RRC Group D Previous Year Paper 21 (Held On: 17 Sept 2018 Shift 2)

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

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CBT

Q1. Choose the correct order of electrical resistivity of metals.

(a) Ag> W> Ni> Hg
(b) Hg> Ni> W> Ag
(c) Ag> Ni> Hg> W
(d) Ag> W> Hg> Ni

Q2. Rise in sugar levels in blood is detected by the

(a) Liver
(b) Gallbladder
(c) Kidney
(d) Pancreas

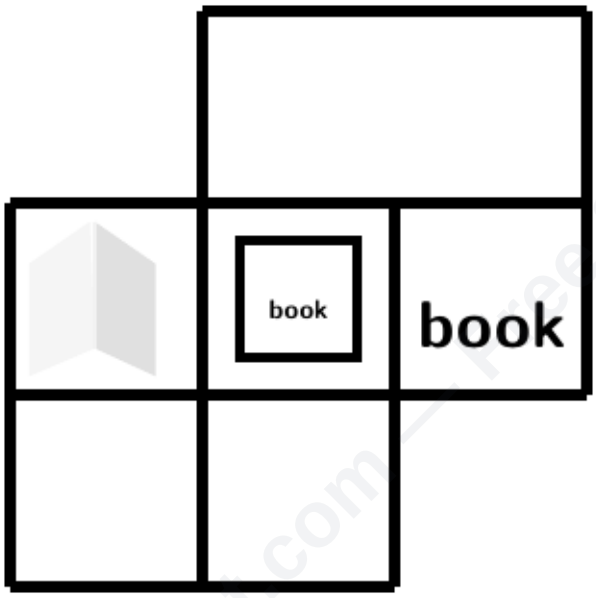
Q3. F is the father of S and D. D's Paternal aunt's daughter is E, how is F related to E?

(a) Maternal Uncle
(b) Daughter-in-law
(c) Daughter
(d) Nephew

Q4. Who among the following is the author of the book 'A Book of Light: When a Loved One Has a Different Mind?

(a) Arundhati Roy
(b) Amish Tripathi
(c) Jerry Pinto
(d) Harper Lee

Q5. Find the number of squares in the following figure.



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

Q6. The length and breadth of a rectangle are in the ratio of 3 : 1 If its perimeter is 96 m, then what is the length of the rectangle?

(a) 36 m
(b) 24 m
(c) 12 m
(d) 48 m

Q7. How many elements are present in the 18^(th) group of the Modern Periodic Table?

(a) 5
(b) 2
(c) 7
(d) 4

Q8. _____ is not a subatomic particle of an atom.

(a) Neutron
(b) Electron
(c) Xenon
(d) Proton

Q9. Consider the given statement and decide which of the following assumptions is/are implicit in the statement.

Statement:

The headmistress called for an urgent meeting for all staff members to discuss on discipline issues.

Assumption:

I. There were some discipline issues that were raised earlier.

II. The headmistress likes to address all of them together

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

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Q10. A person lifts luggage of 20 kg from the ground and puts it on his head 2 m above the ground. Calculate the work done by him. (g = 10 ms^(-2))

(a) 20 J
(b) 400 J
(c) 200 J
(d) 40 J

Q11. A natural number, when divided by 9, 10, 12 or 15, leaves a remainder of 3 in each case. What is the smallest of all such numbers?

(a) 183
(b) 153
(c) 63
(d) 123

Q12. Rama Setu is located in which of the following?

(a) Palk Strait
(b) Strait of Gibraltar
(c) Kiel Canal
(d) Bering Strait

Q13. Which of the following is work done by the placenta tissue in humans?

(a) Support the embryo
(b) Remove waste matter from the embryo and provide nutrition to the embryo
(c) Provide nutrition to the embryo
(d) Remove waste matter from the embryo

Q14. Spandana is the sister of Raju. How is Raju's father's sister related to Spandana?

(a) Grandmother
(b) Mother
(c) Aunt
(d) Sister

Q15. Which of the following doesn't fit into the series?

5 – 1 – 96, 27 – 1 – 96, 18 – 2 – 96, 12 – 3 – 96, 2 – 4 – 96

(a) 18 – 2 – 96
(b) 27 – 1 – 96
(c) 12 – 3 – 96
(d) 5 – 1 – 96

Q16. Teacher is related to Class in the same way Driver is related to _____

(a) Brake
(b) Wheel
(c) Parts
(d) Vehicle

Q17. (55/11) + (18 – 6) × 9 = ?

(a) 113
(b) 115
(c) 100
(d) 110

Q18. Weight of an object on the moon is ____ the weight of the object on earth.

(a) equal to
(b) 1/6th
(c) 1/2

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(d) 1/5th

Q19. 48 people could complete a task in 17 days. After 6 days. 4 of the workers left, how many days from then will it take to complete the task?

(a) 12
(b) 13
(c) 15
(d) 616

Q20. What was the name of the party launched by Subhash Chandra Bose in 1939?

(a) Communist Party of India
(b) All India Forward Bloc
(c) Azad Bengal Fauj
(d) Socialist Party of India

Q21. Which tissue makes the plant hard and stiff?

(a) Parenchyma
(b) Sclerenchyma
(c) Collenchyma
(d) Xylem

Q22. Out of the 60 student of a class, 29 took Mathematics, 32 took Biology and 8 took none of the two subjects. How many students took both Mathematics and Biology?

(a) 8
(b) 9
(c) 7
(d) 6

Q23. Which property of metals enables production of metallic foils?

(a) Malleability
(b) Ductility
(c) Sonority
(d) Conductivity

Q24. If ‘Q’ means ‘+’, ‘J’ means ‘×’, ‘T’ means ‘-‘ and ‘K’ means ‘÷’ then what is the value of 18K3Q7J2T8?

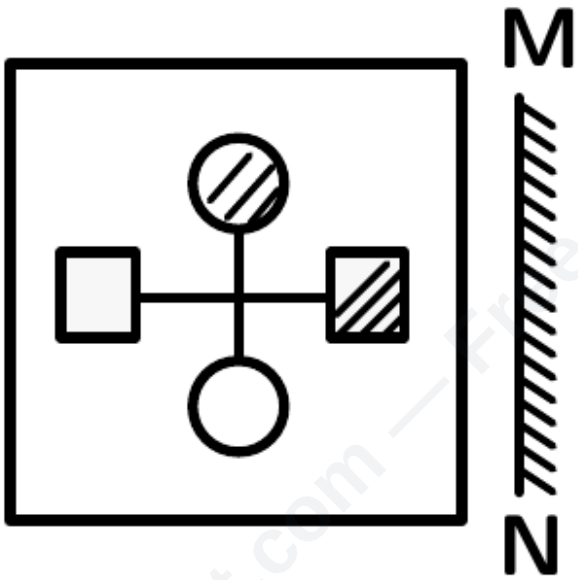
(a) 15
(b) 10
(c) 18
(d) 12

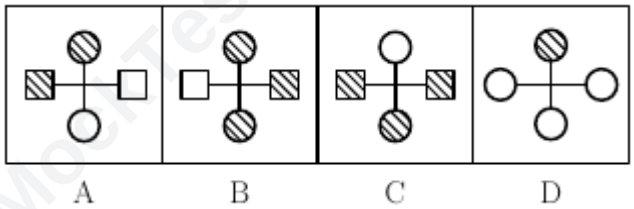
Q25. _____ is a deliquescent compound

(a) Quick lime
(b) Sulphuric acid
(c) Phosphorous pentoxide
(d) Sodium chloride

Q26. Choose the mirror image for the following figure when the mirror is kept at the MN line.

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

Q27. In which year was Bombay Stock Exchange (BSE) established?

(a) 1947
(b) 1875
(c) 1920
(d) 1960

Q28. Which company has been conferred with the ‘Startup of the year 2017’ award at the 7^(th) small Business Awards in New delhi?

(a) Milkbasket
(b) Milkmaid
(c) Milkdairy
(d) Milbar

Q29. Raju walks 4 km towards East. Then he turns left and walks another 3 km. In which direction and at what distance is he from his initial positon?

(a) South-west, 5 km
(b) North-East, 5 km
(c) South-East 5 km
(d) North-west 5 km

Q30. The mean of 21 observation (all different) is 40. If each observation greater than the median is increased by 21 then the mean of observation will become:

(a) 50
(b) 30
(c) 50.5
(d) 45

Q31. Who was awarded Banga Bibhushan, the highest civilian award of west Bengal, for 2018?

(a) Aparna Sen
(b) Victor Banerjee
(c) Sounitra Chatterjee
(d) Asha Bhosle

Q32. Let A(0, -1), B(0, 3) and C(2, 1) be three points. Let Δ1 be the area of the triangle ABC and Δ2 be the area of the triangle formed by the mid points of the sides of the triangle whose vertices are A, B and C such that Δ2/Δ1=1/x Find the value of x.

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

Q33. Ranjith can complete a task in 25 days while Anjali can finish it in 20 days. They work together on the task for 5 days and then Ranjith leaves. In how many days will Anjali finish the remaining work?

(a) 15 days
(b) 10 days
(c) 11 days
(d) 9 days

Q34. ____ Solution is used to treat bee sting

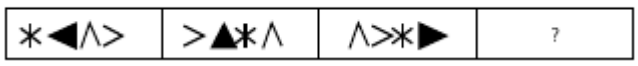
(a) Lemon juice
(b) Milk
(c) Vinegar
(d) Baking soda

Q35. The mass number of an isotope of an element is 298. If its nucleus has 189 neutrons, what is its atomic number?

(a) 487.0
(b) 189.0
(c) 109.0
(d) 298.0

Q36. Select the option figure that will complete the series of question figures.

Question Figures



Option Figures



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

Q37. LCM of two co–prime numbers a and b is (a is greater than b):

(a) a
(b) a + b
(c) ab
(d) b

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Q38. You are given a question and two statements. Identify which of the statements is/ are necessary/sufficient to answer the question.

M, A, N and K are standing in a row. Based on the following information, if we arrange shortest to tallest, who is standing last?

Statements:

1. A is shorter than K

2. M is shorter than A

(a) Statements 1 and 2 together are not sufficient
(b) Statement 1 and 2 together are sufficient to solve
(c) Statement 1 alone is sufficient
(d) Statement 2 alone is sufficient

Q39. Constantan is alloyed from ____ metals.

(a) Ni, Ti, Fe, Cr
(b) Cu, Ni, Mn
(c) Ni, Cr, Mn, Fe
(d) Cu, Ni

Q40. If the present ages of a father and his son are 48 years and 28.8 years old respectively, then the father can say to his son, “I was _____ of your present age when you were born”.

(a) Half
(b) Two-third
(c) One-fifth
(d) One-third

Q41. Fishes have a _____ chambered heart.

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

Q42. When $7^{21} + 7^{22} + 7^{23} + 7^{(24)}$ is divided by 25 the remainder is:

(a) 5
(b) 17
(c) 7
(d) 0

Q43. Weight of a body is maximum at the:

(a) Equator
(b) Pole
(c) Subtropics
(d) Tropics

Q44. Which of the following will yield a recurring decimal?

(a) 24/60
(b) 24/30
(c) 24/90
(d) 24/120

Q45. As of 2018, who is the union minister of the Ministry of women and Child Development (MWCD)?

(a) Renuka Chowdhury
(b) Krishna Tirath
(c) Smriti Irani
(d) Maneka Gandhi

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Q46. Find the odd one out.

A	B	C	D
5E	J9	T20	25Y

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

Q47. The increasing order of the refractive index of certain materials in (left to right) _____.

(a) Rocksalt, Benzene, Kerosene, Ice
(b) Rock Salt, Ice, Benzene, Kerosene
(c) Ice, Kerosene, Benzene, Rock Salt
(d) Kerosene, Ice, Benzene, Rock Salt

Q48. A parallelogram PQRS, the length of whose sides are 8cm and 12 cm, has one diagonal 10 cm long. The length of the other diagonal is approximately:

(a) 17.8 cm
(b) 17.5 cm
(c) 17 cm
(d) 18 cm

Q49. Given is a statement followed by two arguments numbered I and II. Consider the statement and the arguments and decide which of the arguments is strong.

Statement:

Is the choice of junk food a better option to create interest in eating in children?

Arguments:

I. Yes, the best way to create interest is to give the food a child likes.

II. No, junk food is the reason behind obesity, heart diseases, diabetes and other health problems and it is important to induce healthy eating habits in children.

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

Q50. Every month, Kritika spends 30% of her income on house rent and 60% of the rest on household expenditure. If she save Rs. 6300 per month, what is her total monthly income?

(a) Rs. 22,000
(b) Rs. 20,500
(c) Rs. 22,500
(d) Rs. 25,000

Q51. In a code language, if LUCK is written as L2U1C3K1, then what is the last digit for the code for XEROX in that same language?

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

Q52. What is the term of office of the members of Rajya Sabha?

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

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Q53. With whom did the Government of India sign a $120 million loan agreement to complete double-tracking and electrification of railway tracks along high-density corridors to improve the operational efficiency of India's railway network?

(a) European Bank
(b) African Development Bank
(c) International Monetary Fund (IMF)
(d) Asian Development Bank

Q54. Give an example of a salt which gives an aqueous solution of pH less than 7.

(a) Ammonium chloride
(b) Sodium carbonate
(c) Sodium bicarbonate
(d) Sodium chloride

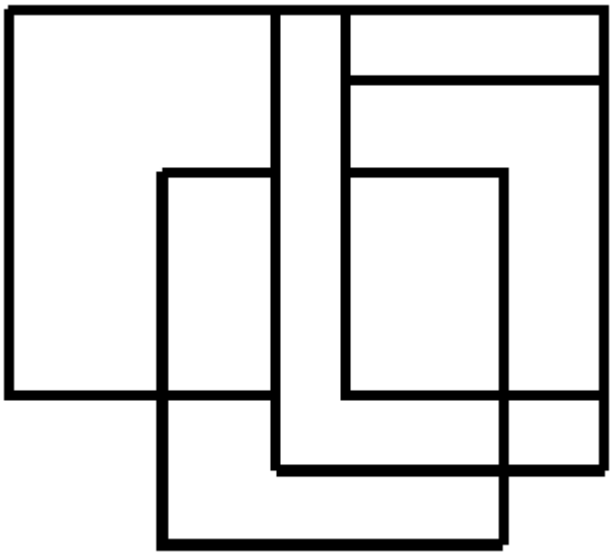
Q55. A person does some work of 1000 J in 2 s. His power will be _____.

(a) 1000 W
(b) 25 W
(c) 500 W
(d) 50 W

Q56. If $X + Y = 3$, $XY = 2$, find the value of $X^3 - Y^3$

(a) 7
(b) 3
(c) 5
(d) 9

Q57. How many closed rectangular boxes are there in the following figure?



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

Q58. The atoms of Germanium, Arsenic Selenium and Bromine contain _____ shells

(a) 3
(b) 7
(c) 5
(d) 4

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Q59. Name the country which will host the 2019 Combined World Cup for shooting?

(a) Pakistan
(b) Nepel
(c) Sri Lanka
(d) India

Q60. The LCM and HCF of two numbers are 4284 and 32, respectively. If one of the numbers is 672, then the second number is:

(a) 102
(b) 64
(c) 204
(d) 92

Q61. Read the statement below followed by two arguments.

Statement:

Should there be strict laws for maintaining ponds and lakes?

Arguments:

I. Yes, it will naturally maintain the water level for generations to come. It affects the migration of birds too.

II. No, it comes in the way of modern urban development and growth.

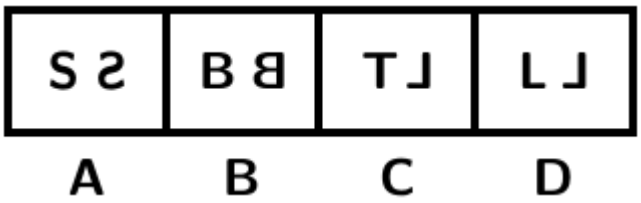
Which argument(s) of the below is/are strong in the context of the statement?

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

Q62. If $a - 1/a = 7$ then $a^2 + 1/a^2 = ?$

(a) 54
(b) 51
(c) 53
(d) 52

Q63. Find the odd one out.



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

Q64. Name the viceroy who inaugurated New Delhi as the new capital of India in the year 1931.

(a) Lord Wellesley
(b) Lord Curzon
(c) Lord Cornwallis
(d) Lord Irwin

Q65. How many medals did India bag at the Jordan Junior and Cadet Open Table Tennis (TT) tournament in 2017 and ended as the second-best finisher?

(a) 23
(b) 24
(c) 20

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(d) 15

Q66. _____ received the Polly Umrigar Award, and is the first Indian cricketer to get it on three occasions.

(a) Virat Kohli
(b) Sachin Tendulkar
(c) MS Dhoni
(d) Ravi Shastri

Q67. The cost of levelling a triangular piece of land whose sides are 72 m, 30 m and 78 m respectively at the rate of 20 paise per square metre is:

(a) Rs. 220
(b) Rs. 200
(c) Rs. 216
(d) Rs. 210

Q68. Read the given statements and the following conclusions carefully and select which of the conclusions logically follow(s) from the statements.

Statement:

All blue are colours.

All colours are shades.

Conclusions:

1. All blue are shades.

2. Some shades are colours.

(a) All the conclusions follow.
(b) Only conclusion 1 follows.
(c) Only conclusion 2 follows.
(d) No conclusions follow

Q69. Which of the following is not a characteristic of Pisces?

(a) Exoskeleton of scales
(b) Breathing through gills
(c) Endoskeleton of bone/cartilage
(d) Presence of pseudocoelom

Q70. How much loan amount was sanctioned by The World Bank to help India develop its first modern waterway?

(a) $575 million
(b) $275 million
(c) $375 million
(d) $475 million

Q71. “When a card placed over a tumbler is flicked with the finger, the coin placed over it falls in the tumbler”.

(a) Law of conservation of energy
(b) Newton’s third law of motion
(c) Law of Inertia
(d) Law of conservation of momentum

Q72. The HCF of two numbers is 11 and their LCM is 330. If one of the numbers is 55, find the other number.

(a) 33
(b) 66
(c) 44
(d) 77

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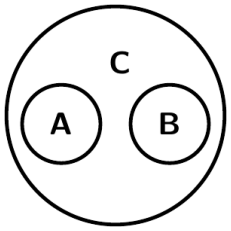
Q73. Which of the following correctly represents the relationship between

A) Peak

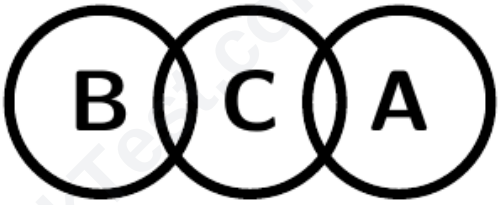
B) Clouds

C) Mountain

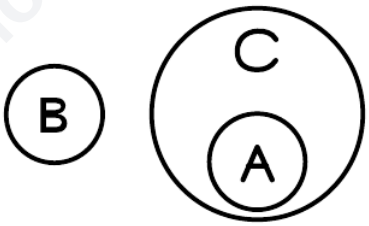
(a)



(b)



(c)



(d)



Q74. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) from the statement(s).

Statement:

All razors are blades

All blades are metals

Conclusions:

1. All metals are razors

2. Some metals are blades.

(a) All the conclusions follow

(b) Neither conclusion follows

(c) Only conclusion 2 follows

(d) Only conclusion 1 follows

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Q75. The CO_2 emissions in million metric tons over 3 years are given in the following table.

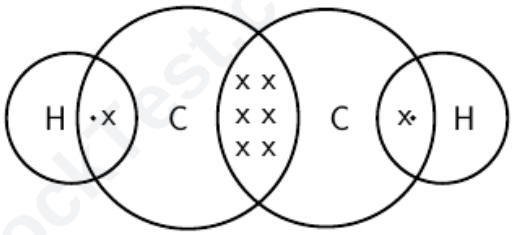
Year	Domestic CO_2 emission
2015	100
2016	110
2017	150

What is the increase in the percentage of CO_2 emission from the year 2016 to 2017?

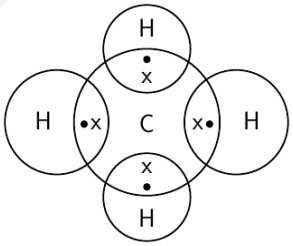
(a) 36.36%
(b) 26.36%
(c) 63.63%
(d) 36.45%

Q76. The electronic dot and cross structure of ethene is _____

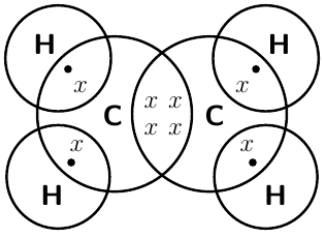
(a)



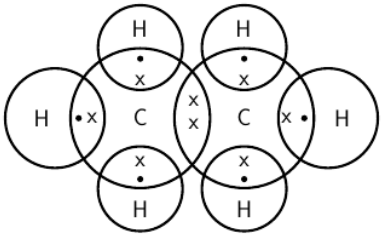
(b)



(c)



(d)



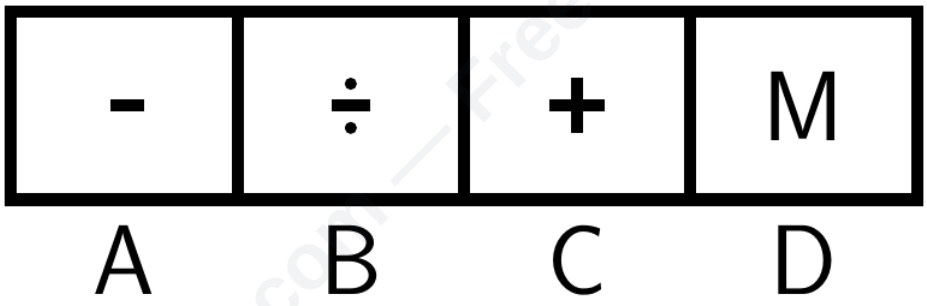
Q77. The LCM of 16, 24, 36, 52 and 54 is:

(a) 5618
(b) 5216
(c) 432
(d) 5616

Q78. Which of the following cannot be used for making lenses?

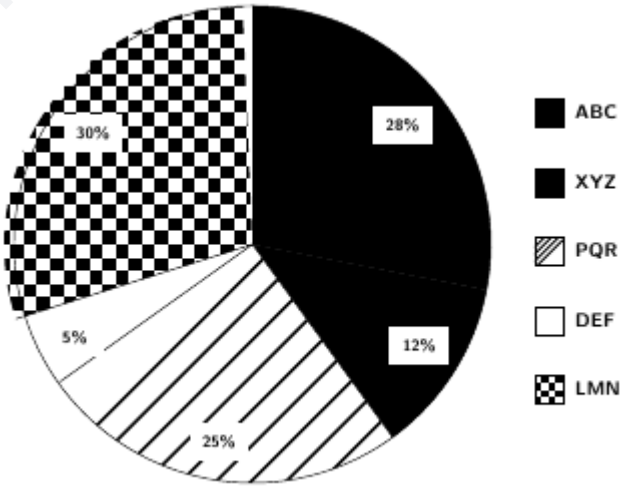
(a) Plastic
(b) Soil
(c) Glass
(d) Water

Q79. Find the odd one out.



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

Q80. The given pie chart shows information about mobile phone manufacturing companies in India. The total number of mobile phone units manufactured is 12,40,000 units.



Which company produces the maximum number of mobile phones?

(a) XYZ
(b) PQR
(c) ABC
(d) LMN

Q81. Which of the following Chief Ministers of India had been presented the 'Transformative Chief Minister Award' by the US-India Business Council (USIBC) in May 2017?

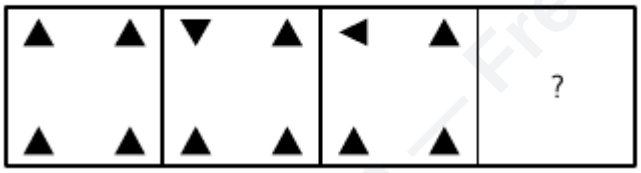
(a) K. Chandrashekhar Rao
(b) Nitish Kuman
(c) N. Chandrababu Naidu
(d) Yogi Adityanath

Q82. What principal will yield Rs. 120 as simple interest at 6% p.a. in 10 years?

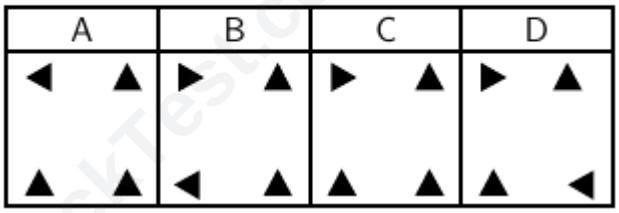
(a) Rs. 120
(b) Rs. 180
(c) Rs. 200
(d) Rs. 210

Q83. Select the option figure that will complete the series of question figures.

Question Figures



Option Figures



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

Q84. The height and the slant height of a right circular cone are 24 cm and 25 cm, respectively. Considering π as 22/7, find the curved surface area of the said cone.

(a) 550 cm^2
(b) 572 cm^2
(c) 528 cm^2
(d) 539 cm^2

Q85. Which movie won the national award for Best Film on social issues at the 64^(th) National Film Awards, 2017?

(a) Dangal
(b) Pink
(c) Sultan
(d) Airlift

Q86. Which of the following does NOT belong to this group?

A. Fox
B. Goat
C. Horse
D. Zebra

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

Q87. Find the next in this series:

YC3, XF6, WI9, _____

(a) UL12
(b) VL12

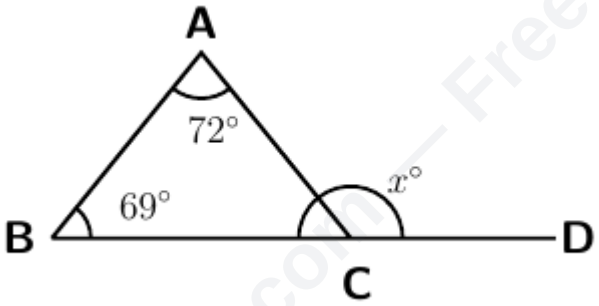
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(c) VM12
(d) UM12

Q88. Read the given question and decide which of the following information is sufficient to answer the question. What is the value of angle ACD?

Information:

1)

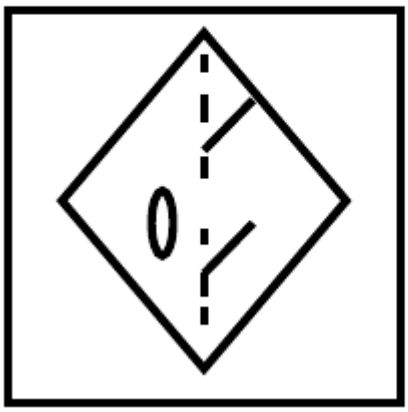


2) angle ACB = 180 – x°

(a) Only 1 is sufficient
(b) Neither 1 nor 2 is sufficient
(c) Either 1 or 2 is sufficient
(d) Only 2 is sufficient

Q89. Which pattern will the given transparent sheet resemble when it is folded at the dotted line?

Question Figure



Option Figures

A	B	C	D
			

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

Q90. Which movie has won ‘the best picture award’ in the 90^(th) Oscar awards?

(a) Phantom thread
(b) Three Billboards
(c) The Shape of water
(d) Coco

Q91. The force that a neutron exerts on a proton inside an atom is:

(a) Tidal force
(b) Gravitational force
(c) Electrostatic force
(d) Nuclear force

Q92. A water tank is filled in 5 hours by three pipes X, Y and Z. The pipe Z is thrice as fast as Y and Y is twice as fast as X. How much time will pipe X alone take to fill the water tank?

(a) 60 hrs
(b) 45 hrs
(c) 40 hrs
(d) 35 hrs

Q93. Where are the Garo Hills located?

(a) Assam
(b) Nagaland
(c) Meghalaya
(d) Mizoram

Q94. Who approved 20 lakh houses for urban poor under the PM Awas Yojna recently?

(a) Smriti Irani
(b) Arun Jaitley
(c) Sushma Swaraj
(d) Shri Venkaiah Naidu

Q95. Who among the following is the first woman lawyer to be directly appointed as a judge of the Supreme Court?

(a) Vrinda Grover
(b) Menaka Guruswamy
(c) Meenakshi Arora
(d) Indu Malhotra

Q96. If the current flowing through a circuit is 0.6 A for 6 mins, the amount of electric charge flowing through it is _____.

(a) 360 C
(b) 216 C
(c) 60 C
(d) 36 C

Q97. Find the missing number in the following series.

27, 29, 33, ?, 57

(a) 30
(b) 41
(c) 40
(d) 35

Q98. I gain 19% if I sell an article for Rs. 595. What would be my gain or loss percentage if I sell it for Rs. 475?

(a) Gain 5%
(b) Loss 5%
(c) Loss 10%
(d) Gain 10%

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Q99. Given is a statement followed by two assumptions numbered I and II. Consider the statement and the following assumptions and decide which of the assumptions is/are implicit in the statement.

Statement:

All the species of plants and animals are part of biodiversity and ecosystems and play major role in the overall health of the environment.

Assumptions:

I. Preserve or create a backyard habitat. Save as many native plants as you can when building or landscaping.

II. One of the major goals of sustainability is to preserve biodiversity. All life on Earth is connected through the flow of energy (planetary food web), and each time a species becomes endangered or lost to extinction, one more part of that energy flow is lost.

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

Q100. Walking at a speed of 10 km/hr, Madhu reaches her university 15 minutes late. Next time, she increases her speed by 2 km/hr, but she is still late 5 minutes. The distance of the university from her house is:

(a) 15 km
(b) 30 km
(c) 20 km
(d) 10 km

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (b) Hg> Ni> W> Ag

The Correct answer is Option 2 i.e Hg> Ni>W>Ag.

• Electrical resistivity is the fundamental property of a material that shows how strongly a material can resist the electric current.
• It is denoted by the Greek letter ρ (rho).
• The lower the resistivity, the more readily the material permits the flow of electric charge.
• Silver(Ag) has a very low level of resistivity but has the highest electrical conductivity.
• According to options, Increasing order of electrical resistivity
• Silver(Ag) < Tungsten(W) < Nickel (Ni) < Mercury (Hg)

Element	Electrical resistivity(ρ)	Electrical Conductivity(σ)
Silver(Ag)	1.59 × 10^(−8)	6.30 × 107
Tungsten(W)	5.60 × 10^(−8)	1.79 × 107

Nickel (Ni)	6.99 × 10^(−8)	1.43 × 107
Mercury (Hg)	9.8 × 10^(−7)	1.02 × 106

Q2. Answer: (d) Pancreas

• Rise in sugar levels in the blood is detected by the Pancreas.

• The pancreas detects the rise in blood glucose and starts to secrete insulin.

• The pancreas is a gland that is located in the abdomen of the body. It is part of the digestive system which produces insulin and other important enzymes and hormones that help in breaking down the foods.

• After eating something, the carbohydrates in food are broken down into glucose and passed into the bloodstream.

• In response to rising glucose in the bloodstream, insulin is released from the beta cells of the pancreas which regulate the body's glucose or sugar level.

• Any disorder in the pancreas leads to diabetes.

Q3. Answer: (a) Maternal Uncle

Now draw a family tree using the following notations:

Hence, F is 'Maternal Uncle' of E.

Q4. Answer: (c) Jerry Pinto

• "A Book of Light: When a Loved One Has a Different Mind" was written by Jerry Pinto.

• In 2012, Jerry Pinto published his debut novel, Em and The Big Hoom, drawing on his experience of dealing with a bipolar mother.

• A Book of Light gathers tales about the fear and beauty of love; the mystery and surprising grace of life; the fragility and incredible strength of the human spirit.

• Other books written by Jerry Pinto are Em and The Big Hoom, Helen: The Life And Times Of An H-bomb, Murder in Mahim, etc.

Q5. Answer: (c) 7

The number of squares is as follows:

Hence, there are seven squares in the given figure.

Q6. Answer: (a) 36 m

Shortcut Trick

Ratio of Length (L) : Breadth (B) = 3 : 1

Sum of ratio parts = 3 + 1 = 4 units

Perimeter = 2 × (L + B) => 96 = 2 × (4 units) => 8 units = 96 m

1 unit = 12 m

Length = 3 units = 3 × 12 = 36 m

Therefore The correct answer is 36 m.

Alternate Method

Given:

Ratio of Length and Breadth = 3 : 1

Perimeter of Rectangle = 96 m

Formula Used:

Perimeter = 2 × (Length + Breadth)

Calculations:

Let the Length be 3x and Breadth be 1x.

=> 2 × (3x + 1x) = 96

=> 2 × 4x = 96

=> 8x = 96

=> x = 96 ÷ 8

=> x = 12

=> Length = 3x = 3 × 12

=> Length = 36 m

Therefore The correct answer is 36 m.

Additional Information

Area of Rectangle

The total space occupied by the rectangle is given by Area = Length × Breadth.

Diagonal of Rectangle

The distance between opposite corners is Calculated using Pythagoras theorem: Diagonal = √(Length² + Breadth²).

Square Special Case

A square is a rectangle where length equals breadth; Perimeter = 4 × side and Area = side².

Q7. Answer: (c) 7

The Group 18 of the Modern Periodic Table has 7 elements.

Key Points

• The elements are Helium (He), Neon (Ne), Argon (Ar), Krypton (Kr), Xenon (Xe), Radon (Rn), and Oganesson (Og).

• The Element of Group 18 of the Modern Periodic Table is also known as Noble gases/ inert gases because elements in this group are very unreactive.

• The noble gases are colourless, odourless, tasteless, nonflammable gases.

Q8. Answer: (c) Xenon

● Xenon's name comes from the Greek word Xenos, which means 'stranger'.

● Xenon is an element belonging to the group of noble gases i.e. 18th group.

● Xenon is used in photographic flashes, in high-pressure arc lamps for motion picture projection, and in high-pressure arc lamps to produce ultraviolet light.

● Xenon is a chemical element with symbol Xe and atomic number 54.

● It was discovered by William Ramsay and Morris Travers in 1898.

● It is a rare, colourless and odourless heavy gas.

● It is used in instruments for radiation detection.

Note:

Neutrons, Protons and Electrons are the subatomic particle of an atom

Q9. Answer: (a) Only I is implicit

• The given statement says that the headmistress wants to discuss "discipline issues" in the "urgent" meeting.

• Therefore, we can safely assume that there were some discipline issues raised earlier which caused the holding of an "urgent" meeting.

• However, the statement does not suggest that the headmistress' reason for convening a meeting is her desire to address the staff members 'together'.

• Hence, only assumption I is implicit.

Q10. Answer: (b) 400 J

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 Force (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

CALCULATION:

Given that:

Mass (m) = 20 kg

Distance (h) = 2 m

Acceleration due to gravity (g) = 10 ms^(-2)

Work done (W) = Fs

W = m g h (F = mass x acceleration due to gravity)

W = 20 x 2 x 10 J

W = 400 J

Q11. Answer: (a) 183

Shortcut Trick

The smallest number is found using the formula: LCM(divisors) + Remainder.

Divisors are 9, 10, 12, 15 and common remainder is 3.

LCM of 9, 10, 12, 15 => 180.

Smallest number => 180 + 3 => 183.

Therefore The correct answer is 183.

Alternate Method

Given: Divisors = 9, 10, 12, 15; Remainder (R) = 3.

Formula Used: Required Number = LCM(x, y, z, ...) + R

Step 1: Calculate the LCM of the given numbers.

=> $9 = 3^2$

=> $10 = 2 \times 5$

=> $12 = 2^2 \times 3$

=> $15 = 3 \times 5$

=> $LCM = 2^2 \times 3^2 \times 5 = 4 \times 9 \times 5 = 180$.

Step 2: Add the common remainder to the LCM.

=> Required Number = 180 + 3 = 183.

Therefore The correct answer is 183.

Additional Information

LCM with Different Remainders

If divisors x, y, z leave remainders a, b, c such that $(x-a) = (y-b) = (z-c) = k$, the number is $LCM(x, y, z) - k$.

HCF Based Problems

To find the largest number that divides x, y, z leaving remainder R in each case, calculate HCF((x−R), (y−R), (z−R)).

General Form

The general form for such numbers is (LCM × n) + R, where n is any natural number (1, 2, 3...).

Q12. Answer: (a) Palk Strait

- Palk Strait is a strait between the Tamil Nadu state of India and the Mannar district of the Northern Province of Sri Lanka.
- It connects the Bay of Bengal in the northeast with the Palk Bay and then with the Gulf of Mannar in the southwest.
- It is bounded on the south by Pamban Island (India), Adam's Bridge, the Gulf of Mannar, and Mannar Island (Sri Lanka).
- The southwestern portion of the strait is also called Palk Bay.
- The strait is 64 to 137 km wide, 137 km long, and less than 100 meters deep.
- It receives several rivers, including the Vaigai (India), and it contains many islands on the Sri Lankan side.

The port of Jaffna, the commercial center for northern Sri Lanka, lies on the strait

Q13. Answer: (b) Remove waste matter from the embryo and provide nutrition to the embryo

The Correct Answer is Option 2 i.e Remove waste matter from the embryo and provide nutrition to the embryo.

• The placenta is the highly specialised organ of pregnancy that supports the normal growth and development of the fetus.

• The placenta is a fetal organ made up of its parenchyma, chorion, amnion, and umbilical cord.

• There are 3 main functions of placenta tissue.

• Attach the fetus to the uterine wall

• Provide nutrients to the embryo

Remove waste matter from the embry

Q14. Answer: (c) Aunt

Now draw a family tree using the following notations:

Hence, Raju's father's sister is 'Aunt' of Spandana.

Q15. Answer: (c) 12 – 3 – 96

These groups of numbers are in pattern of dates(mm – dd – yy).

The days on these dates are:

5 – Jan – 96 to 27 – Jan – 96 → 23 days

27 – Jan – 96 to 18 – Feb – 96 → 23 days
18 – Feb – 96 to 11 – Mar – 96 (not 12 – Mar – 96) → 23 days
11 – Mar – 96 (not 12 – Mar – 96) to 2 – April – 96 → 23 days
Hence, '12 – 03 – 96' does not fit the series.

Q16. Answer: (d) Vehicle

Teacher monitors and operates a Class.
Similarly,
The driver monitors and operates a Vehicle.
Hence, 'Vehicle' is the correct answer.

Q17. Answer: (a) 113

Concept:
Follow BODMAS rule to solve this question, as per the order given below,
Step-1: Parts of an equation enclosed in 'Brackets' must be solved first, and in the bracket,
Step-2: Any mathematical 'Of' or 'Exponent' must be solved next,
Step-3: Next, the parts of the equation that contain 'Division' and 'Multiplication' are calculated,
Step-4: Last but not least, the parts of the equation that contain 'Addition' and 'Subtraction' should be calculated
Calculation:
=> (55/11) + (18 – 6) × 9
=> 5 + 12 × 9
=> 113

Q18. Answer: (b) 1/6th

- The weight of an object depends on the value of g, i.e. acceleration due to gravity.
- Acceleration due to gravity of earth is 6 times the acceleration due to gravity of the moon.
- The weight of an object on the moon is equal to 1/6th of its weight on the Earth.
- Weight = (mass) × (acceleration due to gravity of planet)
- At the surface of the earth
  - Weight = mg
- At the surface of Moon
  - Weight = mg / 6
- Acceleration due to Moon's gravity = (Acceleration due to Earth's gravity)/6
- Weight on moon = 1/6 × Weight on earth.

Q19. Answer: (a) 12

Shortcut Trick
Remaining work in terms of man-days = 48 × (17 − 6) = 48 × 11
New number of workers = 48 − 4 = 44
Required days = (48 × 11) ÷ 44 = 12
Therefore The correct answer is 12 days.
Alternate Method
Given: Total initial workers = 48, Initial days = 17, Days worked = 6, Workers left = 4.
Formula Used: M1D1 = M2D2 (for remaining work)
=> Remaining days for 48 men = 17 − 6 = 11 days
=> Total remaining work = 48 × 11 man-days
=> New number of workers (M2) = 48 − 4 = 44 men
=> Let the required days be D2
=> 44 × D2 = 48 × 11
=> D2 = (48 × 11) ÷ 44
=> D2 = 48 ÷ 4 = 12
Therefore The correct answer is 12 days.
Additional Information

Chain Rule in Time and Work

The relationship between men (M), days (D), hours (H) and work (W) is given by (M1×D1×H1)/W1 = (M2×D2×H2)/W2.

Man-Days Concept

Total work is often expressed as the product of the number of men and the number of days taken to finish the work (Work = M × D).

Q20. Answer: (b) All India Forward Bloc

• The Forward Bloc of the Indian National Congress was formed on June 22, 1939.

• Bose had many differences with Mahatma Gandhi on many points of ideology, which led him to resign from Indian National Congress on April 29, 1939.

• Subhas Chandra Bose was elected as the President of the Indian National Congress (INC) in 1939 against Dr. Pattabhi Sitaramayya.

• Subhash Chandra Bose and Sardul Singh Kavishar were the party's first president and vice-president respectively.

• It held its first conference in Nagpur from June 20-22, 1940 where it demanded complete independence to Indian.

• It had its own newspaper called Forward Bloc.

• After independence, the party joined mainstream politics.

Q21. Answer: (b) Sclerenchyma

Xylem	**Xylem is the tissue that carries water up through a plant. It is made up of vessels or tracheids, xylem parenchyma, and xylem fibre.**
Sclerenchyma	Sclerenchyma is the simple permanent tissue that makes a plant hard and stiff.
Parenchyma	Parenchyma is thin-walled tissues that are involved in food storage, photosynthesis, and other activities of plant life.
Collenchyma	Collenchyma cells are those which have irregularly thick cell walls that provide support and structure.

Q22. Answer: (b) 9

Total number of student : 60

Number of students who took none of the subjects : 8

Remaining students in the class (at least one subject) = 52

Number of students who took Mathematics : 29

Number of students who took Biology : 32

Total number who took Mathematics or Biology or both = 32 + 29 = 61

Total number who took both the subjects = Total number who took at least one of Mathematics or Biology or both – remaining students in the class = 61 – 52 = 9.

Hence, 9 is the correct answer.

Q23. Answer: (a) Malleability

• The property of the metals wherein they can be beaten into thin sheets is called the Malleability.

• Malleability is the ability of the material to deform under the pressure.

• Malleability occurs in metal because of the metallic bonds that keep the metal in place.

• Metallic bonds are characterized as the sea of the electron, and electrons easily can move from one atom to another, which allows the atom to slide on each other by applying the force.

Extra facts:

• Ductility- It is the physical property of the material which is associated with the ability to be hammered thin or stretched wire without breaking.

• Conductivity- It is the property of the material to allow the flow of charges in the metals.

• Sonority: It is the property of a metal which associates with producing sound.

Q24. Answer: (d) 12

Lets decode the symbols:

Symbol	**Q**	**J**	**T**	**K**

Operator	•	×	•	÷

→18 K 3 Q 7 J 2 T 8

→ (18 ÷ 3) + (7 × 2) – 8

→ 6 + 14 – 8

→ 12

Hence, the value of 18K3Q7J2T8 is '12'.

Q25. Answer: (c) Phosphorous pentoxide

• Deliquescence is the property of substance to absorb water from the air to dissolve itself and form an aqueous solution.

• Deliquescent substances are the solid substances when exposed to air, they absorb water enough to form solutions.

• Hygroscopy is the property of substance to absorb water from the air, but it can not form solutions

• Hygroscopic Substances are the substances which absorb water from air, but not enough to form solutions.

Deliquescent substances	Hygroscopic Substances
1. NaOH 2. CaCl2 3. CaCl2. 6H2O 4. P4O10 (forms HPO3) 5. FeCl3 6. KOH 7. MgCl2	1. CaO 2. NaNO3 3. NaCl 4. Sucrose 5. CuO 6. Conc. H2SO4 7. Conc. HCl

Q26. Answer: (c) A

Hence, the figure A is the correct mirror image.

Q27. Answer: (b) 1875

The correct answer is option 2 i.e.,1875.

• The Bombay Stock Exchange (BSE) was established in the year 1875.

• It is the largest stock exchange in India and Asia as well.

• It was recognized as an official organization by the name 'The Native Share & Stock Brokers Association.

• As per the Securities Contracts Regulation Act, BSE became the first stock exchange to be recognized by the Government of India in 1956.

• The headquarters of the Bombay Stock Exchange is in Mumbai.

Q28. Answer: (a) Milkbasket

• Milkbasket, India's first and largest micro-delivery platform has been recognised as 'Startup of the Year' 2017 at the 7th Small Business Awards.

• Milkbasket delivers milk, bread, eggs, butter, juices and other daily need items every morning.

The startup of the year award is dedicated to young SMEs, aged 7 years or less, with great potential to become big in local/international markets

Q29. Answer: (b) North-East, 5 km

Applying Pythagoras theorem:

Distance between initial and final Position will be → $\sqrt{(4^2 + 3^2)} = \sqrt{(16 + 9)} = \sqrt{25} = 5$

Hence, the distance between initial and final position of Raju is 5 km and in North East direction.

Q30. Answer: (a) 50

Shortcut Trick

For 21 observations, the median is the 11^(th) term.

Number of observations greater than the median = 21 − 11 = 10.

Total increase in the sum = 10 × 21 = 210.

Increase in mean = Total increase ÷ Total observations = 210 ÷ 21 = 10.

New Mean = Old Mean + Increase = 40 + 10 = 50.

Therefore The correct answer is 50.

Alternate Method

Given:

Total observations (n) = 21

Initial Mean = 40

Increment for observations > Median = 21

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Formula Used:

Mean = Sum of observations ÷ Number of observations

Median (for odd n) = ((n + 1) ÷ 2)^(th) term

Calculations:

=> Median position = (21 + 1) ÷ 2 = 11^(th) observation.

=> Number of observations greater than median = 21 − 11 = 10.

=> Initial sum of observations = 21 × 40 = 840.

=> Total increment = 10 × 21 = 210.

=> New total sum = 840 + 210 = 1050.

=> New Mean = 1050 ÷ 21 = 50.

Therefore The correct answer is 50.

Additional Information

Effect of Change on Mean

If each of the n observations is increased by a constant k, the mean increases by k. If only a subset of m observations is increased by k, the mean increases by (m × k) ÷ n.

Median for Odd and Even n

For odd n, Median = ((n+1)/2)^(th) term. For even n, Median = average of (n/2)^(th) and (n/2 + 1)^(th) terms.

Empirical Relationship

For a moderately skewed distribution: Mode = 3 × Median − 2 × Mean.

Q31. Answer: (d) Asha Bhosle

• Asha Bhosle was conferred with the highest civilian award of West Bengal, the Banga Bibhushan, by the Chief Minister Mamata Banerjee.

• She has done playback singing for over a thousand Bollywood movies & has sung in over 20 Indian & foreign languages.

• The Bengal government in 2011 instituted Banga Bibhushan award to recognize the services of eminent personalities from their respective fields

Q32. Answer: (a) 4

Shortcut Trick

The area of a triangle formed by joining the midpoints of the sides of a given triangle is always 1/4^(th) of the area of the original triangle.

Property: Δ2 = (1/4) × Δ1

=> Δ2 / Δ1 = 1/4

Given: Δ2 / Δ1 = 1/x

Comparing both, we get x = 4.

Therefore The correct answer is 4.

Alternate Method

Given: Vertices A(0, −1), B(0, 3), and C(2, 1).

Formula Used: Area of triangle = 1/2 |x1(y2 − y3) + x2(y3 − y1) + x3(y1 − y2)|

Calculations:

=> Δ1 = 1/2 |0(3 − 1) + 0(1 − (−1)) + 2(−1 − 3)|

=> Δ1 = 1/2 |0 + 0 + 2(−4)| = 1/2 |−8| = 4 sq. units

Midpoints of sides:

=> M1 (AB) = ((0+0)/2, (−1+3)/2) = (0, 1)

=> M2 (BC) = ((0+2)/2, (3+1)/2) = (1, 2)

=> M3 (CA) = ((2+0)/2, (1−1)/2) = (1, 0)

Q33. Answer: (c) 11 days

Shortcut Trick

Total Work = LCM(25, 20) = 100 units.

Efficiency of Ranjith = 100 ÷ 25 = 4 units/day; Anjali = 100 ÷ 20 = 5 units/day.

Work done in 5 days together = 5 × (4 + 5) = 45 units.

Remaining work = 100 − 45 = 55 units.

Days for Anjali to finish remaining work = 55 ÷ 5 = 11 days.

Therefore The correct answer is 11 days.

Alternate Method

Given: Time taken by Ranjith = 25 days; Time taken by Anjali = 20 days; Working together = 5 days.

Formula Used: Total Work = Efficiency × Time

Person	Days	Total Work	Efficiency
Ranjith	25	100	4
Anjali	20	5	

=> Combined efficiency of Ranjith and Anjali = 4 + 5 = 9 units/day.

=> Work completed in 5 days = 5 × 9 = 45 units.

=> Remaining work = 100 − 45 = 55 units.

=> Time taken by Anjali to complete remaining work = Remaining Work ÷ Efficiency of Anjali

=> Time = 55 ÷ 5 = 11 days.

Therefore The correct answer is 11 days.

Additional Information

Combined Work Formula

If A does work in 'a' days and B in 'b' days, working together they finish in (a×b)/(a+b) days.

Efficiency vs Time

Efficiency is inversely proportional to time. If time ratio is x:y, efficiency ratio is y:x.

Remaining Work Calculation

Remaining work = 1 − (Work done), where work done is expressed as a fraction of the total work.

Q34. Answer: (d) Baking soda

• Sodium Bicarbonate is the chemical name of Baking Soda.

• The other name for Sodium Bicarbonate is Sodium Hydrogen Carbonate.

• Sodium Bicarbonate (Baking Soda) Solution is used to treat bee sting.

• It is popularly called cooking soda.

• The chemical formula of Baking Soda is NaHCO3

Q35. Answer: (c) 109.0

• The Mass number is always equal to the sum of the number of protons and the number of neutrons. The mass number determines the Atomic mass of an atom, Mass Number is denoted by A

• The Atomic number of an element is the number of protons present in the nucleus of an atom, Atomic Number is denoted by Z.

Atomic Number = Number of Protons

Mass Number = Number of Protons + Number of Neutrons

• Here, Mass Number = 298

Number of Protons + Number of Neutrons = 298

Number of Protons = 298 - 189 = 109

Hence, Atomic Number = 109 [As, Atomic Number = Number of Protons]

• Isotopes are defined as elements with the same number of protons but a different number of neutrons present in their nucleus. As the electrons remain the same, so their chemical properties don’t change however due to change in neutron number their atomic mass is changed which results in different physical properties like melting, colour, etc.

Q36. Answer: (b) D

There are four symbols in each figure:

Let us number each position from left to right from 1 to 4.

The symbol ‘?’ moves one position to the right. So, in the figure 4 it will be at position 2.

The symbol ‘>’ moves one position to the right. So, in the figure 4 it will be at position 3.

The places that are left are 1 and 4.

The symbol ‘*’ changes their position around ‘Δ'

In figure 1 star is to the left of triangle.

In figure 2 star is to the right of triangle.

In figure 3 star is to the left of triangle.
So, in the figure 4 star will be at position 4.
Hence, the figure 4 will be figure D:
Hence, D is the correct answer.

Q37. Answer: (c) ab

Shortcut Trick
For any two co−prime numbers, the only common factor is 1.
Since there are no other common factors, the LCM is simply the product of the numbers.
LCM of a and b = a × b = ab.
Therefore The correct answer is ab.
Alternate Method
Given:
Two numbers a and b are co−prime (where a > b).
Formula Used:
LCM(a, b) × HCF(a, b) = a × b
Calculations:
=> Definition of co−prime numbers: HCF(a, b) = 1.
=> Using the product rule: LCM × 1 = a × b
=> LCM = ab
Therefore The correct answer is ab.
Additional Information
Co-prime Numbers
Two numbers are said to be co−prime if their Highest Common Factor (HCF) is 1. Example: 8 and 9.
LCM and HCF Relationship
For any two numbers x and y, LCM(x, y) × HCF(x, y) = x × y.
Consecutive Integers
Any two consecutive integers are always co−prime to each other, thus their LCM is always their product.

Q38. Answer: (a) Statements 1 and 2 together are not sufficient

Statement I: A is shorter than K
A < K
No information has been provided about M and N.
Statement II: M is shorter than A
M < A
No information has been provided about M and N.
Combining I and II:
1. A is shorter than K
2. M is shorter than A
M < A < K
No information has been provided about position of N.
Hence, Statements 1 and 2 together are not sufficient to answer the question.

Q39. Answer: (d) Cu, Ni

• Constantan is alloyed from Copper and Nickel metals.
• This normally consists of 55% copper, and 45% nickel.
• The key feature is the low thermal variation of its resistivity, which is constant over a large temperature range.
Extra facts:
• Alloy:
• It is a homogeneous mixture of two or more metals, or a metal and a non-metal.
• For example, Brass, Bronze, Stainless steel, etc.

Alloy	Mixture of

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Brass	Copper and Zinc
Bronze	Copper and Tin
Rolled Gold	Copper and Aluminium
Stainless steel	Iron, chromium, Nickle, and Carbon
Solder	Lead, Tin
Gunmetal	Copper, Tin, Zinc, and lead
Nichrome	Nickel, Chromium, Manganese, and Iron
German Silver	Copper, Zinc, and Nickel
Nickel Steel	Iron and Nickel

Q40. Answer: (b) Two-third

Present age of father = 48 years

Present age of son = 28.8 years

Age of father at the birth of his son = 48 – 28.8 = 19.2 years

→ 19.2 = A × (28.8)

→ 19.2 / 28.8 = A

→ 9.6 / 14.4 = A

→ 8 / 12 = A

→ 2 / 3= A

Hence, the father was two – third of the son's present age when son was born.

Q41. Answer: (d) Two

● Fishes have an only two-chambered heart with an atrium and a ventricle, and the chambers of the heart which receive the blood from body tissues are called auricles.

● Fishes respire through their gills.

● The human heart has four chambers.

● Two relatively small upper chambers called atria and two larger lower chambers called ventricles.

● Amphibians; and the reptiles (except crocodiles); have a 3-chambered heart with two atria and a single ventricle.

● Frogs respire through their skin.

● The lizard has a three-chambered heart.

Shark has a two-chambered heart.

Q42. Answer: (d) 0

Shortcut Trick

Take the lowest power 7^{21} as a common factor.

Expression = 7^{21} (1 + 7^1 + 7^2 + 7^3)

Expression = 7^{21} (1 + 7 + 49 + 343) = 7^{21} × 400

Since 400 is perfectly divisible by 25 (400 ÷ 25 = 16), the remainder is 0.

Therefore The correct answer is 0.

Alternate Method

Given: 7^{21} + 7^{22} + 7^{23} + 7^(24) is divided by 25.

Formula Used: a^m + a^(m+1) + a^(m+2) + a^(m+3) = a^m(1 + a + a^2 + a^3)

=> Expression = 7^{21} + 7^{22} + 7^{23} + 7^(24)

=> Expression = 7^{21} (7^0 + 7^1 + 7^2 + 7^3)

=> Expression = 7^{21} (1 + 7 + 49 + 343)

=> Expression = 7^{21} × 400

=> To find remainder: (7^{21} × 400) ÷ 25

=> Remainder of (400 ÷ 25) = 0

=> Total Remainder = 0 × (Remainder of 7^{21} ÷ 25) = 0

Therefore The correct answer is 0.

Additional Information

Divisibility Rule of 25

A number is divisible by 25 if its last two digits are 00, 25, 50, or 75.

Remainder Theorem

If a number is a multiple of the divisor, the remainder is always 0. Rem(A × B / K) = [Rem(A/K) × Rem(B/K)] / K.

Laws of Exponents

For any non-zero number 'a', a^m × aⁿ = a^(m+n). This allows factoring out the smallest power in a summation series.

Q43. Answer: (b) Pole

● In physics, the weight of an object is defined as the force of gravity on the object and may be calculated as the mass times the acceleration of gravity, w = mg.

● The weight of an object is maximum at poles as the gravity is slightly higher at the poles and hence the weight there is more as compared to anywhere else.

Extra facts:

The value of acceleration due to gravity (g) is greater at the poles than at the equator.

● Since the earth is flattened at the Poles and bulged at the Equator, the Poles are nearer to the center of the earth than the Equatorial region.

● As acceleration due to gravity is inversely proportional to the distance, the poles being at a lesser distance from the center of the earth have more value of acceleration due to gravity.

● The acceleration produced by the force of attraction of the earth is known as acceleration due to gravity i.e., g

F = ma = mg = weight of the body

Q44. Answer: (c) 24/90

Shortcut Trick

A fraction in its simplest form yields a recurring decimal if the prime factorization of its denominator contains factors other than 2 or 5.

Check denominators of simplified fractions:

(1) 24/60 = 2/5 (Denom: 5) → Terminating

(2) 24/30 = 4/5 (Denom: 5) → Terminating

(3) 24/90 = 4/15 (Denom: 3 × 5) → Recurring (contains 3)

(4) 24/120 = 1/5 (Denom: 5) → Terminating

Therefore The correct answer is 24/90.

Alternate Method

Given: Fractions (1) 24/60, (2) 24/30, (3) 24/90, (4) 24/120.

Formula Used: For a fraction p/q to be a terminating decimal, q must be of the form 2ⁿ × 5^m. Otherwise, it is recurring.

=> Case 1: 24/60 = 0.4 (Terminating)

=> Case 2: 24/30 = 0.8 (Terminating)

=> Case 3: 24/90 = 4/15 = 0.2666... (Recurring)

=> Case 4: 24/120 = 0.2 (Terminating)

Therefore The correct answer is 24/90.

Additional Information

Terminating Decimals

A rational number has a terminating decimal expansion if the denominator has no prime factors other than 2 and 5.

Pure vs Mixed Recurring Decimals

Pure recurring decimals have all digits after the decimal point repeating (e.g., 0.333...), while mixed have some non-repeating digits (e.g., 0.2666...).

Simplest Form Rule

Always simplify the fraction by canceling common factors between the numerator and denominator before checking the denominator's prime factors.

Q45. Answer: (d) Maneka Gandhi

• The union minister of the Ministry of women and Child Development (MWCD) was Maneka Gandhi in 2018.

• 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 for promoting inter-Ministerial and inter-sectoral convergence to create gender equitable and child-centred legislation, policies and programmes.

Q46. Answer: (c) B

Positional value of E → 5

Positional value of J → 10 ≠ 9

Positional value of T → 20

Positional value of Y → 25

Hence, B is the correct answer.

Q47. Answer: (c) Ice, Kerosene, Benzene, Rock Salt

• The refractive index of a material describes how fast light travels through that material.

• More specifically, it is the ratio of the speed of light in a vacuum to the speed of light in that medium.

• It is always greater than one.

• Refractive index is the ratio of speed of light in vacuum to the speed of light in medium.

• For example, the refractive index of water is 1.333, meaning that light travels 1.333 times as fast in a vacuum as in water.

• The refractive index is a unit-less, dimensionless quantity.

• The concept of refractive index applies within the full electromagnetic spectrum, from X-rays to radio waves.

Additional Information

• Refractive indices of Ice, Benzene, Rock salt and Kerosene are 1.31, 1.50, 1.54 and 1.44 respectively.

Q48. Answer: (a) 17.8 cm

Shortcut Trick

Use the Parallelogram Law: $2(a^2 + b^2) = d1^2 + d2^2$.

Where a = 8 cm, b = 12 cm, and d1 = 10 cm.

$2(8^2 + 12^2) = 10^2 + d2^2 \Rightarrow 2(64 + 144) = 100 + d2^2$.

$416 = 100 + d2^2 \Rightarrow d2^2 = 316 \Rightarrow d2 = \sqrt{316} \approx 17.77$ cm.

Therefore The correct answer is 17.8 cm.

Alternate Method

Given: Side PQ = 8 cm, Side QR = 12 cm, Diagonal PR = 10 cm.

Formula Used: In a parallelogram, the sum of the squares of the diagonals is equal to twice the sum of the squares of its sides.

=> PQ = 12 cm, PS = 8 cm, PR = 10 cm, QS = d2

$\Rightarrow 2 \times (PQ^2 + PS^2) = PR^2 + QS^2$

$\Rightarrow 2 \times (12^2 + 8^2) = 10^2 + d2^2$

$\Rightarrow 2 \times (144 + 64) = 100 + d2^2$

$\Rightarrow 2 \times 208 = 100 + d2^2$

$\Rightarrow 416 = 100 + d2^2$

$\Rightarrow d2^2 = 416 - 100 = 316$

$\Rightarrow d2 = \sqrt{316}$

$\Rightarrow d2 \approx 17.776...$ cm

Therefore The correct answer is 17.8 cm.

Additional Information

Parallelogram Law

The sum of the squares of the four sides of a parallelogram is equal to the sum of the squares of its two diagonals.

Area of Parallelogram

Area = Base × Height. Also, Area = ab sin(θ) where θ is the angle between sides a and b.

Properties of Diagonals

Diagonals of a parallelogram bisect each other but are not necessarily equal in length or perpendicular.

Q49. Answer: (a) Only argument II is strong.

Anything or everything that a child likes to eat might not be good for him. One such example being junk food.

Therefore, the first argument is weak.

The various health issues mentioned in the second argument strongly suggest that using junk food to lure children into eating is not a good option.

Hence, only argument II is strong.

Q50. Answer: (c) Rs. 22,500

House Rent → 30%

Remaining → 70%

Household Expenditure → 60% of remaining 70% → 42%

Savings = 100 – (30 + 42) = 28%

→ Rs. 6300 = 28%

→ Total Income = (6300/ 28) × 100 = 22500

Hence, Total income is Rs. 22500.

Q51. Answer: (a) 4

For the code of each word the letters of the word are followed by second digit of their positional value in alphabet series.

Word	L	U	C	K
Positional Value	12	21	03	11
Second Digit	2	1	3	1
Code	L2	U1	C3	K1

Similarly,

Word	X	E	R	O	X
Positional Value	24	05	18	15	24
Second Digit	4	5	8	5	4
Code	X4	E5	R8	O5	X4

Hence, 4 will be the last digit of the code for ‘XEROX’.

Q52. Answer: (b) 6 years

The correct answer is option 2 i.e., 6 years.

• Six years is the term of office of the members of Rajya Sabha.

• Rajya Sabha is a permanent House and is not subject to dissolution.

• One-third of the members of Rajya Sabha retire after every second year.

• A member who is elected for a full term serves for a period of six years.

• The presiding officers of Rajya Sabha have the responsibility to conduct the proceedings of the house.

• The representatives of the States and of the Union Territories in the Rajya Sabha are elected by the method of indirect election.

Q53. Answer: (d) Asian Development Bank

With Asian Development Bank the Government of India signed a $120 million loan agreement to complete double-tracking and electrification of railway tracks along high-density corridors to improve the operational efficiency of India’s railway network.

● The Headquarter of the Asian Development Bank (ADB) is in Manila, Philippines.

● The Asian Development Bank was established as a regional development bank on 19th December 1966.

● The company also maintains 31 field offices around the world to promote social and economic development in Asia.

● The bank admits the members of the United Nations Economic and Social Commission for Asia and the Pacific and non-regional developed countries.

The current president is Masatsugu Asakawa.

Q54. Answer: (a) Ammonium chloride

● Ammonium Chloride is an example of salt that gives an aqueous solution of pH less than 7.

● We know the reaction between Ammonium Chloride (NH4Cl)

$NH_4Cl + H_2O \rightarrow NH_4OH + HCl$

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Q55. Answer: (c) 500 W

CONCEPT:

• Power: The rate of doing work is called power.

• The SI unit of power is the watt (W).

• Another unit of power is horse-power (hp).

1 hp = 746 W

Power (P) = work(W)/time (t)

CALCULATION:

Given that:

Work (w) = 1000 J

Time (t) = 2 s

Power (P) =?

Power = 1000/2 (J/s)

Power = 500 W. So option 3 is correct.

Q56. Answer: (a) 7

Shortcut Trick

By inspection, find two numbers whose sum is 3 and product is 2.

The numbers are 2 and 1, as 2 + 1 = 3 and 2 × 1 = 2.

Assuming X = 2 and Y = 1 (to get a positive result as per options):

$X^3 - Y^3 = 2^3 - 1^3 = 8 - 1 = 7$.

Therefore The correct answer is 7.

Alternate Method

Given: X + Y = 3, XY = 2

Formula Used: $X^3 - Y^3 = (X - Y)(X^2 + XY + Y^2)$

=> First, find (X − Y):

=> $(X - Y)^2 = (X + Y)^2 - 4XY$

=> $(X - Y)^2 = 3^2 - 4(2) = 9 - 8 = 1$

=> $X - Y = \sqrt{1} = 1$

=> Now, calculate $X^3 - Y^3$:

=> $X^3 - Y^3 = (X - Y)[(X + Y)^2 - XY]$

=> $X^3 - Y^3 = 1 \times [3^2 - 2]$

=> $X^3 - Y^3 = 1 \times [9 - 2] = 7$

Therefore The correct answer is 7.

Additional Information

Difference of Two Cubes

The algebraic identity for the difference of cubes is $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$.

Sum of Two Cubes

The algebraic identity for the sum of cubes is $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$.

Square Relations

The relationship between the sum and difference of two numbers is $(a - b)^2 = (a + b)^2 - 4ab$.

Q57. Answer: (d) 8

Hence, there are 8 closed rectangular boxes in the given figure.

Q58. Answer: (d) 4

Four shells are present in the atoms of Germanium, Arsenic Selenium and Bromine.

● Elements in a period have the same number of shells.

● The Period in a periodic table is one of the horizontal rows.

● Going across a period, each element has one more proton and is less metallic than its predecessor.

Germanium, Arsenic, Selenium and Bromine are present in 4 period of modern periodic table.

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Q59. Answer: (d) India

• The National Rifle Association of India (NRAI) announced that India will be hosting the Combined World Cup for shooting in 2019 during the meeting held in New Delhi.

• The Combined World Cup will be a qualifying event for the 2020 Tokyo Olympics. It will comprise all the three categories: shotgun, rifle and pistol

Q60. Answer: (c) 204

Shortcut Trick

Product of LCM and HCF = Product of the two numbers.

Second number = (LCM × HCF) ÷ First number

=> Second number = (4284 × 32) ÷ 672

=> Second number = 4284 ÷ 21 = 204

Therefore The correct answer is 204.

Alternate Method

Given:

LCM = 4284

HCF = 32

First Number (N1) = 672

Formula Used:

LCM × HCF = Product of two numbers

Calculations:

=> 4284 × 32 = 672 × N2

=> N2 = (4284 × 32) ÷ 672

=> N2 = 137088 ÷ 672

=> N2 = 204

Therefore The correct answer is 204.

Additional Information

HCF and LCM Relation

The product of any two numbers is always equal to the product of their HCF and LCM. This rule only applies to a set of two numbers.

Co-prime Numbers

For two co-prime numbers, the HCF is always 1 and the LCM is the product of the numbers itself.

HCF of Fractions

HCF of Fractions = (HCF of Numerators) ÷ (LCM of Denominators).

LCM of Fractions

LCM of Fractions = (LCM of Numerators) ÷ (HCF of Denominators).

Q61. Answer: (a) Only argument I is strong

Ponds and lakes are essential water resources for every living being and therefore, maintaining them is beneficial for future generations.

Besides this many migratory birds visit lakes and ponds to lay eggs and raise their young ones.

Stricter laws can help us ensure the maintenance of these water resources.

Thus, argument I is strong.

The second argument does not explain any damage caused by the imposing of strict laws for maintenance of ponds and lakes and therefore is not strong enough.

Hence, only argument I is strong.

Q62. Answer: (b) 51

Shortcut Trick

If the difference of a term and its reciprocal is k (i.e., $a - 1/a = k$), then the sum of their squares is always $k^2 + 2$.

Given: k = 7

=> $a^2 + 1/a^2 = 7^2 + 2$

=> 49 + 2 = 51

Therefore The correct answer is 51.

Alternate Method

Given: $a - 1/a = 7$

Formula Used: $(x - y)^2 = x^2 + y^2 - 2xy$

To find the value of $a^2 + 1/a^2$, square both sides of the given algebraic equation:

$\Rightarrow (a - 1/a)^2 = 7^2$

$\Rightarrow a^2 + (1/a)^2 - 2 \times a \times (1/a) = 49$

$\Rightarrow a^2 + 1/a^2 - 2 = 49$

$\Rightarrow a^2 + 1/a^2 = 49 + 2$

$\Rightarrow a^2 + 1/a^2 = 51$

Therefore The correct answer is 51.

Additional Information

Square of Sum Identity

If $a + 1/a = k$, then $a^2 + 1/a^2 = k^2 - 2$.

Cube of Difference Identity

If $a - 1/a = k$, then $a^3 - 1/a^3 = k^3 + 3k$.

Cube of Sum Identity

If $a + 1/a = k$, then $a^3 + 1/a^3 = k^3 - 3k$.

Q63. Answer: (c) C

In each square there is an alphabet and its mirror image except in figure C. In figure C it is the water image.

Hence, C is the correct answer.

Q64. Answer: (d) Lord Irwin

The correct answer is Lord Irwin.

Key Points

• It was on 13 February 1931 that the Viceroy of India, Lord Irwin, inaugurated New Delhi as the country's new capital.The case was conducted at 1911 Delhi Durbar.

• Two British architects, namely Sir Herbert Baker and Sir Edwin Lutyens, have done the design and planning of the area.

Additional Information

• Lord Irwin was the Viceroy of India from 1926 to 1931.

• On his advice, the Simon Commission didn't include any Indian member.

• He concluded an important pact known as the Gandhi-Irwin pact in 1931.

• He died of a heart attack at his estate on 23ed December 1959, aged 78.

Q65. Answer: (b) 24

• 24 medals did India bag at the Jordan Junior and Cadet Open Table Tennis (TT) tournament in 2017 and ended as the second best finisher.

• India bagged seven gold medals, seven silver, and ten bronze to complete a sweep of sorts and make the trip and Amman a success.

Q66. Answer: (a) Virat Kohli

● Polly Umrigar was an Indian cricketer who mostly played first-class cricket.

● It is an annual award given by BCCI.

● Virat Kohli had also won it in 2011-12 and 2014-15 and became the first Indian cricketer to be bestowed the honour on three occasions.

Extra facts:

● Jasprit Bumrah received the prestigious Polly Umrigar Award for his super performance in international cricket in the 2018-19 season.

● He made his Test debut during India's tour of South Africa in Jan 2018.

● Former India captains Krishnamachari Srikkanth and Anjum Chopra will be presented with the Col CK Nayudu Lifetime Achievement Award and the BCCI Lifetime Achievement Award for women.

Q67. Answer: (c) Rs. 216

Shortcut Trick

Identify the triplet: 72, 30, 78 is a multiple of (5, 12, 13) since 5×6=30, 12×6=72, 13×6=78.

Area of right-angled triangle = 1/2 × base × height = 1/2 × 30 × 72 = 1080 m².

Total Cost = Area × Rate = 1080 × 0.20 = Rs. 216.

Therefore The correct answer is Rs. 216.

Alternate Method

Given: Sides of the triangle (a, b, c) = 72 m, 30 m, 78 m. Rate = 20 paise/m².

Formula: Heron's Formula for Area = √[s(s−a)(s−b)(s−c)] where s = (a+b+c)/2.

=> Semi-perimeter (s) = (72 + 30 + 78) / 2 = 180 / 2 = 90 m.

=> Area = √[90 × (90−72) × (90−30) × (90−78)]

=> Area = √[90 × 18 × 60 × 12] = √[1166400] = 1080 m².

=> Rate in Rupees = 20/100 = Rs. 0.20 per m².

=> Total Cost = 1080 × 0.20 = Rs. 216.

Therefore The correct answer is Rs. 216.

Additional Information

Pythagorean Triplets

A set of three positive integers a, b, and c, such that $a^2 + b^2 = c^2$. Common examples include (3, 4, 5), (5, 12, 13), and (8, 15, 17).

Heron's Formula

Used for finding the area of any triangle when all three sides are known: Area = √[s(s−a)(s−b)(s−c)].

Cost Calculation

Total cost for levelling or fencing is calculated as Area × Rate per unit area or Perimeter × Rate per unit length.

Q68. Answer: (a) All the conclusions follow.

The least possible Venn diagram is as follows:

Conclusions:

1. All blue are shades.→ True (All blue are colours and All colours are shades)

2. Some shades are colours. → True (All colours are shades)

Hence, all the conclusions follow.

Q69. Answer: (d) Presence of pseudocoelom

• These are the gill-bearing vertebrates that lack limbs with digits.

• They are the aquatic craniate animals generally called fish.

• Pisces are cold blooded animals.

The pseudocoelom is a fluid-filled body cavity lying inside the external body wall of the nematode that bathes the internal organs, including the alimentary system and the reproductive system

Q70. Answer: (c) $375 million

• The Government of India and the World Bank today signed a $375 million loan agreement to support India develop its first modern inland water transport fairway on the Ganga river between Varanasi and the seaport of Haldia.

• The Project will help the Inland Waterways Authority of India (IWAI) put in place state-of-the-art infrastructure and navigation services needed to develop the waterway known as National Waterway 1 as an efficient logistics artery for northern India while adopting the least intrusive methods of making the river navigable.

• The Capacity Augmentation of National Waterway 1 (Jal Marg Vikas) Project will help save more than 150, 000 tons of CO2 equivalent in greenhouse gas emissions annually by moving cargo away from fossil fuel-consuming road and rail networks.

Q71. Answer: (c) Law of Inertia

The Correct Answer is Option 3 i.e Law of Inertia.

Concept:-

• Friction: Friction is a force that opposes the motion of two surfaces that are in contact. In this scenario, friction plays a minor role as it is not sufficient to overcome the inertia of the coin to carry it along with the card.

• Gravity: Gravity is the force that attracts two bodies toward each other. Once the card is flicked away and the coin starts to fall, gravity is the force that accelerates it downward into the tumbler.

• Newton's Second Law of Motion: This law states that the acceleration of an object is dependent upon two variables - the net force acting upon the object and the mass of the object. In the context of the coin, once it starts to fall, its acceleration due to gravity is explained by this law.

• Newton's Third Law of Motion: This law states that for every action, there is an equal and opposite reaction. While it does not directly explain the coin's drop, it's exemplified in the interaction between the finger and the card when flicked.

Explanation:-

The Law of Inertia, also known as Newton's First Law of Motion, states that an object at rest stays at rest, and an object in motion continues in motion with the same speed and in the same direction unless acted upon by an unbalanced force. Essentially, this law describes the resistance of any physical object to any change in its state of motion, including changes to its speed and direction.

In the scenario with the card and the coin, initially, both the card and the coin are at rest. When the card is flicked, an external force is applied to it, causing it to move. However, no significant external force is applied to the coin at the moment the card is flicked. The coin's inertia causes it to resist any change in its state of motion. Thus, as the card is rapidly moved out from under it, the coin doesn't move with the card but instead falls vertically due to gravity into the tumbler below.

So, The Correct Answer is Option 3 i.e Law of Inertia.

Q72. Answer: (b) 66

Shortcut Trick

Product of numbers = HCF × LCM

Other number = (11 × 330) ÷ 55

=> 330 ÷ 5 = 66

Therefore The correct answer is 66.

Alternate Method

Given:

HCF of two numbers = 11

LCM of two numbers = 330

One number (a) = 55

Formula Used:

Product of two numbers (a × b) = HCF × LCM

Calculations:

=> 55 × Other number = 11 × 330

=> Other number = (11 × 330) ÷ 55

=> Other number = 330 ÷ 5

=> Other number = 66

Therefore The correct answer is 66.

Additional Information

HCF and LCM Relation

For any two positive integers a and b, HCF(a, b) × LCM(a, b) = a × b. This property is only valid for two numbers.

HCF of Fractions

HCF of Fractions = (HCF of Numerators) ÷ (LCM of Denominators).

LCM of Fractions

LCM of Fractions = (LCM of Numerators) ÷ (HCF of Denominators).

Q73. Answer: (c) [figure]

C → Mountain

A → Peak

B → Clouds

Every mountain has a peak.

Hence, the figure in option 3 is the correct answer.

Q74. Answer: (c) Only conclusion 2 follows

The least possible Venn diagram is as follows:

Conclusions:

1. All metals are razors → False (it is possible but not definite)

2. Some metals are blades → True (All blades are metals)

Hence, only conclusion II follows.

Q75. Answer: (a) 36.36%

CO2 emission in 2016 = 110 million metric tons

CO2 emissions in 2017 = 150 million metric tons

Therefore Percentage increase = (150 – 110)/110 × 100% = 36.36%

Q76. Answer: (c) [figure]

The Correct answer is Option Fig. 3

• The electronic dot and cross structure of ethene is:

• As we know that, the molecular formula of Ethene is C2H4. Hence, the above diagram shows the correct dot and cross structure of Ethene.

• Ethylene/Ethene is an unsaturated hydrocarbon.

• It is a colorless flammable gas with a faint sweet and musky gas.

• It is naturally produced and released by most fresh fruits and vegetables as a natural ripening agent.

• It is also known as the natural ripening hormone.

Q77. Answer: (d) 5616

Shortcut Trick

Break numbers into prime factors: 16 = 2^4, 24 = $2^3 \times 3$, 36 = $2^2 \times 3^2$, 52 = $2^2 \times 13$, 54 = 2×3^3.

LCM = Highest powers of all prime factors = 2^4 × 3^3 × 13.

LCM = 16 × 27 × 13 = 432 × 13 = 5616.

Therefore The correct answer is 5616.

Alternate Method

Given: Numbers are 16, 24, 36, 52 and 54.

Formula Used: Division Method for Least Common Multiple (LCM).

=> 2 | 16, 24, 36, 52, 54

=> 2 | 8, 12, 18, 26, 27

=> 2 | 4, 6, 9, 13, 27

=> 2 | 2, 3, 9, 13, 27

=> 3 | 1, 3, 9, 13, 27

=> 3 | 1, 1, 3, 13, 9

=> 3 | 1, 1, 1, 13, 3

=> LCM = 2 × 2 × 2 × 2 × 3 × 3 × 3 × 13

=> LCM = 16 × 27 × 13 = 5616.

Therefore The correct answer is 5616.

Additional Information

LCM (Least Common Multiple)

The smallest positive integer that is divisible by each of the given numbers.

HCF and LCM Relation

For two numbers a and b, Product of numbers = HCF(a, b) × LCM(a, b).

Prime Factorization Method

LCM is the product of the highest powers of all prime factors present in the numbers.

Q78. Answer: (b) Soil

CONCEPT:

• Lens: A transparent material that is used to refract the light rays and form images is called the lens.

• Transparent materials: The material which allows the light rays to pass through it easily is called transparent material.

• For example: Plastic, Glass, and water, etc.

• Opaque material: The material which doesn't allow the light rays to pass through them is called opaque material.

• For example: Soil, wood, iron, etc.

EXPLANATION:

• Flint glass is used in optical instruments like lenses, Prisms, etc.

• Soil is an opaque material. So it can't be used to make a lens. Hence option 2 is correct.

• There is some transparent plastic, water so that the film can be used to create a lens.

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Q79. Answer: (c) D

In the given figures all are mathematical operators except D which has an alphabet.

Hence, figure D is the odd one.

Q80. Answer: (d) LMN

Maximum number of mobile phones is produced by company LMN

Number of mobile phones produced = 1240000 × 30/100 = 372000

Q81. Answer: (c) N. Chandrababu Naidu

● On 09 May 2017, Andhra Pradesh Chief Minister N Chandrababu Naidu was presented with the Transformative Chief Minister Award in the US.

● The award by the US-India Business Council (USIBC) was presented to Naidu during the USIBC West Coast Summit in the Silicon Valley.

The award acknowledges excellence in public service and recognizes the honouree's achievement in championing US-India ties in the areas of trade, politics, and culture.

Q82. Answer: (c) Rs. 200

Shortcut Trick

Effective interest percentage for the given period = Rate × Time

Effective % = 6% × 10 = 60%

According to the question, 60% of Principal = Rs. 120

Hence, 100% of Principal = (120 ÷ 60) × 100 = Rs. 200

Therefore The correct answer is Rs. 200.

Alternate Method

Given:

Simple Interest (SI) = Rs. 120

Rate of interest (R) = 6% p.a.

Time period (T) = 10 years

Formula Used:

SI = (P × R × T) ÷ 100

Calculations:

=> 120 = (P × 6 × 10) ÷ 100

=> 120 = (P × 60) ÷ 100

=> 120 × 100 = 60 × P

=> 12000 = 60 × P

=> P = 12000 ÷ 60

=> P = 200

Therefore The correct answer is Rs. 200.

Additional Information

Total Amount

The total Amount (A) at the end of the term is the sum of the initial Principal and the interest earned: A = P + SI.

Interest Calculation for Different Periods

In Simple Interest, the interest for each year is the same: SI per year = (P × R) ÷ 100. For 10 years, it is simply 10 × (annual interest).

Variable Formulas

To find Time (T) when SI, P, and R are given: T = (SI × 100) ÷ (P × R).

Q83. Answer: (a) C

In figure 2 only the first triangle of figure 1 changes its orientation.

Similarly,

In figure 4 the first triangle of figure 3 will change its orientation.

.Hence, figure C is the correct answer

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Q84. Answer: (a) 550 cm²

Shortcut Trick

Identify the Pythagorean triplet (7, 24, 25) where height (h) = 24 and slant height (l) = 25.

The radius (r) must be 7 cm.

Curved Surface Area (CSA) = π × r × l = (22/7) × 7 × 25 = 22 × 25.

CSA = 550 cm².

Therefore The correct answer is 550 cm².

Alternate Method

Given:

Height (h) of the right circular cone = 24 cm

Slant height (l) of the right circular cone = 25 cm

Value of π = 22/7

Formula Used:

Radius (r) = √(l² − h²)

Curved Surface Area (CSA) = πrl

Calculations:

=> r = √(25² − 24²)

=> r = √(625 − 576)

=> r = √49 = 7 cm

=> Curved Surface Area = (22/7) × 7 × 25

=> CSA = 22 × 25

=> CSA = 550 cm²

Therefore The correct answer is 550 cm².

Additional Information

Total Surface Area of Cone

It includes the base area and is given by TSA = πr(l + r).

Volume of a Cone

The capacity of a cone is given by Volume = (1/3) × πr²h.

Pythagorean Property

In a right circular cone, the slant height (l), height (h), and radius (r) satisfy $l^2 = r^2 + h^2$.

Q85. Answer: (b) Pink

• Pink movie won the national award for Best Film on social issues at the 64^(th) National Film Awards, 2017.

• President Pranab Mukherjee gave the 64th National Film Awards in New Delhi in 2017. Akshay Kumar was chosen for the Best Actor Award for Hindi Movie Rustom.

• Surabhi was named as the best actress for her role in Malayalam film Minnaminungu-The Firefly.

Q86. Answer: (b) A

Goat, Horse and Zebra are herbivores.

Fox is not a herbivore and does not belong to this group.

Hence, Fox is the correct answer.

Q87. Answer: (b) VL12

The pattern followed here is,

Hence, VL12 is the next term in the series.

Q88. Answer: (a) Only 1 is sufficient

Shortcut Trick

The Exterior Angle Theorem states that the exterior angle of a triangle is equal to the sum of its two opposite interior angles.

From Information 1: angle ACD = angle BAC + angle ABC = 45° + 70° = 115°. This provides a unique numerical value.

From Information 2: angle ACB = 180 − x°, which implies angle ACD = x°. Since x is an unknown variable, the value cannot be determined.

Therefore The correct answer is Only 1 is sufficient.

Alternate Method

Given: angle BAC = 45°, angle ABC = 70° (from Information 1); angle ACB = 180 − x° (from Information 2).

Formula Used: Exterior Angle = Sum of two opposite interior angles; Linear Pair sum = 180°.

Calculations:

=> In ΔABC, side BC is extended to point D, forming the exterior angle angle ACD.

=> According to the Exterior Angle Theorem: angle ACD = angle BAC + angle ABC.

=> Using values from Information 1: angle ACD = 45° + 70° = 115°.

=> From Information 2, angle ACB = 180° − x°.

=> Since BCD is a straight line, angle ACD = 180° − angle ACB = 180° − (180° − x°) = x°.

=> Without the value of x, Information 2 alone is insufficient to find the numerical value of angle ACD.

Therefore The correct answer is Only 1 is sufficient.

Additional Information

Exterior Angle Theorem

The measure of an exterior angle of a triangle is equal to the sum of the measures of its two remote interior angles (angle ext = angle int1 + angle int2).

Linear Pair Axiom

If a ray stands on a line, then the sum of the two adjacent angles so formed is 180° (angle ACB + angle ACD = 180°).

Angle Sum Property

The sum of all interior angles of any triangle is always 180° (angle A + angle B + angle C = 180°).

Q89. Answer: (a) C

After folding, the sheet will look like the below figure:

Hence, the figure given in option figure C is the correct answer.

Q90. Answer: (c) The Shape of water

- The Shape of Water has won the Oscar for best picture at the 90th Academy Awards.
- The Shape of Water is an American fantasy drama film directed by Guillermo del Toro and written by del Toro and Vanessa Taylor.
- Set in Baltimore in 1962, the plot follows a mute custodian at a high-security government laboratory who falls in love with a captured humanoid-amphibian creature.

Q91. Answer: (d) Nuclear force

Nuclear force:

- Hideki Hukawa discovered the theory of nuclear forces.
- The forces acting between 2 or more nucleons are known as nuclear forces.
- A Nuclear force is a force that exists between nucleons (protons and neutrons) inside a nucleus.
- Since it exists inside the nucleus, it is a short-range force.
- With a force about times stronger than the gravitational force, nuclear force is the strongest force in nature.

Q92. Answer: (b) 45 hrs

Shortcut Trick

Ratio of efficiencies of X : Y : Z = 1 : 2 : (2 × 3) = 1 : 2 : 6.

Total efficiency of X + Y + Z = 1 + 2 + 6 = 9 units/hr.

Total capacity of tank = Total efficiency × Total time = 9 × 5 = 45 units.

Time taken by X alone = Total capacity ÷ Efficiency of X = 45 ÷ 1 = 45 hours.

Therefore The correct answer is 45 hr.

Alternate Method

Person/Pipe	Time (hr)	Total Work	Efficiency
Pipe X	T_x	45 units	1 unit/hr
Pipe Y	T_y	2 units/hr	
Pipe Z	T_z	6 units/hr	

Given:

Efficiency of Y = 2 × Efficiency of X

Efficiency of Z = 3 × Efficiency of Y = 3 × (2 × Efficiency of X) = 6 × Efficiency of X

Combined time for X, Y, and Z = 5 hours

Calculations:

=> Let Efficiency of X = k

=> Efficiency of Y = 2k and Efficiency of Z = 6k

=> Total Efficiency (X+Y+Z) = k + 2k + 6k = 9k

=> Total Work (Tank Capacity) = Efficiency × Time = 9k × 5 = 45k

=> Time taken by X alone = Total Work ÷ Efficiency of X

=> Time = 45k ÷ k = 45 hours

Therefore The correct answer is 45 hr.

Additional Information

Efficiency and Time Relation

Efficiency is inversely proportional to the time taken to complete a work. If the ratio of efficiencies of two pipes is a : b, the ratio of time taken by them is b : a.

Pipes and Cisterns Formula

If a pipe fills a tank in x hours and another fills it in y hours, then together they fill it in (x × y) ÷ (x + y) hours.

Q93. Answer: (c) Meghalaya

Garo Hills:

• It is the part of the Garo- Khasi range in Meghalaya, India.

• The range is part of the Meghalaya Subtropical forest ecoregion. The Garo's call themselves A.chik (locally used).

• Nokrek Peak is the highest peak of Garo hills.

Extra facts:

Khasi Hills:

• It is located in the Shillong Plateau in the Meghalaya State of India.

• The Khasi hills are a part of the Garo-Khasi-Jaintia range and connect with Purvanchal range and larger Patkai range further east.

• The highest peak is Lum Shillong which is 1968m high.

Jaintia Hills:

• The Jaintia hills are located further to the east of Khasi Hills in the state of Meghalaya.

• It is a part of the Patkai hill range that extends across the Indo- Myanmar borders.

Q94. Answer: (d) Shri Venkaiah Naidu

• The construction of over 20 lakh affordable houses for urban poor in 4, 720 cities and towns has been approved under the Pradhan Mantri Awas Yojana (Urban) launched two years ago, Union Urban Development Minister M Venkaiah Naidu said.

• The scale of housing activity has picked up in the three years of the Narendra Modi government, the minister said while participating in a foundation laying ceremony for 1, 09, 000 houses under the Yojana in Andhra Pradesh's Vijayawada town.

Q95. Answer: (d) Indu Malhotra

• Indu Malhotra is the first woman lawyer to be directly appointed as a judge of the Supreme Court.

• Senior lawyer Indu Malhotra was sworn in on 27th April 2018 as Supreme Court Judge. Justice Malhotra is the 7th woman Judge of the top court.

• Justice M. Fatima Beevi was the first woman judge of the SC.

• She was followed by Justice Sujata V. Manohar, Justice Ruma Pal, Justice Misra, Justice Desai and Justice Banumathi. She is the 1st woman lawyer from the Supreme Court bar to be directly elevated.

Q96. Answer: (b) 216 C

CONCEPT:

• Electric current: The rate of flow of electric charge is called electric current. It is denoted by I.

Electric current (I) = Charge (Q)/time (t)

Charge flown (Q) = I × t

CALCULATION:

Given that:

Current (I) = 0.6 A

Time (t) = 6 mins = 6 × 60 sec

Charge (Q) =?

Electric charge = Current × Time

Q = I × t

Q = 0.6 × 6 × 60 C

Q = 216 C

Q97. Answer: (b) 41

The logic followed here is

27 + 2 = 29;

29 + 4 = 33;

33 + 8 = 41;

41 + 16 = 57.

Hence, 41 is the missing number in the given series.

Q98. Answer: (b) Loss 5%

Shortcut Trick

Ratio method: Selling Price 1 (SP1) corresponds to (100 + Gain%) = 119%.

Value of 119% => Rs. 595.

Value of 1% => 595 ÷ 119 = Rs. 5.

For the second sale, SP2 = Rs. 475.

Percentage value of SP2 => 475 ÷ 5 = 95%.

Since 95% is less than 100%, Loss% = 100% − 95% = 5%.

Therefore The correct answer is Loss 5%.

Alternate Method

Given: SP1 = Rs. 595, Gain% = 19%, SP2 = Rs. 475.

Formulas: CP = [SP × 100] ÷ [100 + Gain%], Loss% = [(CP − SP) ÷ CP] × 100.

=> Step 1: Calculate Cost Price (CP) = (595 × 100) ÷ (100 + 19)

=> CP = (595 × 100) ÷ 119 = 5 × 100 = Rs. 500.

=> Step 2: Compare SP2 with CP. Since SP2 (475) < CP (500), there is a Loss.

=> Loss = 500 − 475 = Rs. 25.

=> Step 3: Loss Percentage = (25 ÷ 500) × 100 = 5%.

Therefore The correct answer is Loss 5%.

Additional Information

Cost Price vs Selling Price

When Selling Price is greater than Cost Price, it is a Gain. When Cost Price is greater than Selling Price, it is a Loss.

Percentage Calculation

Both gain and loss percentages are always calculated on the Cost Price (CP) unless stated otherwise in the question.

Q99. Answer: (d) Only assumption II is implicit

The statement says that plants and animals are a part of biodiversity and the ecosytem, and that their existence is important for a healthy environment.

Thus, it indirectly suggests that there is a need to protect these species.

Assumption II emphasizes that these species must be protected to preserve biodiversity and explains their role in the ecosystem.

Also, the phrase ‘part of ecosystems’ means that we can assume we know the meaning of an ecosystem.

Therefore, assumption II is implicit.

However, the statement does not suggest any measure to ensure the protection of the species of plants and animals.

Therefore, assumption I is not implicit.

Hence, only assumption II is implicit.

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Q100. Answer: (d) 10 km

Shortcut Trick

Speed1 (S1) = 10 km/hr, Speed2 (S2) = 10 + 2 = 12 km/hr.

Time Difference (ΔT) = 15 − 5 = 10 minutes = 10/60 hours.

Distance (D) = [(S1 × S2) ÷ (S2 − S1)] × ΔT

D = [(10 × 12) ÷ 2] × (10 ÷ 60) = 60 × (1 ÷ 6) = 10 km.

Therefore The correct answer is 10 km.

Alternate Method

Given: Initial speed = 10 km/hr, New speed = 12 km/hr, Time difference = 10 min.

=> Let the distance be D.

=> Time1 − Time2 = Difference in time

=> (D ÷ 10) − (D ÷ 12) = 10 ÷ 60

=> (6D − 5D) ÷ 60 = 10 ÷ 60

=> D ÷ 60 = 10 ÷ 60

=> D = 10 km

Therefore The correct answer is 10 km.

Additional Information

Time Difference Rule

If both cases are 'late' or both 'early', subtract the times. If one is 'late' and one 'early', add the times to find ΔT.

Speed-Time Inversely Proportional

For a constant distance, Speed1 ÷ Speed2 = Time2 ÷ Time1. This ratio method can also solve distance problems efficiently.

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