 6 s

=> Average speed = 39 ÷ 6

=> Average speed = 6.5 ms^(−1)

Therefore The correct answer is 6.5 ms^(−1).

Additional Information

Average Speed for Equal Distances

When an object travels equal distances at speeds u and v, the average speed is given by the Harmonic Mean: (2 × u × v) ÷ (u + v).

Uniform Speed vs Variable Speed

Uniform speed implies covering equal distances in equal intervals of time, while variable speed (as in this question) requires calculating the total ratio of distance to time.

Unit Conversion

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

Q31. Answer: (a) Farid

The correct answer is Farid.

• Farid was the real name of Sher Shah Suri or Sher Khan.

Key Points

• Sher Shah Suri:

• His real name was Farid.

• He joined the Babar Khan Lohani's service and then was appointed as the Deputy Governor of Bihar.

• He usurped the throne as 'Hazarat-i-Ala'.

• He gained Chunar by marrying one widow Lad Malika.

• Battle of Chausa: In 1539 AD, he captured Chausa from Humayun.

• He assumed the title of Sher Shah as the emperor.

• He also issued coins and Khutba was read in his name.

• The whole area from Bengal to Benares was under his empire.

• The campaign of Bundelkhand was the last campaign of his life.

• He built Purana Qila, Grand Trunk Road.

• He also built his tomb at Sasaram in Bihar.

Q32. Answer: (d) Linear curve

The correct answer is the Linear curve.

• The current-voltage graph of ohmic devices is of the form linear curve.

Key Points

• Ohm's Law

• The electric current flowing through a conductor is directly proportional to the potential difference across its ends.

• It is given by the formula:

• V=IR

• The device which follows ohm's law for all voltages across it is called an ohmic device.

• The current-voltage graph of ohmic devices is a linear curve.

Q33. Answer: (d) Rs. 4000

Shortcut Trick

Expenditure on food is constant in both cases.

Ratio of percentage expenditure = 25% : 20% = 5 : 4

Since Expenditure = Income × % Expenditure, the Income ratio is the inverse = 4 : 5

Difference in Income units = 5 − 4 = 1 unit → Rs. 1000

Initial income = 4 units = 4 × Rs. 1000 = Rs. 4000

Therefore The correct answer is Rs. 4000.

Alternate Method

Let Initial Income be Rs. x.

Given Increment = Rs. 1000. New Income = Rs. (x + 1000).

=> Initial Food Expenditure = 25% of x = 0.25x

=> New Food Expenditure = 20% of (x + 1000) = 0.20(x + 1000)

=> Since food expenditure is unchanged: 0.25x = 0.20(x + 1000)

=> 25x = 20(x + 1000)

=> 25x = 20x + 20000

=> 5x = 20000

=> x = 4000

Therefore The correct answer is Rs. 4000.

Additional Information

Percentage Inverse Relation

When the product of two variables is constant, an increase in one variable leads to a proportional decrease in the other (e.g., Income × Rate = Fixed Expense).

Successive Percentage Change

Net change after two successive changes of a% and b% is given by the formula: [a + b + (a × b)/100]%.

Base Change Property

If expenditure remains constant and price increases by r%, then consumption must decrease by [r/(100+r)] × 100%.

Q34. Answer: (a) Rs. 40

Shortcut Trick

Total ratio parts = 5 + 6 = 11 units.

Given: 11 units = Rs. 88 → 1 unit = Rs. 8.

Jayati's share = 5 units = 5 × Rs. 8 = Rs. 40.

Therefore The correct answer is Rs. 40.

Alternate Method

Given: Total amount = Rs. 88, Ratio of Jayati to Prateek = 5 : 6.

Formula: Share of A = [Ratio of A / Total Ratio] × Total Amount

=> Total ratio = 5 + 6 = 11

=> Jayati's share = (5 ÷ 11) × 88

=> Jayati's share = 5 × 8

=> Jayati's share = Rs. 40

Therefore The correct answer is Rs. 40.

Additional Information

Ratio and Proportion

A ratio indicates how many times one number contains another. If a quantity Z is divided in ratio a : b, the parts are [a/(a+b)] × Z and [b/(a+b)] × Z.

Duplicate Ratio

The duplicate ratio of a : b is $a^2 : b^2$, and the sub-duplicate ratio is $\sqrt{a} : \sqrt{b}$.

Q35. Answer: (b) Modern periodic table

The correct answer is the Modern periodic table.

• There are 7 periods and 18 groups in the Modern periodic table classification.

Key Points

• Periodic Table:

• It is a tabular presentation of the chemical elements, organised on the basis of their properties.

• Mendeleev's Periodic Table (1869):

• It is based upon Mendeleev's periodic law, which states, "Properties of the elements are the periodic function of their atomic masses."

• Mendeleev is known as the father of the periodic table.

• Modern Periodic Law was given by Moseley.

• According to him: "The physical and chemical properties of the elements are the periodic function of their atomic numbers."

• Modern Periodic Table:

• It is a graphical representation of the Aufbau principle.

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• It is based on the electronic configuration of elements and contains 118 elements.
• There are 7 periods and 18 groups.
• Modern periodic table is classified as:
i. s-block;
ii. p-block;
iii. d-block;
iv. f-block.

Q36. Answer: (a) Uranium

The correct answer is Uranium.
• The mines of Jadugoda are famous for uranium.
Key Points
• Jaduguda mine is the first mine in the country to produce uranium on a commercial scale.
• It is in Singhbhum thrust belt is the first uranium deposit to be discovered in the country in 1951.
• It is located in the Singhbhum district of Jharkhand.
• The mining operations here began in the year 1967-68.
• Other Uranium mines in India:

Mines	State
Tummalapalle uranium mine	Andhra Pradesh
Bagjata	Jharkhand
Bhatin	Jharkhand
Turamdih uranium mine	Jharkhand

Additional Information
• Khetri copper belt in Rajasthan is famous for the production of copper.
• Hatti Gold Mines and Kolar Gold Fields of Karnataka are famous for the production of gold.
• Bailadila Mines of Chhattisgarh is famous for the production of Iron in India.

Q37. Answer: (b) Li

The correct answer is Li.
• Li is the lightest metal.
Key Points
• Lithium:
• It is the lightest metal.
• Its atomic number is 3.
• Its atomic mass is 6.941 g.mol -1.
• It was discovered by Johann Artvedson in the year 1817.
Additional Information
• The atomic number of calcium is 20.
• The atomic number of phosphorus is 15.
• The atomic number of helium is 2.

Q38. Answer: (c) SiO2

The correct answer is SiO2.
• SiO2 is the main component of cement.
Key Points
• Cement:
• It is a complex material containing a controlled chemical combination of calcium, silica, aluminium, iron and other ingredients.
• Silicon dioxide (SiO2) is the main component of cement.
• Types of Cement:
• Ordinary Portland Cement (OPC).
• Portland Pozzolana Cement (PPC).

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• Rapid Hardening Cement.
• Extra Rapid Hardening Cement.
• Low Heat Cement.
• Sulfates Resisting Cement.

Q39. Answer: (c) 18

The correct answer is 18.

• An element with electronic frequency 2, 8, 8 is placed in group 18 in the modern periodic table.

Key Points

• Periodic Table:
• It is a tabular presentation of the chemical elements, organized on the basis of their properties.
• Mendeleev's Periodic Table (1869):
• It is based upon Mendeleev's periodic law, which states, "Properties of the elements are the periodic function of their atomic masses."
• Mendeleev is known as the father of the periodic table.
• Modern Periodic Law
• The physical and chemical properties of the elements are the periodic function of their atomic numbers.
• Modern Periodic Table:
• It is a graphical representation of the Aufbau principle.
• It is based on the electronic configuration of elements and contains 118 elements.
• There are 7 periods and 18 groups.
• Modern periodic table is classified as:
• i. s-block;
• ii. p-block;
• iii. d-block;
• iv. f-block

Q40. Answer: (b) Refractive index

CONCEPT:

• Refraction of Light: The bending of the ray of light passing from one medium to the other medium is called refraction.
• The refraction of light takes place on going from one medium to another because the speed of light is different in the two media.
• The greater the difference in the speeds of light in the two media, the greater will be the amount of refraction.
• A medium in which the speed of light is more is known as an optically rarer medium and a medium in which the speed of light is less is known as an optically denser medium.

EXPLANATION:

The difference in speed of light is due to Refractive index.

• Mathematically the refractive index can be written as

=> Speed of light in a medium(v) = (Speed of light in vaccum(C))/(Refractive index (μ))

• As the speed of light in a vacuum is constant, therefore we can say that speed of light in a medium is inversely proportional to the refractive index of the medium.
• Hence, we can say that the speed of light travels at different speeds in different media.
• The speed of light in the air is 3 × 108 m/s. T
• When the light is travelling from water to air and as we know that the refractive index of water (1.33) and that of air (1.008), it means the water is a denser medium and air is a rarer medium.
• Whenever light goes from water to air, the frequency of light and phase of light does not change.
• However, the velocity of light and wavelength of light change (increases) because the light is travelling from a denser medium (μwater = 1.33) to a rarer medium (μair = 1.008).

Additional Information

• We can predict that Light travels slower in water than in air because as light travels from a rarer medium to a denser medium its velocity decreases because of the change in density of the medium
• This is a reason why light bends towards normal when it passes from a rarer medium to a denser medium
• And the amount of bending of light in any medium is given using the refractive index of a material.

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Q41. Answer: (b) Rs. 390

Shortcut Trick

Profit earned is 30% of the Cost Price (CP).

Given CP = Rs. 1300.

Profit = CP × Profit% ÷ 100.

Profit = 1300 × 30 ÷ 100 = 13 × 30 = 390.

Therefore The correct answer is Rs. 390.

Alternate Method

Given: Cost Price (CP) = Rs. 1300, Profit Percentage = 30%.

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

=> Cost Price of the book = Rs. 1300.

=> Profit Percentage = 30%.

=> Amount Earned (Profit) = 1300 × (30 ÷ 100).

=> Profit = 1300 × 0.3 = 390.

=> Selling Price (SP) = 1300 + 390 = Rs. 1690.

Therefore The correct answer is Rs. 390.

Additional Information

Cost Price vs Marked Price

The Cost Price is the actual amount paid by the buyer (Rs. 1300), regardless of the discount received from the Marked Price.

Profit Calculation

Profit is always calculated on the Cost Price unless stated otherwise. Formula: Profit = CP × Profit%.

Q42. Answer: (c) Arvind Parikh

The correct answer is Arvind Parikh.

• Arvind Parikh was honoured with the Padma Bhushan award in the field of art music from Maharashtra in 2018.

Key Points

• Arvind Parikh:

• He is a classical sitar player.

• He was also the vice president of the International Music Council (UNESCO) during 1994-97.

• He was given the Padma Bhushan award in the year 2018.

Important Points

• Padma Bhushan:

• The award is given for distinguished service of a high order in any field, including service rendered by government servants.

• It is the third-highest civilian honour in India.

• It was first awarded in 1954.

Additional Information

• S.P. Balasubramaniam was given Padma Vibhushan (2021, posthumously), Padma Bhushan in 2011, and Padma Shri in 2001.

• A. R. Rahman was given the Padma Bhushan in the year 2010.

• Ilayaraja was awarded the Padma Bhushan award in the year 2010 and Padma Vibhushan in 2018.

Q43. Answer: (c) MC Mary Kom

The correct answer is MC Mary Kom.

• MC Mary Kom was honoured with the 'Legend Award' by the Amateur International Boxing Association (AIBA).

Key Points

• MC Mary Kom:

• Her full name is Mangte Chungneijang Mary Kom.

• She is the only woman in the world to win the World Amateur Boxing Championship six times.

• She is nicknamed *M*agnificent* Mary*.

• Mary Kom has won eight World Championship medals.

• No other boxer either male or female in this world holds such an accomplishment.

• She has won six gold, one silver, and one bronze in the opposition in her famous lifetime.

• The last one came in Russia in 2019.

• She is also a Member of Parliament, Rajya Sabha.

Additional Information

• Amateur International Boxing Association (AIBA):

• It is also known as the International Boxing Association.

• It was formed in the year 1946.

• Its headquarters is located in Lausanne, Switzerland.

Q44. Answer: (c) Either I or II is strong

The given statement suggests whether buying double-door refrigerator is better.

• Argument I agrees with it giving the reason that it is good since it separates freezer and refrigerator. So it is strong.

• Argument II disagrees with it giving the reason that it is costlier and needs more power. So this is also strong.

• Since the arguments are justifying opposite answers, either one of them can be strong at a time. One argument states the benefit whereas the other argument states the disadvantage of a double-door refrigerator.

Hence the correct answer is option 3.

Q45. Answer: (a) [figure]

The logic followed here is:-

• All biscuits are baked and

• rice pakoras are different from both.

The logical Venn diagram is given below:-

Hence, "option 1" is the correct answer.

Q46. Answer: (b) 2051212

The logic followed here is:-

Similarly,

Hence, "option 2" is the correct answer.

Q47. Answer: (c) 10

Shortcut Trick

Ratio of ages of Nag : Ragini : Rani = x : 2x : (2x + 2)

Sum of ratios => x + 2x + 2x + 2 = 27

=> 5x = 25 => x = 5

Ragini's age = 2x = 2 × 5 = 10 years.

Therefore The correct answer is 10 years.

Alternate Method

Given:

Let the age of Nag be x years.

Age of Ragini = 2 × Age of Nag = 2x

Age of Rani = Age of Ragini + 2 = 2x + 2

Calculations:

=> Total Sum = Rani + Ragini + Nag = 27

=> (2x + 2) + 2x + x = 27

=> 5x + 2 = 27

=> 5x = 27 − 2

=> 5x = 25

=> x = 5

=> Ragini's age = 2x = 2 × 5 = 10

Therefore The correct answer is 10 years.

Additional Information

Ages Problems Strategy

Always identify the base person (usually the youngest) and represent others in terms of that person's age to simplify equations.

Ratio of Ages

If the ratio of ages is a:b, then ages are assumed as ax and bx. The difference in ages remains constant throughout life.

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Linear Equations

Most age problems result in a linear equation in one variable. Ensure all terms (years ago, hence) are adjusted relative to the present age.

Q48. Answer: (a) Yogi Adityanath

The correct answer is Yogi Adityanath.

• Yogi Adityanath was a priest of the first temple.

Key Points

• Yogi Adityanath:

• He is the 22nd and current Chief Minister of Uttar Pradesh.

• He is from the Gorakhpur constituency.

• He is also the head priest of the Gorakhnath Math, Gorakhpur.

• He is also the founder of Hindu Yuva Vahini.

Additional Information

• Vijay Rupani was the former chief minister of Gujarat.

• Manohar Parrikar was a former defence minister of India.

• He was an IIT alumnus.

• Mayawati was Chief Minister of Uttar Pradesh briefly in 1995 and again in 1997, then from 2002 to 2003 and from 2007 to 2012.

Q49. Answer: (a) 4 √3 cm²

Shortcut Trick

Perimeter of rectangle = 2(4 + 2) = 12 cm.

Side of equilateral triangle (a) = 12 ÷ 3 = 4 cm.

Area of triangle = (√3 / 4) × a² = (√3 / 4) × 16 = 4√3 cm².

Therefore The correct answer is 4√3 cm².

Alternate Method

Given: Length of rectangle (l) = 4 cm, Breadth of rectangle (b) = 2 cm.

Formula Used: Perimeter of rectangle = 2(l + b); Perimeter of equilateral triangle = 3 × side; Area of equilateral triangle = (√3/4) × side².

=> Total length of wire = Perimeter of rectangle

=> Perimeter = 2 × (4 + 2) = 2 × 6 = 12 cm

=> This wire is bent into an equilateral triangle.

=> 3 × side (a) = 12 cm

=> side (a) = 4 cm

=> Area = (√3 / 4) × (4)²

=> Area = (√3 / 4) × 16 = 4√3 cm²

Therefore The correct answer is 4√3 cm².

Additional Information

Equilateral Triangle Properties

All sides are equal and each interior angle is 60°. Height (h) = (√3/2) × side.

Perimeter Invariance

When a 1D wire is reshaped into different 2D polygons, the perimeter remains constant while the area changes.

Area of Rectangle

Area = Length × Breadth. For the given rectangle, Area = 4 × 2 = 8 cm².

Q50. Answer: (a) Rs. 360000

Shortcut Trick

Domestic work expenditure = 80% of Monthly Salary = Rs. 24000.

100% Monthly Salary = (24000 ÷ 80) × 100 = Rs. 30000.

Annual Income = Monthly Salary × 12 months.

Annual Income = 30000 × 12 = Rs. 360000.

Therefore The correct answer is Rs. 360000.

Alternate Method

Given Domestic Expenditure = 80%
Value of 80% = Rs. 24000
=> 1% of Monthly Salary = 24000 ÷ 80
=> 1% of Monthly Salary = Rs. 300
=> 100% (Monthly Salary) = 300 × 100 = Rs. 30000
=> Annual Income = Monthly Salary × 12
=> Annual Income = 30000 × 12 = Rs. 360000
Therefore The correct answer is Rs. 360000.
Additional Information
Percentage Base Change
Always ensure the base value (Total Salary) represents 100% before calculating specific components.
Annual vs Monthly Calculation
To find Annual Income from Monthly Income, multiply by 12. To find Monthly from Annual, divide by 12.
Successive Percentage
If the question states % of 'remaining', use the successive multiplication method: Total × (Remaining %/100).

Q51. Answer: (a) 0

Shortcut Trick
Use complementary angles: tan θ × tan(90° − θ) = 1.
tan 34° × tan 56° = 1 and tan 42° × tan 48° = 1.
Standard values: tan 60° = √3, cot 30° = √3, cosec 30° = 2, sec 60° = 2.
Expression => (1 × 1) + (√3 × √3) − (2 × 2) = 1 + 3 − 4 = 0.
Therefore The correct answer is 0.
Alternate Method
Given: tan 34° tan 42° tan 48° tan 56° + tan 60° cot 30° − cosec 30° sec 60°
Formula Used: tan(90° − θ) = cot θ; tan θ × cot θ = 1; Trigonometric standard values.
=> tan 34° tan 42° tan(90° − 42°) tan(90° − 34°) + (√3 × √3) − (2 × 2)
=> tan 34° tan 42° cot 42° cot 34° + 3 − 4
=> (tan 34° cot 34°) × (tan 42° cot 42°) + 3 − 4
=> (1 × 1) + 3 − 4
=> 1 + 3 − 4 = 0
Therefore The correct answer is 0.
Additional Information
Complementary Angle Identities
For any angle θ, sin(90° − θ) = cos θ, tan(90° − θ) = cot θ, and sec(90° − θ) = cosec θ.
Trigonometric Table Values
Standard values like sin 30° = 1/2, cos 30° = √3/2, and tan 45° = 1 are essential for fast calculation.
Reciprocal Identities
sin θ × cosec θ = 1, cos θ × sec θ = 1, and tan θ × cot θ = 1.

Q52. Answer: (c) 82

Shortcut Trick
Step 1: Identify the range. 802 = 6400 and 902 = 8100. So, √6724 lies between 80 and 90.
Step 2: Look at the unit digit. The unit digit of 6724 is 4. Possible unit digits of the square root are 2 or 8.
Step 3: The possible numbers are 82 or 88. Since 6724 is much closer to 6400 (802) than 8100 (902), the answer is 82.
Therefore The correct answer is 82.
Alternate Method
Given: The number is 6724.
Formula: Long Division Method for finding Square Root.
=> Group the digits in pairs from right to left: 67, 24.
=> Find the largest square less than or equal to 67: 8 × 8 = 64.
=> Remainder = 67 − 64 = 3. Bring down the next pair: 324.

=> Double the divisor 8 to get 16. Find a digit 'x' such that 16x × x ≤ 324.
=> Try x = 2: 162 × 2 = 324.
=> Remainder = 0. The quotient is 82.
Therefore The correct answer is 82.
Additional Information
Square Root Unit Digit Rule
If a perfect square ends in 4, its square root must end in either 2 or 8 because 22 = 4 and 82 = 64.
Range Method
For any number N, if x2 < N < (x+1)2, then the square root lies between x and x+1. This helps narrow down options quickly.

Q53. Answer: (d) Alcohol

The correct answer is Alcohol.
• Alcohol compound has –OH as a functional group.
Key Points
• Alcohols are important molecules in organic chemistry.
• They can be prepared from and converted into many different types of compounds.
• Alcohols contain the hydroxy functional group (-OH) which is bonded to a carbon atom of an alkyl or a substituted alkyl group.
• The functional group of an alcohol is the hydroxyl group, –OH.
Additional Information
• The functional group of the carboxylic acid is –COOH.

Q54. Answer: (d) Iskcon

The correct answer is Iskcon.
• Iskcon has established Govardhan Ecological Village in Maharashtra.
Key Points
• Govardhan Village:
• The village is located in Wada taluka, Palghar district at the foothills of the Sahyadri mountains.
• It was set up by the International Society for Krishna Consciousness (ISKCON) in the adjoining Thane district.
• The village has also won an award for being a sustainable project in rural Maharashtra.
• ISKCON:
• It is the acronym for International Society for Krishna Consciousness.
• It is also known as the Hare Krishna movement.
• It was founded in the year 1966 in New York City by A. C. Bhaktivedanta Swami Prabhupada.
• Its headquarters is located at Mayapur Chandrodaya Mandir
Nadia, West Bengal.
Additional Information
• ISH is International Social Humanity Foundation.
• It was founded by Sadhguru.
• Gaudiya Math is founded by Bhaktisiddhanta Sarasvati.

Q55. Answer: (c) 348.488

Shortcut Trick
Subtract the numbers sequentially or group the negative terms: 392 − (39.2 + 3.92 + 0.392).
Sum of negative terms = 43.512.
392.000 − 43.512 = 348.488.
Therefore The correct answer is 348.488.
Alternate Method
Given:
Expression = 392 − 39.2 − 3.92 − 0.392
Calculations:
=> Step 1: 392 − 39.2 = 352.8
=> Step 2: 352.8 − 3.92 = 348.88
=> Step 3: 348.88 − 0.392 = 348.488

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Therefore The correct answer is 348.488.

Additional Information

BODMAS Rule

Always follow the BODMAS order: Brackets, Orders, Division, Multiplication, Addition, and Subtraction.

Decimal Alignment

When subtracting decimals, always align the decimal points and add trailing zeros to maintain the same number of decimal places.

Grouping Property

For multiple subtractions, a − b − c = a − (b + c) helps in faster calculation.

Q56. Answer: (b) Aishwarya Rai

The correct answer is Aishwarya Rai.

• Aishwarya Rai has won the Best Actress award at the International Film Festival of Australia and Awards (IFFA) in March 2017.

Key Points

• The International Film Festival of Australia and Award was given to Aishwarya Rai Bacchan for the character of Sarabjit Singh's sister Dalbir Kaur in the movie Sarabjit.

• The movie was directed by director Omung Kumar.

Additional Information

• International Film Festival Australia:

• It is an annual film festival held in Melbourne, Australia.

• It was founded in 1952.

Q57. Answer: (b) Cousin sister

The family tree is given below:-

The lady in the picture is the cousin sister of Madhu.

Hence, "option 2" is the correct answer.

Q58. Answer: (b) 5/12

Given:

Sum of two numbers = 7/6

Calculation:

Second fraction = 7/6 - 3/4

=> (14 - 9)/12

=> 5/12

Therefore The second fraction is 5/12

Q59. Answer: (a) C6H12O6

The correct answer is C6H12O6.

• The compound using the proven formula CH2O has a vapour density of 90.

• The molecular formula of the compound is C6H12O6.

Key Points

• n = (Molecular Formula)/(Empirical Formula)

• Given, the empirical formula of compound = CH2O.

• Vapour density of compound = 90.

• Molar mass of a compound = vapour density x 2

• = 180 g.

• Empirical formula Mass of CH2O = 12 + 2 + 16 = 30

• n = 180/30

• n = 6

• Hence, n of the compound is 6.

Q60. Answer: (a) Pankaj Advani

The correct answer is Pankaj Advani.

• Pankaj Advani won the World Billiards Championship title in 2017.

Key Points

• Pankaj Advani:

• He is an Indian billiards and snooker player.

• He is a 23-time world champion.

• He has also won the IBSF World Billiards Championship 15 times.

• He won the World Billiards Championship title in 2017.

• The championship was held in Doha, Qatar.

• He defeated Mike Russel of England.

• He was awarded Padma Shri in 2009 and Padma Bhushan in 2018.

Additional Information

• Saurav Kothari, Michael Ferreira and Geet Sethi are all associated with the billiards.

Q61. Answer: (b) 0.80

Shortcut Trick

For any angle θ, the relationship between secθ and tanθ is reciprocal: (secθ + tanθ) × (secθ − tanθ) = 1.

Given: secθ + tanθ = 1.25 = 5/4.

Logic: secθ − tanθ = 1 ÷ (secθ + tanθ) = 1 ÷ 1.25.

=> 1 / (5/4) = 4/5 = 0.80.

Therefore The correct answer is 0.80.

Alternate Method

Given: secθ + tanθ = 1.25

Formula Used: $sec^2\theta - tan^2\theta = 1$

=> (secθ + tanθ)(secθ − tanθ) = 1

=> 1.25 × (secθ − tanθ) = 1

=> secθ − tanθ = 1 / 1.25

=> secθ − tanθ = 100 / 125

=> secθ − tanθ = 4 / 5

=> secθ − tanθ = 0.80

Therefore The correct answer is 0.80.

Additional Information

Trigonometric Identities

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

Cosecant and Cotangent Relationship

Similar to sec and tan, (cosecθ + cotθ) and (cosecθ − cotθ) are reciprocals of each other since $cosec^2\theta - cot^2\theta = 1$.

Finding Individual Values

If secθ + tanθ = x, then secθ = $(x^2 + 1) / 2x$ and tanθ = $(x^2 - 1) / 2x$.

Q62. Answer: (d) Meat

The logic followed here is:-

Oregano, cauliflower, and salad are obtained from plants and meat is obtained from animals.

So, meat is different from others.

Hence, "option 4" is the correct answer.

Q63. Answer: (a) Aurangzeb

The correct answer is Aurangzeb.

• The Mughal Emperor Aurangzeb adopted the title 'Alamgir'.

Key Points

• Aurangzeb (1658 AD-1707 AD):

• He was crowned at Delhi under the title Alamgir.

• Aurangzeb captured Guru Teg Bahadur, the 9th Guru of Sikhs in 1675 AD and executed him when he refused to embrace Islam.

• Aurangzeb compiled Fatwa-i-Alamgiri.

• He was called Zinda Pir, the living saint.

• He annexed Marwar in 1678 AD.

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• The campaign was led by Akbar II against Durgadas, General of Ajit Singh.

Additional Information

• Akbar ascended the throne under the title of Jalaluddin Muhammad Akbar Badshah Ghazi.

• Shahjahan (1628 AD-1658 AD):

• His real name was Khurram.

• French travellers Bernier and Tavernier and the Italian traveller Nicolo Manucci visited during his reign.

• The Red Fort, Jama Masjid, and Taj Mahal are some of the magnificent structures built during his reign.

• Shahjahan's reign is also said to have marked the pinnacle of the Mughal dynasty and empire

Q64. Answer: (b) 23

The triangles are as follows:

The total number of triangles is 23.

Hence, "option 2" is the correct answer.

Q65. Answer: (b) 1500 J

The correct answer is 1500 J.

• Given,

• Mass, m = 30 kg.

• Velocity, v = 10 ms^(-1).

• Kinetic Energy=1/2 mv^2

• =12(30×102)=12(30×102)

• = 1500 J.

Additional Information

• Kinetic Energy:

• If a body of mass m is moving with velocity v, then kinetic energy

• KE =1/2mv^2= (P^2)/2m

• where p is the linear momentum.

• When momentum is doubled, kinetic energy becomes four times.

• If a body is moving in a horizontal circle then its kinetic energy is the same at all points, but if it is moving in a vertical circle, then the kinetic energy is different at different points.

Q66. Answer: (a) Both assumptions I and II are implicit.

The teacher telling the students that 'water is a valuable resource' implies that

• water is important and the teacher wants the children to know it,

• since it is important it should not be wasted.

• Thus, both the assumptions are implicit.

Hence the correct answer is option 1.

Q67. Answer: (b) 960

Shortcut Trick

Find the LCM of 10, 8, and 12.

LCM (10, 8, 12) = 120.

The largest 3-digit number (999) ÷ 120 gives a remainder of 39.

Largest number = 999 − 39 = 960.

Therefore The correct answer is 960.

Alternate Method

Given: Divisors are 10, 8, and 12.

Formula Used: Largest n-digit number divisible by x, y, z = (Largest n-digit number) − (Remainder when largest n-digit number is divided by LCM of x, y, z).

=> Prime factorization of 10 = 2 × 5

=> Prime factorization of 8 = 2^3

=> Prime factorization of 12 = 2^2 × 3

=> LCM = 2^3 × 3 × 5 = 8 × 15 = 120

=> Largest 3-digit number = 999

=> 999 ÷ 120 → Quotient = 8, Remainder = 39

=> Required number = 999 − 39 = 960

Therefore The correct answer is 960.

Additional Information

LCM (Least Common Multiple)

The smallest positive integer that is divisible by each of the given numbers. It is used to find common intervals or common multiples.

HCF and LCM Relation

For any 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).

Smallest n-digit number divisible by x, y, z

Calculated as (Smallest n-digit number) + (LCM − Remainder), where the remainder is from dividing the smallest n-digit number by the LCM.

Q68. Answer: (d) 6 – √3

Shortcut Trick

Put standard values: sin 30° = 1/2 and cos 30° = √3/2.

Expression => [2(1/2) / (1 + √3/2)] + [(1 + √3/2) / (1/2)]

=> [1 / ((2+√3)/2)] + [((2+√3)/2) / (1/2)] => 2/(2+√3) + (2+√3)

Rationalizing 2/(2+√3) gives 2(2−√3) = 4 − 2√3. Total => 4 − 2√3 + 2 + √3 = 6 − √3.

Therefore The correct answer is 6 − √3.

Alternate Method

Given: expression with θ = 30°.

Formula Used: $\sin^2\theta + \cos^2\theta = 1$

=> [2sinθ / (1 + cosθ)] + [(1 + cosθ) / sinθ]

=> [$2\sin^2\theta$ + (1 + cosθ)²] / [sinθ(1 + cosθ)]

=> [$2\sin^2\theta$ + 1 + $\cos^2\theta$ + 2cosθ] / [sinθ(1 + cosθ)]

=> [($\sin^2\theta$ + $\cos^2\theta$) + $\sin^2\theta$ + 1 + 2cosθ] / [sinθ(1 + cosθ)]

=> [1 + $\sin^2(30°)$ + 1 + 2cos(30°)] / [sin(30°)(1 + cos(30°))]

=> [2 + $(1/2)^2$ + 2(√3/2)] / [(1/2)(1 + √3/2)]

=> [2 + 1/4 + √3] / [(1/2)((2 + √3)/2)] => [(9/4 + √3)] / [(2 + √3)/4]

=> (9 + 4√3) / (2 + √3)

=> [(9 + 4√3)(2 − √3)] / [(2 + √3)(2 − √3)]

=> (18 − 9√3 + 8√3 − 12) / (4 − 3) => 6 − √3

Therefore The correct answer is 6 − √3.

Additional Information

Trigonometric Identities

Fundamental identity: $\sin^2\theta + \cos^2\theta = 1$. Also, $1 + \tan^2\theta = \sec^2\theta$.

Standard Values

For θ = 30°, sin 30° = 1/2, cos 30° = √3/2, and tan 30° = 1/√3.

Rationalization

To rationalize a denominator like (a + √b), multiply numerator and denominator by its conjugate (a − √b).

Q69. Answer: (c) 164°

One of the angles between the hour hand and the minute hand when the clock shows 3:52 pm can be calculated using the following formula:-

Angle = | 11/2 M - 30 H|

Where, M = minutes and H = hours.

Here, M = 52, H = 3

Therefore, we get angle = | 11/2 × 52 - 30 × 3| = |286 - 90| = 196°.

For the smaller angle, we subtract 196° from 360°

• 360° - 196° = 164°

Hence, "option 3" is the correct answer.

Q70. Answer: (c) Vegetative propagation

The correct answer is Vegetative propagation.

• Roots, stems, and leaves of some plants develop into new plants through the process of Vegetative propagation.

Key Points

• Vegetative reproduction:

• It is any form of asexual reproduction occurring in plants in which a new plant grows from a fragment or from the cuts off of the parent plant or a specialized reproductive structure.

• The roots, stems, and leaves of some plants develop into new plants through the same process.

Q71. Answer: (a) Kerala

The correct answer is Kerala.

• The tropical rainforest can be found in the Silent Valley of Kerala.

Key Points

• Tropical Rain Forests:

• These forests are evergreen.

• These are found in the equatorial and the tropical regions with more than 200 cms annual rainfall.

• The leaves of trees in such forests are very wide.

• Examples: Redwood, palm, etc.

• As Kerala is located near the equator and always becomes a part of Western Ghats, the tropical rainforest can be found here.

• Silent Valley National Park is located in Kerala.

Additional Information

• Tropical Dry Deciduous Forests are found in Rajasthan.

• Tropical Thorn Forest is found in Delhi.

• Deciduous and Evergreen Tropical Forests are found in Meghalaya.

Q72. Answer: (a) 121, 169

The logic followed here is:-

• This is a series of squares of natural numbers in ascending order.

Hence, "option 1" is the correct answer.

Q73. Answer: (d) Chenab Bridge

The correct answer is Chenab Bridge.

• The Indian Railways has planned to build Chenab Bridge in Jammu and Kashmir by the year 2016, which will be the world's highest railway bridge.

Key Points

• Chenab Bridge:

• It is the world's highest railway bridge.

• It is being constructed by Indian Railways.

• It is part of the Udhampur-Srinagar-Baramulla rail link project (USBRL).

• The Chenab bridge project was declared as a Project of National Importance in March 2002.

• The length of the bridge is 1,315-metre and its height is 359 metres above the river bed level.

Additional Information

• Indian Railways:

• Indian Railway Board was established in March 1905.

• Indian Railway was nationalised in 1950.

• Railways have been divided into 19 zones.

• The first Indian railway line in India was operated for public traffic in 1853 between Mumbai and Thane over a distance of 34 km.

• Ashwini Vaishnaw is the current Minister of Railways.

• The first electric train in India was ‘Deccan Queen’.

• It was introduced in 1929 between Bombay and Poona

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Q74. Answer: (d) Rs. 4000

Shortcut Trick

Identify the percentage for outdoor games = 40%.

Total monthly sales = Rs. 10000.

Outdoor sales = 40% of 10000 = 40 × 100.

Outdoor sales = Rs. 4000.

Therefore The correct answer is Rs. 4000.

Alternate Method

Given:

Percentage of swimming accessories = 50%

Percentage of outdoor game accessories = 40%

Percentage of indoor game accessories = 10%

Total monthly sales = Rs. 10000

Calculations:

=> Outdoor game sales = Total Sales × (Outdoor game percentage / 100)

=> Outdoor game sales = 10000 × (40 / 100)

=> Outdoor game sales = 10000 × 0.4

=> Outdoor game sales = 4000

Therefore The correct answer is Rs. 4000.

Additional Information

Percentage Base Change

To find the absolute value from a percentage, use the formula: Value = (Percentage / 100) × Total Base Value.

Ratio Representation

The distribution 50%:40%:10% can be expressed in the simplest ratio as 5 : 4 : 1. The total parts are 10.

Unitary Method

If 100% represents Rs. 10000, then 1% represents Rs. 100. Therefore, 40% represents 40 × 100 = Rs. 4000.

Q75. Answer: (a) virtual and laterally inverted

The correct answer is virtual and laterally inverted.

• The image for a plane mirror is virtual and laterally inverted.

Key Points

• Reflection From Plane Mirror:

• The image is virtual and laterally inverted.

• The size of the image is equal to that of the object.

• The distance of the image from the mirror is equal to the distance of the object from the mirror.

• If an object moves towards (or away from) a plane mirror with speed u, relative to the object, the image moves towards (or away) with a speed of 2u.

• If a plane mirror is rotated by an angle θ, keeping the incident ray fixed, the reflected ray is rotated by an angle 2θ.

• To see his full image in a plane mirror, a person requires a mirror of at least half of his height.

Additional Information

• The image formed by a concave mirror is real and virtual.

• The images formed by a convex mirror is always virtual and erect.

Q76. Answer: (a) 6 m

Shortcut Trick

Relative Speed Difference logic: (V − 9.6) × 4.5 = (V − 12) × 9

=> 4.5V − 43.2 = 9V − 108

=> 4.5V = 64.8 => V = 14.4 kmph

=> Length = (14.4 − 12) × (5/18) × 9 = 2.4 × (5/2) = 6 m

Therefore The correct answer is 6 m.

Alternate Method

Given: Speed of Person 1 (v1) = 9.6 km/hr, Speed of Person 2 (v2) = 12 km/hr, Time 1 (t1) = 4.5 sec, Time 2 (t2) = 9 sec.

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Formula Used: Distance (Length) = Relative Speed × Time

=> Let the speed of the bus be V km/hr and Length be L meters.

=> L = (V − 9.6) × (5/18) × 4.5 --- (i)

=> L = (V − 12) × (5/18) × 9 --- (ii)

=> Equating (i) and (ii): (V − 9.6) × 4.5 = (V − 12) × 9

=> V − 9.6 = 2 × (V − 12)

=> V − 9.6 = 2V − 24

=> V = 14.4 km/hr

=> L = (14.4 − 12) × (5/18) × 9

=> L = 2.4 × (5/2) = 1.2 × 5 = 6 m

Therefore The correct answer is 6 m.

Additional Information

Relative Speed

When moving in the same direction, Relative Speed = V1 − V2. When moving in opposite directions, Relative Speed = V1 + V2.

Unit Conversion

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

Train/Bus Crossing Objects

When a bus/train crosses a person or a pole, the distance covered is equal to the length of the bus/train itself.

Q77. Answer: (a) Cousin brother

The family tree is given below:-

Vishal's father is the cousin brother of Vinay's father.

Hence, "option 1" is the correct answer.

Note: This question was ignored in the official paper due to a discrepancy. Therefore, we have modified this question to make it logical.

Q78. Answer: (a) Ram and Shyam do equal work.

Concept:

• Work is said to be done by a force when the body is displaced actually through some distance in the direction of the applied force.

• Since the body is being displaced in the direction of F, therefore work done by the force in displacing the body through a distance s is given by:

W = vec F · vec s

Or, W = Fs cos θ

So, from this, we can conclude that

• Work done is positive when the direction of both force and displacement are the same

• Work done is negative when the direction of force and displacement are the opposite.

• Whereas work is done is zero when direction force (Centripetal force) and displacement are perpendiculars this case is true for an object moving in a circular motion

Explanation:

• Work done is not dependent on Time taken.

• It is dependent on Force and displacement.

• Since there is no change in any of them here.

• They displace the same upward displacement, so they do the same work.

• Hence Ram and Shyam have done an equal amount of work done.

Mistake Points

• In terms of power, they do different unit.

• As power equals = (Work done/Time)

• Shyam consumes more power than Ram or Shyam is more efficient.

Q79. Answer: (c) D

The logic followed here is:-

All figures are made with four lines and then the fourth part is also made with four lines. Figure D is made of four lines

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Therefore, the series will be as follows:

Hence, "option 3" is the correct answer.

Q80. Answer: (c) Vijay Rupani

The correct answer is Vijay Rupani.

• Vijay Rupani is the Chief Minister of Gujarat as of March 2017.

• Bhupendrabhai Patel is the current CM of Gujarat (as of June 2022)

Key Points

• Vijay Rupani:

• He was the 16th Chief Minister of Gujarat from 2016 to 2021.

• His constituency is Rajkot West.

• He is a member of Bharatiya Janata Party (BJP).

• He also served as the Minister of Transport, Minister of Labour & Employment, and Minister of Water Supply of Gujarat.

• Bhupendrabhai Patel is the current chief minister of Gujarat as of January 2022.

• He is from the Ghatlodia constituency.

Additional Information

• Shankar Singh Vaghela was the 12th Chief Minister of Gujarat.

• Narendra Modi was the 14th Chief Minister of Gujarat.

• Keshubhai Patel was the 10th Chief Minister of Gujarat.

Q81. Answer: (d) 1024

The logic followed here is:-

Hence, "option 4" is the correct answer.

Q82. Answer: (b) 21411142017

The logic followed here is:-

Similarly,

Hence, "option 2" is the correct answer.

Q83. Answer: (c) D

The logic followed here is:-

• L and positional value of L is 12 present in figure A,

• C and positional value of C is 3 present in figure B,

• E and positional value of E present in figure C, and

• O and positional value of O is 15 but 16 present in figure D.

So, Figure D is different from others.

Hence, "option 3" is the correct answer.

Q84. Answer: (a) Team A and Team B have the same average score.

From the given table we can say,

Average score of both teams is 2 [12 goals in 6 games]

Therefore Team A and Team B have the same average score.

Q85. Answer: (c) In the north-west

The figure is given below:-

Market is in the north-west of his house.

Hence, "option 3" is the correct answer.

Q86. Answer: (b) 3696 m2

Shortcut Trick

Circumference (C) = $2 \times \pi \times r \Rightarrow r = C / (2\pi)$

Inner radius (r) = $44 / (2 \times 22/7) = 7$ m

Outer radius (R) = $220 / (2 \times 22/7) = 35$ m

Area of path = $\pi(R^2 - r^2) = \pi(R + r)(R - r) = 22/7 \times (35 + 7) \times (35 - 7)$

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Area of path = 22/7 × 42 × 28 = 22 × 42 × 4 = 3696 m²

Therefore The correct answer is 3696 m².

Alternate Method

Given: Outer Perimeter (C_(outer)) = 220 m, Inner Perimeter (C_(inner)) = 44 m

Formula Used: Perimeter = 2πr; Area of circular path = π(R² − r²)

=> 2 × (22/7) × r = 44

=> r = (44 × 7) / 44 = 7 m

=> 2 × (22/7) × R = 220

=> R = (220 × 7) / 44 = 35 m

=> Area of path = (22/7) × (35² − 7²)

=> Area of path = (22/7) × (1225 − 49)

=> Area of path = (22/7) × 1176 = 22 × 168 = 3696 m²

Therefore The correct answer is 3696 m².

Additional Information

Area of Annulus

The region between two concentric circles is called an annulus. Its area is given by π(R² − r²) or π(R + r)(R − r).

Width of the Path

The uniform width of a circular path is the difference between the outer and inner radii: Width = R − r.

Circumference and Radius Relationship

If the circumference is C, the radius r is C / 2π. If the circumference increases by x, the radius increases by x / 2π.

Q87. Answer: (c) Sakshi Malik

The correct answer is Sakshi Malik.

• Sakshi Malik was awarded Padma Shri in 2017.

Key Points

• Sakshi Malik:

• She is a freestyle wrestler.

• she won the bronze medal in the 58 kg category at the 2016 Summer Olympics.

• She became the first Indian female wrestler to win a medal at the Olympics.

• She also won the silver medal at the 2014 Commonwealth Games in Glasgow.

• She was awarded Padma Shri in 2017.

• She was awarded the Major Dhyan Chand Khel Ratna in the year 2016.

Q88. Answer: (b) 20 ms^(–1)

Shortcut Trick

Average Speed = Total Distance ÷ Total Time

Speed = 500 ÷ 25 = 20 m/s

Note: m/s can be written as ms^(−1).

Therefore The correct answer is 20 ms^(−1).

Alternate Method

Given:

Total Distance = 500 m

Total Time = 25 second

Formula Used:

Average Speed = Distance / Time

=> Average Speed = 500 / 25

=> Average Speed = 20 m/s

=> In standard unit notation: 20 ms^(−1)

Therefore The correct answer is 20 ms^(−1).

Additional Information

Unit Conversion

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

Average Speed for equal distances

If a body travels two equal distances at speeds u and v, then Average Speed = (2 × u × v) / (u + v).

Instantaneous Speed

The speed of an object at a particular moment in time, measured by a speedometer in vehicles.

Q89. Answer: (b) C

The logic followed here is:-

• When the question figure rotates 90^0 clockwise, we get figure C.

Hence, "option 2" is the correct answer.

Q90. Answer: (a) Rs. 25300

His total income = Rs. 55000

Spend on EMI = 55000 × 46/100

=> Rs. 25300

Therefore EMI to be paid by him in each month is Rs. 25300

Q91. Answer: (d) 2 hours 36 minute

Shortcut Trick

Total Capacity (LCM of 3.9, 5.2, 10.4) = 31.2 units.

Efficiencies: A = 8, B = 6, C = −3. Combined Efficiency = 8 + 6 − 3 = 11 units/hr.

Remaining work to fill = (1 − 1/12) × 31.2 = 11/12 × 31.2 = 28.6 units.

Time taken = 28.6 ÷ 11 = 2.6 hours = 2 hr 36 min.

Therefore The correct answer is 2 hr 36 min.

Alternate Method

Pipe	Time (hrs)	Total Work (units)	Efficiency
Pipe A (Inlet)	3.9	31.2	8
Pipe B (Inlet)	5.2	6	
Pipe C (Outlet)	10.4	−3	

=> Total capacity of the cistern = LCM(3.9, 5.2, 10.4) = 31.2 units.

=> Combined efficiency of all three pipes = 8 + 6 − 3 = 11 units/hr.

=> Initial filled volume = 1/12 × 31.2 = 2.6 units.

=> Remaining volume to be filled = 31.2 − 2.6 = 28.6 units.

=> Time required = 28.6 ÷ 11 = 2.6 hours.

=> 0.6 hours = 0.6 × 60 minutes = 36 minutes.

=> Total time = 2 hours 36 minutes.

Therefore The correct answer is 2 hr 36 min.

Additional Information

Pipes and Cisterns Efficiency

Inlet pipe work is taken as positive (+) and outlet pipe (leak) work is taken as negative (−).

Time and Work Relation

Total Work = Efficiency × Time. For cisterns, Volume = Net Flow Rate × Time.

Q92. Answer: (b) momentum

The correct answer is momentum.

• The product of mass and velocity is momentum.

Key Points

• Momentum

• Momentum is the property of a moving body and is defined as the product of the mass and velocity of the body.

• It is a vector quantity.

• Its SI unit is kg m/s.

Additional Information

• Impulse
• When a large force acts on a body for a very small period, then force is called impulsive force.
• Impulse is defined as the product of force and time.
• It is a vector quantity and its direction is the direction of force.
• Its SI unit is Newton-second (Ns).
• Pressure is defined as a force acting normally on the unit area on the surface.
• SI unit of pressure is N/m^2 also called Pascal.

Q93. Answer: (b) simple squamous epithelium

The correct answer is the simple squamous epithelium.

Key Points

• Simple squamous epithelium:
• It is a single layer of flat scale-shaped cells.
• This tissue makes up the inner lining of the mouth and blood vessels.
• It also makes the mesothelial lining of the body cavities.

Additional Information

• Ciliated columnar epithelium tissues are found in the fallopian tube and parts of the respiratory system.
• Stratified squamous epithelium tissues are found in the organ system where the body comes into close contact with the outside environment
• Columnar epithelium tissues are found in the stomach and intestines.

Q94. Answer: (b) Can

The logic followed here is:-

Milk, Oil, and Petrol are liquids and a can is used to store liquids.

So, "can" is different from others.

Hence, "option 2" is the correct answer.

Q95. Answer: (d) Only Argument II is Strong

The statement asks whether opinion polls be held before the elections.

• Argument I agrees with it and states that it helps the public understand the election scenario which is not true. As the name suggests, opinion polls are usually not impartial. They are based on the opinions of a few people. Thus, it is not a reliable way of understanding the election scenario. So, argument I is not strong.
• If opinion polls are biased, then there is no point in continuing or holding such polls and hence they should be cancelled. Thus argument II is strong.

Hence the correct answer is option 4.

Q96. Answer: (c) 63/255

Given:

131/255+2/5+5-17/3

Calculation:

131/255+2/5+5-17/3

=> (131 + 102 + 1275 - 1445)/255

=> 63/255

Therefore Required answer is 63/255

Q97. Answer: (c) Economics

The correct answer is Economics.

• Professor Amartya Sen is famous in the field of economics.

Key Points

• Amartya Sen:
• He is a famous economist and philosopher.
• He won the Bharat Ratna award in the year 1999.
• He was awarded the Nobel Memorial Prize in Economic Sciences in 1998.

Q98. Answer: (a) Paris

The correct answer is Paris.

• Paris is the capital city of France.

Key Points

• France:

• Capital: Paris

• President: Emmanuel Macron (As of Jan 2022).

• Prime Minister: Jean Castex (As of Jan 2022).

• Currency: Euro

Q99. Answer: (c) 8.0 ms^(–1)

Shortcut Trick

Average Speed = Total Distance ÷ Total Time

Total Distance = 25 m + 15 m = 40 m

Total Time = 3 s + 2 s = 5 s

Average Speed = 40 ÷ 5 = 8.0 ms^(−1)

Therefore The correct answer is 8.0 ms^(−1).

Alternate Method

Given:

Distance 1 (d1) = 25 m, Time 1 (t1) = 3 s

Distance 2 (d2) = 15 m, Time 2 (t2) = 2 s

Formula Used:

Average Speed = (d1 + d2) ÷ (t1 + t2)

Calculations:

=> Total Distance = 25 + 15 = 40 m

=> Total Time = 3 + 2 = 5 s

=> Average Speed = 40 ÷ 5

=> Average Speed = 8.0 ms^(−1)

Therefore The correct answer is 8.0 ms^(−1).

Additional Information

Average Speed Formula

For unequal distances, Average Speed = Total Distance ÷ Total Time. It is a scalar quantity.

Special Case: Equal Distances

If an object covers two equal distances at speeds v1 and v2, the average speed is 2v1v2 ÷ (v1 + v2).

Units of Speed

The SI unit of speed is m/s or ms^(−1). To convert km/h to m/s, multiply by 5/18.

Q100. Answer: (c) k = 8 or k = 0

Shortcut Trick

For recurrent (equal) roots, the discriminant (D) of the quadratic equation must be zero.

D = b2 − 4ac = 0

=> (1.5k)2 = 4 × 1 × 4.5k

=> 2.25k2 = 18k

=> k = 0 or k = 18 ÷ 2.25 = 8

Therefore The correct answer is k = 8 or k = 0.

Alternate Method

Given:

Quadratic equation: x2 + 1.5kx + 4.5k = 0

Comparing with standard form ax2 + bx + c = 0:

a = 1, b = 1.5k, c = 4.5k

Formula Used:

For equal roots, Discriminant (D) = b2 − 4ac = 0

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Calculations:

=> $(1.5k)^2 - 4 \times (1) \times (4.5k) = 0$

=> $2.25k^2 - 18k = 0$

=> $2.25k(k - 8) = 0$

=> Either $2.25k = 0 \rightarrow k = 0$

=> Or $k - 8 = 0 \rightarrow k = 8$

Therefore The correct answer is k = 8 or k = 0.

Additional Information

Nature of Roots

The nature of roots of $ax^2 + bx + c = 0$ depends on $D = b^2 - 4ac$. If $D > 0$, roots are real and distinct; if $D < 0$, roots are complex.

Sum and Product of Roots

For a quadratic equation, the Sum of roots $(\alpha + \beta) = -b/a$ and the Product of roots $(\alpha\beta) = c/a$.

Perfect Square Condition

A quadratic expression is a perfect square if the discriminant is exactly zero, resulting in two identical real roots.

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