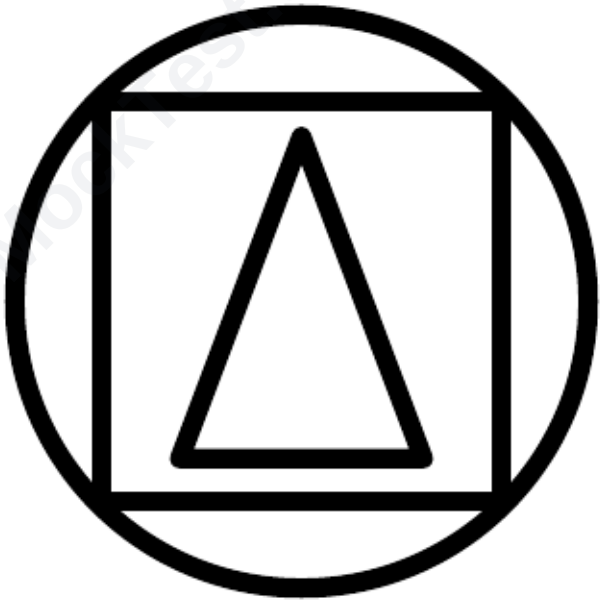
RRC Group D Previous Year Paper 60 (Held On: 25 Sept 2018 Shift 3)

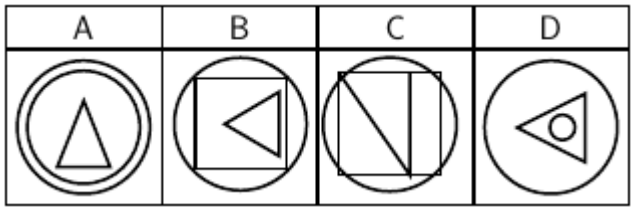
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CBT

Q1. Which one of the following options is the most closely related to the given figure?





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

Q2. [60 ÷{3^3 × 2 - (29 - 26 - 31)}]

(a) 6
(b) 10
(c) 5
(d) 3

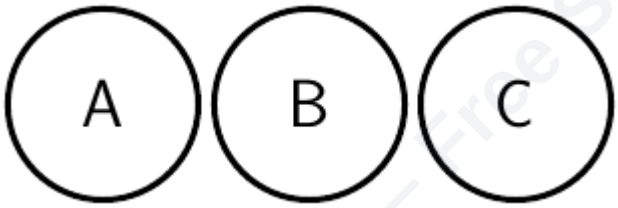
Q3. Which Venn diagram correctly depicts the relationship between the following?

(A) Computer

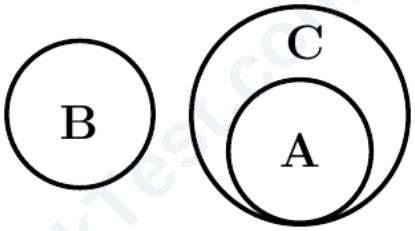
(B) Table

(C) Electronic

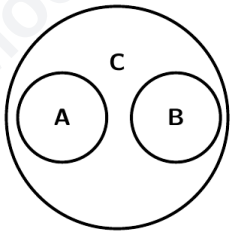
(a)



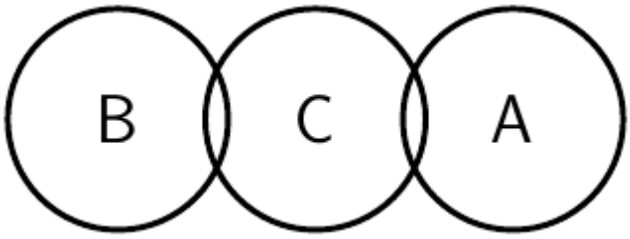
(b)



(c)



(d)



Q4. 216 cards are distributed among A and B. First of all, the cards are distributed among A and B in the ratio 5:4 respectively. After some time, the cards are again collected and distributed among A and B in the ratio of 11:13 respectively. How many cards did A get the second time as compared to the first?

(a) 3 less

(b) 3 more

(c) 21 more

(d) 21 less

Q5. If the density of water is 10^3 kg/m^3 and the density of copper is 8.9×10^3 kg/m^3, then the relative density of copper will be:

(a) 89

(b) 0.89

(c) 890

(d) 8.9

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Q6. Which book is written by former RBI governor Raghuram Rajan?

(a) The Emergency-Indian Democracy's Darkest Hour
(b) I Do What I Do
(c) The Ministry of Utmost Happiness
(d) The Unseen Indira Gandhi

Q7. When an acid reacts with a metal oxide, _____ and _____ are obtained as products.

(a) Salt, Water
(b) Acid, Water
(c) Base, Water
(d) Base, Acid

Q8. The L.C.M. of two numbers is 2604 and H.C.F. is 12. If one of the numbers is 84, what will be the other number?

(a) 327
(b) 273
(c) 372
(d) 237

Q9. Isobars have the same number of _____.

(a) Ion
(b) Nucleons
(c) Electron
(d) Proton

Q10. Read the given statement(s) and conclusions carefully and choose which of the conclusions beyond reasonable doubt logically follows from the information in the statement.

Statements:

Some cotton are cloth. Some woolen clothes are cotton

Conclusion

1. Some cotton are leaves

2. Wool is a fabric

(a) Both the conclusions are true in according to the statements
(b) Only conclusion 2 is true according to the statement
(c) Only conclusion 1 is true according to the statement
(d) Neither 1 nor 2 is true according to the statement

Q11. There is a creator and a destroyer in a computer game. Their total number is 16. Some try to build a wall around the palace and others try to destroy it. Each builder alone can build a wall in 18 hours while any destroyer can destroy it in 15 hours. The wall is built in 2.5 hours if all the 16 people are activated before the wall is built. Find the number of destroyers out of these?

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

Q12. Which of the following has only magnitude and no direction?

(a) Momentum
(b) Displacement
(c) Work
(d) Force

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Q13. Testosterone which is a male sex hormone is synthesized in _____.

(a) Scrotum
(b) Testicle
(c) Seminal Vesicle
(d) Prostate Gland

Q14. _____ started the system of Mansabdari to strengthen the army.

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

Q15. _____ in plants helps in the absorption and uptake activity, from roots to leaves, in the transmission of water and minerals.

(a) Consideration
(b) Photosynthesis
(c) Respiration
(d) Transpiration

Q16. (-8) [30 ÷{7 - (-3)}] = ?

(a) –24
(b) 60
(c) 24
(d) –60

Q17. The nature of _____ is electro-positive.

(a) Non-metals
(b) Metals
(c) Semi-metals
(d) Metalloid

Q18. Kaveri bought a toy for Rs. 280 and sold it for Rs. 315. How much profit did she get?

(a) 17.5%
(b) 12.5%
(c) 16%
(d) 15.25%

Q19. A train with a speed of 78 km/hr crosses a platform 450 m long in 27 sec. What is the length of the train?

(a) 120 m
(b) 135 m
(c) 130 m
(d) 125 m

Q20. The L.C.M. of 42, 84 and 48 is.

(a) 210
(b) 336
(c) 168
(d) 420

Q21. Which of the following is a unicellular green algae?

(a) Chara
(b) Ulothrix
(c) Spirogyra
(d) Chlamydomonas

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Q22. If 522 ÷ 29 = 18, then 5.22 ÷ 0.0018 = ?

(a) 0.29
(b) 2900
(c) 2.9
(d) 290

Q23. Which of the following is present in carpel?

(a) Pollen grain
(b) Ovule
(c) Petals
(d) Sepals

Q24. Objects that do not produce light themselves are called?

(a) Transparent objects
(b) Translucent objects
(c) Non-illuminated objects
(d) Illuminated objects

Q25. Which of the following will be the sides of a right angled triangle?

(a) 84 cm, 13 cm, 85 cm
(b) 84 cm, 63 cm, 115 cm
(c) 15 cm, 112 cm, 111 cm
(d) 76 cm, 100 cm, 57 cm

Q26. Which is the largest producer of manganese in India?

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

Q27. _____ tissue is formed by the combination of dead cells.

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

Q28. A question and two statements are given. Decide which of the statement(s) is/are sufficient to answer the question.

Question:

Nitara has 20 colored pencils of four different colours. How many black pencils does she have?

Statements:

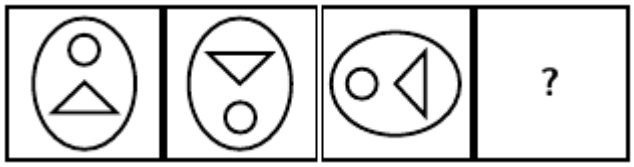
1. It has 5 red colored pencils.
2. She has 4 blue colored pencils.
3. The number of green pencils is twice that of blue pencils.

(a) Only statement 1 is sufficient.
(b) Only statement 3 is sufficient.
(c) Statements 1, 2 and 3 all together are sufficient.
(d) Statements 1 and 2 together are sufficient.

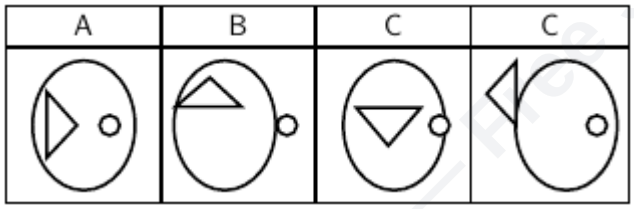
Q29. Select the alternative figure that will complete the series of question pictures?

Question Figure:

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Option Figure:



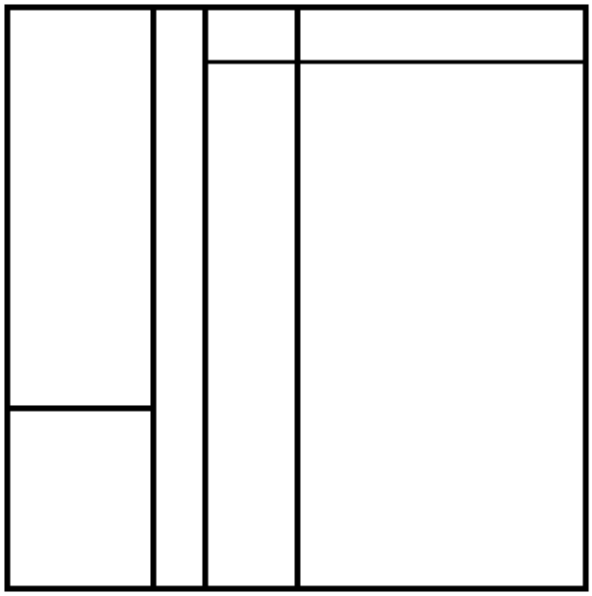
(a) A
(b) B
(c) C
(d) D

Q30. Select the term which is related to the third term in the same way as the second term is related to the first term.

Needle : Stitch :: Knife : ?

(a) Blade
(b) Butter
(c) Cut
(d) Sharp

Q31. How many rectangles are there in the following picture?



(a) 10
(b) 20
(c) 18
(d) 15

Q32. Which of the following words does not belong to the group?

A. Jam
B. Juice
C. Squash
D. Lemon

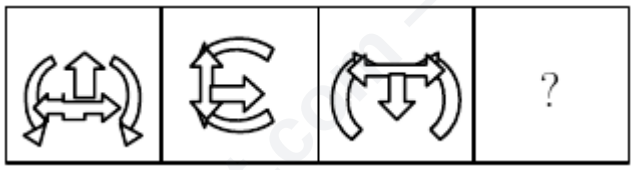
(a) B

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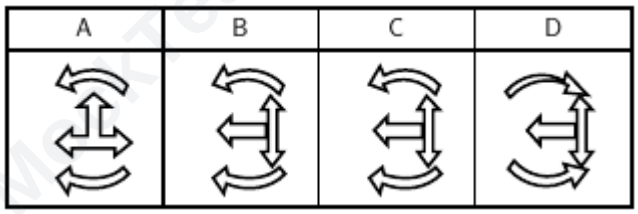
(b) D
(c) A
(d) C

Q33. An object covers a distance of 22 m in 4 s and then another 15 m in 2 s. What is the average speed of the object?
(a) 6.67 ms¹
(b) 6.17s^(–1)
(c) 6.17 m
(d) 6.17 ms^(–1)

Q34. Select the option figure that will complete the series of question figures.
Question Figure:



Option Figure:



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

Q35. The question given below is followed by two arguments. You have to decide which of the arguments are strong with respect to the statement.
Question:
Should there be any check on consumerism in society?
Argument:
I. Yes, as it promotes the acquisition of at most goods, it affects the ecological balance by generating more waste. People have got into the habit of throwing used objects. We must strike a balance.
II. No, it promotes industrial development and welfare responsible for the economic conditions of a country.
(a) Only Argument II is strong
(b) Neither argument I nor argument II is strong
(c) Only Argument I is strong
(d) Arguments I and II both are strong

Q36. On an average Meenakshi spends 10% of her monthly salary on shopping and going to restaurants and malls. The remaining 80% is spent on his household expenses and 10% is saved. If the monthly household expenditure is Rs. 48,000, then what is the monthly income?
(a) Rs. 60,000
(b) Rs. 80,000
(c) Rs. 1,20,000
(d) Rs. 54,000

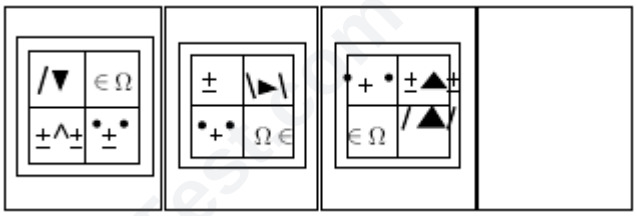
Q37. {28 - (31 - 48)} ÷ {-2 × 9 -(-3)} -57 ÷ (-22 + 3) = ?

(a) –2
(b) 1
(c) 0
(d) 2

Q38. The mean of 12, 13, 15, 18, X, 28, 18, 12, 6, 8 is 15. What is the median of the data?

(a) 14.5
(b) 13.5
(c) 14
(d) 13

Q39. Select the option that will replace the question mark in the following series.



A		B		C		D	
±	Ω ϵ	* ± *	Ω ϵ	Ω ϵ	* ± *	Ω ϵ	* ± *
/▶\	* ± *	/▶\	±	\◀/	±∧±	\◀/	±

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

Q40. The number of diagonals in a 19 - gon is:

(a) 161
(b) 133
(c) 171
(d) 152

Q41. Who is the first wicket-keeper in the world to do 100 stumpings in One Day International cricket matches?

(a) Kumar Sangakkara
(b) Shahid Afridi
(c) Adam Gilchrist
(d) M.S. Dhoni

Q42. Aarti and Bharti take 30 days and 42 days respectively to complete a work individually. Aarti starts working alone and then a few days later Bharti joins her. In all, they take 20 days to complete the work. After how many days did Bharti join the work?

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

Q43. Metal reacts with steam of _____ to form oxide.

(a) Potassium
(b) Sodium
(c) Calcium

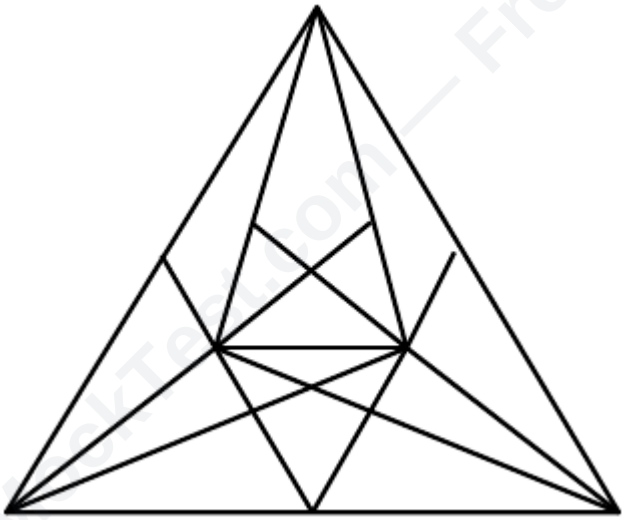
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(d) Iron

Q44. Loo is a type of _____.

(a) Cyclone
(b) Cold wave
(c) Heat wave
(d) Tsunami

Q45. How many triangles are there in the following figure?



(a) 16
(b) 23
(c) 10
(d) 20

Q46. What is "Hausla 2017", which was celebrated from 16 November to 20 November 2017?

(a) Celebration of the rights of senior citizens
(b) Celebration of women's rights
(c) Celebration of transgender rights
(d) Celebration of children's rights

Q47. Find the difference between simple interest and compound interest on Rs. 2000 for 2 years at 10% per annum?

(a) Rs. 0
(b) Rs. 30
(c) Rs. 20
(d) Rs. 10

Q48. Sanchi Stupa has been designed on the page side of which of the following Indian bank notes?

(a) Rs. 200
(b) Rs. 50
(c) Rs. 500
(d) Rs. 2,000

Q49. If WAIT is coded as 231920 then what will be the code for RUN?

(a) 182014
(b) 192114
(c) 182115
(d) 182114

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Q50. Who was honored with the 2018 Padma Shri award in the field of 'Art-Folk Music' from Uttar Pradesh?

(a) Bhikhudan Gadhvi
(b) Chitra Singh
(c) Mohan Swaroop Bhatia
(d) Shubha Mudgal

Q51. Which of the following elements has three valence electrons?

(a) Al
(b) Ag
(c) Au
(d) Ca

Q52. From the top of a 46 m high tower, the angles of depression of the top and bottom of a building are observed to be 45^o and 60^o respectively. Find the height of the building.

(a) 23 m
(b) 19.45m
(c) 46 m
(d) 23 √3 m

Q53. If RATE is coded as 181205, then what will be the code for KEY?

(a) 11523
(b) 11814
(c) 11924
(d) 11525

Q54. Example of motion of a freely falling object is:

(a) rectilinear motion
(b) Non Uniform acceleration
(c) Uniform acceleration
(d) Circular motion

Q55. The Mughal ruler Akbar was born in _____.

(a) Amarkot
(b) Fatehpur Sikri
(c) Sialkot
(d) Agra

Q56. Read the given statements and conclusions carefully and choose which of the conclusions logically follows from the statements.

Statement:

"My dog loves food," Anita tells her friend.

Conclusion:

I. Anita has a dog.

II. Her dog doesn't like anything but food.

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

Q57. Consider the given statement and decide which of the given concepts are implicit in the statement.

Statement: "Try to steal this phone from our store" - a display unit on the notice board of the stores

Assumption:

I. People want to own a mobile phone

II. A powerful surveillance system has been put in place in this store to challenge theft.

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(a) Either I or II is implicit.
(b) Only II is implicit.
(c) Only I is implicit.
(d) Both I and II are implicit.

Q58. The liquid used to conduct current is called
(a) suspension
(b) non-electrolyte
(c) emulsion
(d) electrolyte

Q59. Who among the following was sworn in as the 45th Chief Justice of India in August 2017?
(a) Justice Chelameswar
(b) Jagdish Singh Khehar
(c) Ranjan Gogoi
(d) Deepak Mishra

Q60. Eight years ago Ashwin's age was 1 year less than 3 times Arpit's age. Six years ago Ashwin's age was 1 year more than 2 times Arpit's age. What will be Arpit's age after 7 years?
(a) 19 years
(b) 15 years
(c) 16 years
(d) 12 years

Q61. Who among the following Chief Ministers of India was presented the 'Transformative Chief Minister Award' by the US-India Business Council (USIBC) in May 2017?
(a) Yogi Adityanath
(b) Nitish Kumar
(c) N. Chandrababu Naidu
(d) K. Chandrashekhar Rao

Q62. What should be added to 53/5 to get the value 83/7 ?
(a) 99/35
(b) 96/35
(c) 99/33
(d) 94/35

Q63. February 2, 2019 will be Saturday. Then which day will be on October 4, 2019?
(a) Thursday
(b) Friday
(c) Saturday
(d) Sunday

Q64. Complete the following sequence by choosing the correct option.
91827364, 81726354, 71625344 _____
(a) 61524334
(b) 5234165
(c) 61524336
(d) 5234166

Q65. Who is the owner of Mumbai's IPL team 'Mumbai Indians'?
(a) Shahrukh Khan
(b) times of India
(c) Reliance Industries
(d) Amitabh Bachchan

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Q66. What is the full form of CII?

(a) Confederation of Indigenous Industry
(b) Conciliation in Indian Industry
(c) Confederation of Indian Industry
(d) Committee for Indian Industry

Q67. What will be the lateral mirror image of &^*$?



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

Q68. Find the next term in the series given below.

2J, 9M, 16P, _____

(a) 23 R
(b) 20 R
(c) 22 R
(d) 23 S

Q69. Which film won the National Award for Best Film on Social Issues at the 64th National Film Awards, 2017?

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

Q70. Who jointly inaugurated the Global Entrepreneurship Summit (GES - 2017) in Hyderabad along with Prime Minister Narendra Modi?

(a) Melanie Trump
(b) Ivanka Trump
(c) Donald Trump
(d) Ivana Trump

Q71. Name the actor who played the character of Bhallaladeva in the film series 'Bahubali'?

(a) M. Nassar
(b) Rana Daggubati
(c) Prabhas
(d) Abhishek Bacchan

Q72. Lime reacts with chlorine to form what?

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

Q73. Read the given statements and conclusions carefully and choose which of the conclusions logically follows from the statement.

Statements:

Diabetics can eat fruits.

Conclusion:

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I. Sugar in its natural form is harmful.

II. Consumption of fruits makes the sugar available in sufficient quantity for the normal metabolism of the body.

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

Q74. Read the question and two statements given below.

Question:

Neeta has 6 pens of two different colours. Can we tell how many black pens he has?

Statements:

1. There are 4 red pens

2. He bought those pens yesterday.

Which statement is sufficient to answer the given question?

(a) Statements 1 and 2 both are not sufficient.
(b) Statement 2 alone is sufficient.
(c) Statements 1 and 2 both are sufficient.
(d) Statement 1 alone is sufficient.

Q75. Strong is related to weak as languorous is to _____.

(a) run
(b) swim
(c) jump
(d) sink

Q76. Which of the following factors reduces the rate of evaporation?

(a) rise in temperature
(b) moisture
(c) increase in surface area
(d) increase in wind speed

Q77. After 11 innings, the average score per innings of a batsman is 52. After 13 innings, the average increased to 54. If the batsman scored 16 more runs in the 13th innings than the previous innings, then how many runs did he score in the 12th innings?

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

Q78. $(2.5)^2 + 8.7 – (1.12/1.4) \times 0.5 = ?$

(a) 14.55
(b) 10.95
(c) 14.91
(d) 14.32

Q79. What is the time taken by an oscillator to complete one oscillation called?

(a) amplitude
(b) period
(c) distance
(d) frequency

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Q80. A computer company sells two brands of computers on the same day and makes a total profit of Rs.15,000. If the profit from one brand is 35% of the total profit, then what is the profit amount made by selling the computer of the other brand?

(a) Rs. 8,750
(b) Rs. 8,000
(c) Rs. 9,750
(d) Rs. 9,000

Q81. 19 years from now Vinod's age will be twice that of Anand. Seven years ago Anand's age was one fourth of Vinod's age then. What is Vinod's present age?

(a) 53 years
(b) 57 years
(c) 55 years
(d) 59 years

Q82. Name the Indian female weightlifter who won the gold medal in the Asian Youth and Junior Weightlifting Competition held in Nepal on July 25, 2017.

(a) Kavita Deva
(b) Konsam Ormila Devi
(c) Karnam Malleswari
(d) Reema Joseph

Q83. If an object moves a distance of 1 m in a specified direction by applying a force of 1 N, then the work done will be:

(a) 1 N
(b) 1 J
(c) 1 kW
(d) 1 ohm

Q84. Which of the following inert gas has only two electrons in its outermost shell?

(a) helium
(b) argon
(c) neon
(d) krypton

Q85. Fullerene is an allotrope of _____.

(a) Zinc
(b) Sulphur
(c) Gold
(d) Carbon

Q86. When a sum is invested for 5 years, the amount will be Rs. 3,640. If the rate of simple interest is increased by 2% per annum from earlier then this amount will be Rs. 3,920 turns out to be. What is the principal amount invested?

(a) Rs. 2,560
(b) Rs. 2,690
(c) Rs. 2,750
(d) Rs. 2,800

Q87. Considering the following statement, decide which of the given assumptions are implicit in which statement?

Statements:

Swimming improves overall physical health.

Assumption:

I. Secretion of good hormones is essential for good health.

II. Water provides relief to the muscles.

(a) Both I and II are implicit
(b) Only I is implicit

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(c) Neither I nor II is implicit
(d) Only II is implicit

Q88. The SI unit of pressure is-
(a) pascal
(b) Kgms^(–1)
(c) dyne
(d) newton

Q89. What is the main occupation of the merchants known as Shroffs, Seths, Sahukars, Mahajans and Chheti since ancient times?
(a) Construction
(b) Teaching
(c) Banking
(d) Treatment

Q90. A man walking towards East takes a 270 clockwise turn and starts walking. In which direction is he walking now?
(a) West
(b) North
(c) East
(d) South

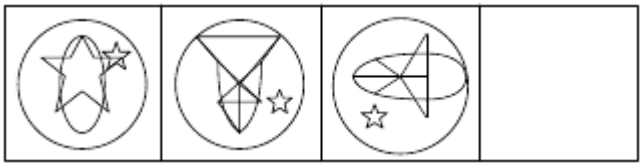
Q91. An object covers a distance of 23 m in 4 s and then another 15 m in 2 s. What is the average speed of the object?
(a) 6.34s^(–1)
(b) 6.34 m
(c) 6.33 ms^(–1)
(d) 6.67 ms^(–1)

Q92. The area of a rhombus is 216 m² and the length of one of its diagonals is 24 m. The length of each side of the rhombus will be:
(a) 12 m
(b) 18 m
(c) 15 m
(d) 30 m

Q93. On adding zinc to copper sulphate solution:
(a) water is formed
(b) zinc sulphate is formed
(c) zinc oxide is formed
(d) no reaction takes place

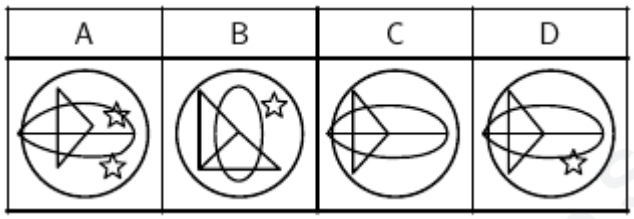
Q94. Two gas filling tubes A and B can fill a gas cylinder in 15 minutes and 40 minutes respectively. Both the tubes are opened simultaneously but after 4 minutes, tube A is closed. How much time will it take to fill the cylinder?
(a) 14 minutes 40 seconds
(b) 10 minutes 10 seconds
(c) 20 minutes 10 seconds
(d) 29 minutes 20 seconds

Q95. Select the option figure that will complete the series of question figures.
Question figure



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Option figure



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

Q96. Nayan walks 1 km towards East. At a crossroads he took a right turn and walked 500 meters to reach the hospital. In which direction is the hospital from Nayan's initial position?

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

Q97. What will be the next term in the following series?

N14M13, O15L12, P16K11, _____

(a) Q17J10
(b) J10Q17
(c) Q18J10
(d) Q17J13

Q98. Navodaya Vidyalaya Samiti and Kendriya Vidyalaya Sangathan are autonomous bodies under which central ministry?

(a) Ministry of home affairs
(b) Ministry of Defence
(c) Finance Ministry
(d) Ministry of Human Resource Development

Q99. On 4 September 2016, _____ was canonized as a saint by Pope Francis at a grand ceremony at the Vatican.

(a) Mother Teresa
(b) Sister Florence
(c) St. Mary's
(d) Sister Nirmala

Q100. What will be the next number in the following series?

30, 43, 56, 69, _____

(a) 80
(b) 78
(c) 82
(d) 81

ANSWER KEY

1	c	2	d	3	b	4	d	5	d	6	b	7	a	8	c	9	b	10	d
11	a	12	c	13	b	14	c	15	d	16	a	17	b	18	b	19	b	20	b
21	d	22	b	23	b	24	c	25	a	26	a	27	a	28	c	29	a	30	c
31	c	32	b	33	d	34	a	35	c	36	a	37	c	38	c	39	a	40	d

41	d	42	d	43	d	44	c	45	b	46	d	47	c	48	a	49	d	50	c
51	a	52	b	53	d	54	c	55	a	56	d	57	b	58	d	59	d	60	a
61	c	62	a	63	b	64	a	65	c	66	c	67	a	68	d	69	c	70	b
71	b	72	d	73	b	74	d	75	a	76	b	77	b	78	a	79	b	80	c
81	d	82	b	83	b	84	a	85	d	86	d	87	d	88	a	89	c	90	b
91	c	92	c	93	b	94	d	95	a	96	c	97	a	98	d	99	a	100	c

SOLUTIONS

Q1. Answer: (c) B

The given figure rotates 90^0 anticlockwise direction which is given below:-

Hence, "option 3" is the correct answer.

Q2. Answer: (d) 3

Concept Used:

Follow the BODMAS rule according to the table given below:

Calculation:

[60 ÷{3^3 × 2 - (29 - 26 - 31)}]

=> [60 ÷ {3^3 × 2 – (29 – (-5))}]

=> [60 ÷ {3^3 × 2 – (29 + 5)}]

=> [60 ÷ {27 × 2 – 34}]

=> [60 ÷ (54 – 34)]

=> (60 ÷ 20)

=> 3

Therefore The required value is 3

Q3. Answer: (b) [figure]

The Venn diagram is given below:-

(A) Computer, (B) Table, (C) Electronic

Modern computers are electronic and the table is different from both.

Hence, "Option 2" is the correct answer.

Additional InformationModern computers are electronic because they use active semiconductors (e.g. transistors), mostly in the form of integrated circuits. That is what distinguishes them from mere electric device, i. e. one that uses electricity (like a conventional lightbulb).

Q4. Answer: (d) 21 less

Shortcut Trick

Total cards = 216

Initial share of A = (5 ÷ 9) × 216 = 5 × 24 = 120 cards

Final share of A = (11 ÷ 24) × 216 = 11 × 9 = 99 cards

Change in cards for A = 120 − 99 = 21 less

Therefore The correct answer is 21 less.

Alternate Method

Given:

Total cards = 216

Initial Ratio A : B = 5 : 4

Final Ratio A : B = 11 : 13

Calculations:

=> Sum of initial ratio parts = 5 + 4 = 9 units

=> Value of 1 unit = 216 ÷ 9 = 24

=> A's first share = 5 × 24 = 120 cards

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=> Sum of final ratio parts = 11 + 13 = 24 units

=> Value of 1 unit = 216 ÷ 24 = 9

=> A's second share = 11 × 9 = 99 cards

=> Difference for A = 120 − 99 = 21

Therefore The correct answer is 21 less.

Additional Information

Ratio Distribution Rule

To divide a quantity Q in ratio a:b, the parts are [a/(a+b)] × Q and [b/(a+b)] × Q.

Comparison of Ratios

When the total sum remains constant, you can equalize the sum of ratio parts by taking their LCM to compare values directly.

Q5. Answer: (d) 8.9

The correct answer is 8.9.

• Given,

• density of water = 103 kg/m³.

• density of copper = 8.9 × 103 kg/m³.

• Relative density = (Density of Copper)/(Density of Water)

• = (8.9 × 10^3 kg/m³)/(10^3 kg/m³)

• = 8.9 kg/m3

Additional Information

• Relative density is measured by Hydrometer.

• The relative density is defined as the ratio of the density of the substance to the density of water at 4°C.

Q6. Answer: (b) I Do What I Do

The correct answer is I Do What I Do.

Key Points

• I do what I do book is written by former RBI governor Raghuram Rajan.

• I do what I Do is a nonfiction book authored by economist and former Governor of the Reserve Bank of India, Raghuram Rajan published by Harper Collins India in 2017.

• The book is a collection of speeches delivered by Rajan during his stint as the Governor of the Reserve Bank of India along with his commentary on the economic and political context prevalent at that time.

• The book was released on September 5, 2017, and quickly made its way to topping the list of best sellers on Amazon India and Flipkart.

^(Additional Information)

• The book titled 'The Emergency – Indian Democracy's Darkest Hour' has been authored by Surya Prakash, the chairman of Prasar Bharati.

• The book has recently launched by Union Minister for Urban Development M Venkaiah Naidu in Ahmedabad, Gujarat.

• The book “The Unseen Indira Gandhi” has been authored by Dr. KP Mathur, who was the personal physician of former Prime Minister Indira Gandhi for nearly 20 years till her assassination in 1984.

• The Ministry of Utmost Happiness is the second novel by Indian writer Arundhati Roy, published in 2017, twenty years after her debut, The God of Small Things.

Q7. Answer: (a) Salt, Water

The correct answer is Salt, water.

Key Points

• When an acid reacts with a metal oxide, salt and water are obtained as products.

• Salt and water are produced when acids react with metal oxides.

• Metal oxides are bases because they neutralize acids.

• In general:

• Acid + metal oxide → salt + water

• For example:

• Sulfuric acid + copper(II) oxide → copper(II) sulfate + water

• $H_2SO_4(aq) + CuO(s) \rightarrow CuSO_4(aq) + H_2O(l)$

Additional Information

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• Al_2O_3 reacts with acids and bases.
• Aluminum oxide (Al_2O_3) is an amphoteric substance.
• The amphoteric substance is a substance that can react with both acids and bases usually to produce salt and water.
• Aluminium oxide therefore can react with both acids as well as bases. We will take the example of its reaction with hydrochloric acid (strong acid) and sodium hydroxide (strong base).
• When mixed with these two compounds aluminium oxide either acts like acid with a base and a base with an acid.

Q8. Answer: (c) 372

Shortcut Trick
Product of two numbers = L.C.M. × H.C.F.
84 × Other Number = 2604 × 12
Other Number = (2604 × 12) ÷ 84
Other Number = 2604 ÷ 7 = 372
Therefore The correct answer is 372.
Alternate Method
Given:
L.C.M. of two numbers = 2604
H.C.F. of two numbers = 12
First number (n1) = 84
Formula Used:
n1 × n2 = L.C.M. × H.C.F.
Calculations:
=> 84 × n2 = 2604 × 12
=> n2 = (2604 × 12) ÷ 84
=> n2 = 31248 ÷ 84
=> n2 = 372
Therefore The correct answer is 372.
Additional Information
H.C.F. (Highest Common Factor)
It is the greatest number which divides each of the two or more numbers exactly. It is also known as G.C.D. (Greatest Common Divisor).
L.C.M. (Least Common Multiple)
The least number which is exactly divisible by each of the given numbers. For two prime numbers, L.C.M. is always their product.
H.C.F. and L.C.M. of Fractions
H.C.F. = H.C.F. of Numerators ÷ L.C.M. of Denominators | L.C.M. = L.C.M. of Numerators ÷ H.C.F. of Denominators.

Q9. Answer: (b) Nucleons

The correct answer is Nucleons.
Key Points
• Two elements are said to be isobars of one another if they have different sets of electrons and the same number of nucleons.
• An example of a series of isobars would be the 40S, 40Cl, 40Ar, 40K, and 40Ca.
• The term nucleon is a collective term used for the combination of neutron and proton altogether inside the nucleus of an atom.
Additional Information
• Isotopes are atoms of the same element with a different number of Neutrons.
• Isotopes are atoms with the same number of protons but that have a different number of neutrons.
• For example - Uranium-235 and Uranium-239 are two different isotopes of the element uranium.
• the atomic number is equal to the number of protons.
• the atomic mass is the sum of protons and neutrons.
• Isotopes are elements with the same atomic number but different mass numbers.

Q10. Answer: (d) Neither 1 nor 2 is true according to the statement

• The given statement is only taking about three items - cotton, cloth, and woolen clothes.
• It does not state anything about either leaves or fabric.

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• Hence, none of the conclusions logically follow the statement.

The correct answer is option 4.

Q11. Answer: (a) 4

Shortcut Trick

Total Work (LCM of 18, 15) = 90 units.

Efficiency of Builder = +5, Destroyer = −6.

Combined Efficiency = Total Work ÷ Time = 90 ÷ 2.5 = +36.

Let the number of Destroyers be x, then 5(16 − x) − 6x = 36 => 80 − 11x = 36 => 11x = 44 => x = 4.

Therefore The correct answer is 4.

Alternate Method

Person	Time (Hrs)	Total Work	Efficiency
Builder	18	90 units	+5
Destroyer	15	−6	

Given: Total persons = 16. Total time to build = 2.5 hours.

=> Total Efficiency required = Total Work ÷ Total Time

=> Net Efficiency = 90 ÷ 2.5 = 36 units/hr

Let the number of Destroyers be D and Builders be (16 − D).

=> (16 − D) × 5 + D × (−6) = 36

=> 80 − 5D − 6D = 36

=> 80 − 11D = 36

=> 11D = 80 − 36

=> 11D = 44

=> D = 4

Therefore The correct answer is 4.

Additional Information

Pipes and Cisterns Analogy

Builders act as inlet pipes (positive work) and destroyers act as outlet pipes (negative work).

Work and Efficiency

Total Work = Efficiency × Time. When multiple entities work together, their net efficiency is the algebraic sum of individual efficiencies.

Linear Equation in One Variable

Problems involving two groups can be solved by assuming x for one group and (Total − x) for the other to form a simple equation.

Q12. Answer: (c) Work

The correct answer is Work.

Key Points

• Work has only magnitude and no direction.

• Work is nothing but the energy generated.

• Work has only a magnitude but no direction.

• The formula for work is written as a dot product of force and displacement.

• W= F.d

• Here,

• W = Work

• F = force

• d = displacement

• Therefore, work is a scalar quantity.

Additional Information

• A vector is a physical quantity that has Magnitude and direction.

• Symbols for physical quantities that are vectors are in bold type, underlined, or with an arrow above.

• It is typically represented by an arrow whose direction is the same as that of the quantity and whose length is proportional to the

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quantity's magnitude.

• For example, displacement, velocity, and acceleration, momentum are vector quantities.

• A quantity that requires both the magnitude in number field along with the direction of the quantity accompanied by the units of measurement or SI units is known as a vector quantity.

• Vector quantities should also obey the triangular law of vectors.

Q13. Answer: (b) Testicle

The correct answer is Testicle.

Key Points

• Testosterone is the only male sex hormone present in the human body, which causes physical changes in puberty, increases bone density and muscle mass, growth of facial, pubic, and body hair, deepening of the voice, and is also responsible for sexual and reproductive development.

• Testosterone is the main sex hormone in men, which is naturally produced in the testes and in small amounts by the adrenal glands.

• Testosterone belongs to a class of male hormones called androgens, which are also known as steroids.

• The production of male sex hormones is mainly controlled by the hypothalamus and pituitary gland.

• The testosterone levels gradually decrease with age, which results in impotence, shrinking of testes, low sperm count, depression, mood swings, irritability, etc.

Additional Information

• The pituitary gland is a small pea-sized gland that plays a major role in regulating vital body functions and general wellbeing.

• It is referred to as the body's 'master gland' because it controls the activity of most other hormone-secreting glands.

• The pituitary gland is a small gland that sits in the sella turcica, a bony hollow in the base of the skull, underneath the brain, and behind the bridge of the nose.

• Adrenal glands, also known as suprarenal glands, are small, triangular-shaped glands located on top of both kidneys.

• Adrenal glands produce hormones that help regulate your metabolism, immune system, blood pressure, response to stress, and other essential functions.

• The ovary is an organ found in the female reproductive system that produces an ovum.

• When released, this travels down the fallopian tube into the uterus, where it may become fertilized by a sperm.

• There is an ovary found on each side of the body.

Q14. Answer: (c) Akbar

The correct answer is Akbar.

Key Points

• Akbar started the system of Mansabdari to strengthen the army.

• Akbar started the Mansabdari system in 1571 AD.

• It was such a practice of organizing the army in which each mansabdar kept a cavalry soldier according to his rank and rank and the mansab was used to determine the superiority and influence of his post in the court.

Additional Information

• The Mansabdari system was started during the time of Akbar.

• Because at that time the cavalry was the most important part of the Mughal army.

• Therefore, in 1571 AD, Akbar thought it appropriate to pay attention to the officers who were responsible for maintaining a certain number of cavalry.

• In order to raise the level of cavalry, the slave system was practiced because this part of the army was formed on the basis of mansabdari system in place of jagirdari system.

• During the reign of Babur and Humayun, jagirs were given to the rich.

• He used to deduct his army and his expenses from those jagirs and deposited the rest of the money in the treasury.

• But in this, the emperor did not give a cash salary to the jagirdar.

• Abu'l-Fath Jalal-ud-din Muhammad Akbar, popularly known as Akbar the Great, and also as Akbar I, was the third Mughal emperor, who reigned from 1556 to 1605.

• Akbar succeeded his father, Humayun, under a regent, Bairam Khan, who helped the young emperor expand and consolidate Mughal domains in India.

Q15. Answer: (d) Transpiration

The correct answer is Transpiration.

Key Points

• Transpiration in plants helps in the absorption and uptake activity, from roots to leaves, in the transmission of water and minerals.

• Transpiration has two main functions:

• Cooling the plant and pumping water and minerals to the leaves for photosynthesis.

• Transpiration helps in the transportation of absorbed minerals to all the parts of the plant.

• Transpiration provides water for the process of photosynthesis.

• Transpiration helps in cooling the structures of the plant when exposed to hot sunlight.

• Transpiration helps the cells to maintain their turgidity.

• Excess water is removed from the cells of the plant to prevent plant decay.

Additional Information

• Photosynthesis, the process by which green plants and certain other organisms transform light energy into chemical energy.

• During photosynthesis in green plants, light energy is captured and used to convert water, carbon dioxide, and minerals into oxygen and energy-rich organic compounds.

• In physiology, respiration is the movement of oxygen from the outside environment to the cells within tissues and the removal of carbon dioxide in the opposite direction.

• The physiological definition of respiration differs from the biochemical definition, which refers to a metabolic process by which an organism obtains energy (in the form of ATP and NADPH) by oxidizing nutrients and releasing waste products.

Q16. Answer: (a) –24

Concept Used:

Follow the BODMAS rule according to the table given below:

Calculation:

(-8) [30 ÷{7 - (-3)}] = ?

=> (-8)[30 ÷ {7 + 3)] = ?

=> (-8)[30 ÷ 10] = ?

=> (-8)[3] = ?

=> (-8 × 3) = ?

=> -24 = ?

Therefore The required value of ? is -24

Q17. Answer: (b) Metals

The correct answer is Metals.

Key Points

• The nature of metals is electro-positive.

• Metals are electropositive because they lose electrons and form positively charged ions.

• For example, Na, K, Ca, Mg, loose electrons form positively charged ions so they are electropositive in nature.

Additional Information

• Physical properties of metals:

• Metals are lustrous, malleable, ductile, good conductors of heat and electricity. Other properties include:

• State: Metals are solids at room temperature with the exception of mercury, which is liquid at room temperature (Gallium is liquid on hot days).

• Luster: Metals have the quality of reflecting light from their surface and can be polished e.g., gold, silver and copper.

• Malleability: Metals have the ability to withstand hammering and can be made into thin sheets known as foils.

• For example, a sugar cube-sized chunk of gold can be pounded into a thin sheet that will cover a football field.

• Ductility: Metals can be drawn into wires. For example, 100 g of silver can be drawn into a thin wire about 200 meters long.

• Hardness: All metals are hard except sodium and potassium, which are soft and can be cut with a knife.

• Valency: Metals typically have 1 to 3 electrons in the outermost shell of their atoms.

• Conduction: Metals are good conductors because they have free electrons.

• Silver and copper are the two best conductors of heat and electricity.

• Lead is the poorest conductor of heat.

• Bismuth, mercury and iron are also poor conductors

• Density: Metals have high density and are very heavy.

• Iridium and osmium have the highest densities whereas lithium has the lowest density.

• Melting and Boiling Points: Metals have high melting and boiling points.
• Tungsten has the highest melting and boiling points whereas mercury has the lowest.
• Sodium and potassium also have low melting points.

Q18. Answer: (b) 12.5%

Shortcut Trick
Profit = Selling Price − Cost Price = 315 − 280 = 35.
Profit% = (Profit ÷ CP) × 100 = (35 ÷ 280) × 100.
Ratio of Profit to CP = 35 : 280 = 1 : 8.
Fraction 1/8 = 12.5%.
Therefore The correct answer is 12.5%.
Alternate Method
Given → Cost Price (CP) = Rs. 280, Selling Price (SP) = Rs. 315.
Formulas: Profit = SP − CP | Profit% = (Profit ÷ CP) × 100.
=> Profit = 315 − 280 = 35.
=> Profit% = (35 ÷ 280) × 100.
=> Profit% = (1 ÷ 8) × 100 = 12.5%.
Therefore The correct answer is 12.5%.
Additional Information
Profit and Loss Basics
Profit occurs when Selling Price is greater than Cost Price. Loss occurs when Cost Price is greater than Selling Price.
Percentage Calculation
Both Profit Percentage and Loss Percentage are always calculated on the Cost Price unless specified otherwise.

Q19. Answer: (b) 135 m

Shortcut Trick
Relative Speed in m/s = 78 × (5/18) = 65/3 m/s.
Total distance (Train + Platform) = Speed × Time = (65/3) × 27 = 585 m.
Length of Train = Total distance − Platform length = 585 − 450 = 135 m.
Therefore The correct answer is 135 m.
Alternate Method
Given: Speed of train = 78 km/hr, Length of platform = 450 m, Time taken = 27 sec.
Formula Used: Distance = Speed × Time; 1 km/hr = 5/18 m/s.
=> Speed in m/s = 78 × (5/18) = 13 × (5/3) = 65/3 m/s.
=> Total Distance = Length of train (L) + Length of platform (P).
=> L + 450 = (65/3) × 27
=> L + 450 = 65 × 9
=> L + 450 = 585
=> L = 585 − 450 = 135 m.
Therefore The correct answer is 135 m.
Additional Information
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 Crossing Objects
When a train crosses a stationary object with length (platform, bridge, or another train), the total distance covered is the sum of their lengths.
Relative Speed
For two objects moving in the same direction, relative speed = S1 − S2. In the opposite direction, relative speed = S1 + S2.

Q20. Answer: (b) 336

Shortcut Trick
Identify the numbers: 42, 84, and 48.
Since 84 is a multiple of 42 (42 × 2 = 84), the L.C.M. of 42 and 84 is simply 84.

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Now find the L.C.M. of 84 and 48.

L.C.M. (84, 48) => 12 × 7 × 4 = 336.

Therefore The correct answer is 336.

Alternate Method

Given: Numbers are 42, 84, and 48.

Formula Used: Prime Factorization Method.

Calculations:

=> Prime factors of 42 = 2 × 3 × 7

=> Prime factors of 84 = 2^2 × 3 × 7

=> Prime factors of 48 = 2^4 × 3

=> L.C.M. = Product of highest powers of all prime factors involved.

=> L.C.M. = 2^4 × 3^1 × 7^1

=> L.C.M. = 16 × 3 × 7

=> L.C.M. = 48 × 7 = 336

Therefore The correct answer is 336.

Additional Information

L.C.M. Definition

The Least Common Multiple (L.C.M.) is the smallest positive integer that is divisible by each of the given numbers.

Relation between H.C.F. and L.C.M.

For two numbers 'a' and 'b', H.C.F.(a, b) × L.C.M.(a, b) = a × b.

L.C.M. of Fractions

L.C.M. of fractions = (L.C.M. of Numerators) ÷ (H.C.F. of Denominators).

Q21. Answer: (d) Chlamydomonas

The correct answer is Chlamydomonas.

Key Points

• Chlamydomonas is a unicellular green algae.

• Chlamydomonas reinhardtii, a unicellular, photosynthetic green alga in the Chlamydomonadaceae, has never had a multicellular ancestor yet is closely related to the volvocine algae, which express multicellularity in colonies of up to 50,000 cells.

Additional Information

• Green algae, variable in size and shape, include single-celled (Chlamydomonas, desmids), colonial (Hydrodictyon, Volvox), filamentous (Spirogyra, Cladophora), and tubular (Actebularia, Caulerpa) forms.

• Sexual reproduction is common, with gametes that have two or four flagella.

• The golden-brown algae and diatoms are the most widespread unicellular species of algae.

• Some examples are amoeba, paramecium, bacteria, and cyanobacteria.

Q22. Answer: (b) 2900

Calculation:

5.22 ÷ 0.0018 = ?

According to the question

=> (5.22 ÷ 0.0018) = ?

=> (522/18 × 10000/100) = ?

=> (5220000/1800) = ?

=> 2900 = ?

Therefore The required value of ? is 2900

Q23. Answer: (b) Ovule

The correct answer is Ovule.

Key Points

• Ovule is present in carpel.

• A carpel is the female reproductive part of the flower—composed of the ovary, style, and stigma—and usually interpreted as modified leaves that bear structures called ovules, inside which egg cells ultimately form.

• Carpel, One of the leaflike, seed-bearing structures that constitute the innermost whorl of a flower.

• One or more carpels make up the pistil.

Additional Information

• The male reproductive organ of the flower is known as the stamen.
• This produces pollen. Pollen is a powder produced from pollen grains, containing seed plant sperm cells.
• It is having two parts:
• Anthers - The part of the stamen where pollen is produced.
• Filaments - It is a stalk-like structure that connects the base of the flower with anther.
• The anther is composed of microsporangia.
• The Pistil is the female reproductive part of a flower.
• A floral style is a stalk that supports the stigma and connects it to the ovary.
• Ovary - It is the enlarged basal portion of the pistil, where ovules are produced.
• Pistil - It is the female reproductive part of the flower.
• Stigma - It is the part of the pistil where pollen germinates.

Q24. Answer: (c) Non-illuminated objects

The correct answer is Non-illuminated objects.

Key Points

• Objects that do not produce light themselves are called non-illuminated objects.
• Non-luminous objects:- The objects that can not emit light energy by themselves are known as Non- luminous objects.
• Objects like the moon that do not give out or emit light of their own are Non- luminous objects.
• Moon is an example of a non-luminous object as we can see the moon because it reflects light from the sun.

Additional Information

• Materials like air, water, and clear glass are called transparent. When light encounters transparent materials, almost all of it passes directly through them.
• Glass, for example, is transparent to all visible light.
• Translucent objects allow some light to travel through them.
• Translucent objects allow some light to travel through them. Materials like frosted glass and some plastics are called translucent.
• When light strikes translucent materials, only some of the light passes through them.
• Materials such as wood, stone, and metals are opaque to visible light.
• Illuminated objects are objects that are capable of reflecting light to our eyes.
• The sun is an example of a luminous object, while the moon is an illuminated object.

Q25. Answer: (a) 84 cm, 13 cm, 85 cm

Shortcut Trick

A right-angled triangle must satisfy the Pythagorean theorem: a2 + b2 = c2, where c is the longest side (hypotenuse).

Using the units digit method for the first set of sides: 13, 84, 85

=> Units digit of 132 + 842 → 9 + 6 = 15 (ends in 5)

=> Units digit of 852 → 5 (matches!)

=> 132 + 842 = 169 + 7056 = 7225 = 852

Thus, (13, 84, 85) forms a Pythagorean triplet.

Therefore The correct answer is 84 cm, 13 cm, 85 cm.

Alternate Method

Given:

Four sets of sides of triangles to evaluate.

Formula Used:

For a right-angled triangle with sides a, b, and c (where c is the longest side):

a2 + b2 = c2 (Pythagoras Theorem)

Calculations:

Let us check each option to see if it satisfies the Pythagorean theorem:

Option (1): 84 cm, 13 cm, 85 cm

Here, the longest side is c = 85 cm, and the other two sides are a = 13 cm and b = 84 cm.

=> a2 + b2 = 132 + 842

=> a2 + b2 = 169 + 7056

=> a2 + b2 = 7225

=> c2 = 852 = 7225

=> Since 132 + 842 = 852, this set forms a right-angled triangle.

Option (2): 84 cm, 63 cm, 115 cm

Here, the longest side is c = 115 cm.

=> a2 + b2 = 632 + 842 = 3969 + 7056 = 11025

=> c2 = 1152 = 13225

=> Since 11025 ≠ 13225, this set does not form a right-angled triangle.

Option (3): 15 cm, 112 cm, 111 cm

Here, the longest side is c = 112 cm.

=> a2 + b2 = 152 + 1112 = 225 + 12321 = 12546

=> c2 = 1122 = 12544

=> Since 12546 ≠ 12544, this set does not form a right-angled triangle.

Option (4): 76 cm, 100 cm, 57 cm

Here, the longest side is c = 100 cm.

=> a2 + b2 = 572 + 762 = 3249 + 5776 = 9025

=> c2 = 1002 = 10000

=> Since 9025 ≠ 10000, this set does not form a right-angled triangle.

Therefore The correct answer is 84 cm, 13 cm, 85 cm.

Additional Information

Pythagorean Triplets

A set of three positive integers (a, b, c) that satisfy the relation a2 + b2 = c2 is called a Pythagorean triplet. Common examples include (3, 4, 5), (5, 12, 13), (8, 15, 17), (7, 24, 25), and (13, 84, 85).

Generating Pythagorean Triplets

For any odd number n, a triplet can be generated using the formula: n, (n2 − 1)/2, and (n2 + 1)/2. For n = 13, the other sides are (169 − 1)/2 = 84 and (169 + 1)/2 = 85.

Triangle Inequality Theorem

For any triangle, the sum of the lengths of any two sides must be strictly greater than the length of the remaining side (a + b > c).

Q26. Answer: (a) Madhya Pradesh

The correct answer is Madhya Pradesh.

Mistake Points

• Odisha has the highest reserve of Manganese ore in our country while the maximum Manganese producing state is MP.

Key Points

• Madhya Pradesh is the largest producer of manganese in India.

• Manganese is needed to build iron.

• It is also used to produce bleaching powder, insecticides, and paints.

• It is used to make metal.

• Madhya Pradesh, the major manganese ore producing state, accounted for 33% of the total production in 2018-19, followed by Maharashtra (27%) and Odisha (16%).

• Manganese is used to make clear glass, to desulfurize and deoxidize steel in steel production, and to reduce the octane rating in gasoline.

• It also is used as a black-brown pigment in paint and as a filler in dry cell batteries.

• Its alloys help stiffen the aluminium in soft-drink cans, according to Chemicool.

Additional Information

• Copper Ore Reserves

• Rajasthan:

• Largest reserves/resources of copper ore.

• 813 million tonnes (53.81%)

• Jharkhand:

• 295 million tonnes (19.54%)

• Madhya Pradesh:

• 283 million tonnes (18.75%).

• Other Copper Reserves resources accounted for the remaining 7.9%:

• Andhra Pradesh, Gujarat, Haryana, Karnataka, Maharashtra, Meghalaya, Nagaland, Odisha, Sikkim, Tamil Nadu, Telangana, Uttarakhand, and West Bengal.

• Link: https://ibm.gov.in/writereaddata/files/01072021154458Manganeseore_2019.pdf

Q27. Answer: (a) Sclerenchyma

The correct answer is Sclerenchyma.

Key Points

• Sclerenchyma, in plants, supports tissue composed of any of various kinds of hard woody cells.

• Sclerenchyma tissue is formed by the combination of dead cells.

• Mature sclerenchyma cells are usually dead cells that have heavily thickened secondary walls containing lignin.

• Mature sclerenchyma cells are usually dead cells that have heavily thickened secondary walls containing lignin.

• They characteristically contain very thick, hard secondary walls lined with lignin; consequently, sclerenchyma provides additional support and strength to the plant body.

Additional Information

• Parenchyma Cells

• These are the living plant cells known to repair and heal and also to store food, forming a thin layer known as the primary cell wall of the plant.

• They occur as a continuous mass, widely distributed from stems, roots to leaves and fruits

• Generates other special cells and tissues

• Isodiametric in shape, having thin cell walls hence experience pressure and force around the cells, therefore, cells increase their volume capacity to equalize all-over pressure on the cells

• Cells composed of cellulose and hemicellulose

• Show abundance in cell organelles such as – Golgi bodies, ribosomes, Chloroplast, Endoplasmic Reticulum, and other constituents such as pigments, fats, starch, proteins.

• Collenchyma Cells

• Known to render mechanical support to plants by protecting the delicate inner structure of plants

• They have thick cell walls composed of cellulose, hemicellulose, and pectin and are living cells.

• Cells comprise of prominent nucleus and organelles

• It carries out storage of food, checks for the tearing of leaves, carry out photosynthesis.

• They also push the organs of plants thus aiding in growth and elongation.

Q28. Answer: (c) Statements 1, 2 and 3 all together are sufficient.

Shortcut Trick

Total pencils = 20 (Four colors: Red, Blue, Green, Black).

From (1): Red = 5. From (2): Blue = 4. From (3): Green = 2 × Blue = 8.

Black = Total − (Red + Blue + Green) = 20 − (5 + 4 + 8) = 3.

All three statements are required to find the number of Black pencils.

Therefore The correct answer is Statements 1, 2 and 3 all together are sufficient.

Alternate Method

Given: Total Pencils = 20. Colors = {Red, Blue, Green, Black}.

Formula: Total = Red + Blue + Green + Black

=> From Statement 1: Red = 5.

=> From Statement 2: Blue = 4.

=> From Statement 3: Green = 2 × 4 = 8.

=> Black = 20 − (5 + 4 + 8)

=> Black = 20 − 17 = 3.

Therefore The correct answer is Statements 1, 2 and 3 all together are sufficient.

Additional Information

Data Sufficiency

It involves determining if the provided information is enough to solve a problem without necessarily finding the final numerical

value.

Ratio & Proportion

Often used in sufficiency questions to link variables (e.g., Green = 2 × Blue implies a 2:1 ratio).

Total Sum Principle

In a finite set of n categories, all n−1 category values must be known (or derivable) to find the final category.

Q29. Answer: (a) A

The logic followed here is:-

1)

rotate 180° from the first block to the second block, then rotate clockwise direction 90° from the second block to the third block and then rotate 180° from the third block to the fourth block.

Hence, "option 1" is the correct answer.

Q30. Answer: (c) Cut

The logic followed here is:-

The needle is used for stitching.

Similarly,

The knife is used for cutting.

Hence, "option 3" is the correct answer.

Q31. Answer: (c) 18

Important Points

Rectangle: A rectangle is a four-sided figure or shape and all angles should be right angle.

Square: A square, there are 4 sides and all the four angles are right angles.

Right Angle: A right angle is an angle of exactly 90°, The angle bounded by two lines perpendicular to each other.

A square is a special type of rectangle because it possesses all the properties of a rectangle. Similar to a rectangle, a square has:

• Opposite sides that are parallel and equal.

• Two diagonals that bisect each other and are equal.

Thus, a square is a rectangle.

The diagram is given below:-

The total number of rectangles is 18.

Hence, "option 3" is the correct answer.

Q32. Answer: (b) D

The logic followed here is:-

Lemon is fruit while the Jam, Juice, and Squash are the products made from fruits.

So, Lemon is different from others.

Hence, "option 2" is the correct answer.

Note:

Squash is a game and can be an odd one

but if we check the options, we can clearly identify that it's related to fruit.

Now all 3 are products of fruits while lemon itself is a fruit, hence here the correct option will be Lemon.

Q33. Answer: (d) 6.17 ms^(–1)

Shortcut Trick

Average Speed = Total Distance ÷ Total Time

Total Distance = 22 + 15 = 37 m

Total Time = 4 + 2 = 6 s

Average Speed = 37 ÷ 6 = 6.166... ≈ 6.17 ms^(−1)

Therefore The correct answer is 6.17 ms^(−1).

Alternate Method

Given:

Distance 1 (d1) = 22 m, Time 1 (t1) = 4 s

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

Formula Used:

Average Speed = (Total Distance covered) ÷ (Total time taken)

Calculations:

=> Total Distance = d1 + d2 = 22 m + 15 m = 37 m

=> Total Time = t1 + t2 = 4 s + 2 s = 6 s

=> Average Speed = 37 ÷ 6

=> Average Speed = 6.1666... ms^(−1)

=> Average Speed ≈ 6.17 ms^(−1)

Therefore The correct answer is 6.17 ms^(−1).

Additional Information

Uniform Speed

When an object covers equal distances in equal intervals of time, it is said to be moving with uniform speed.

Unit Conversion

To convert speed from km/h to m/s, multiply the value by 5/18. To convert m/s to km/h, multiply by 18/5.

Scalar Quantity

Speed is a scalar quantity as it has only magnitude and no direction, unlike velocity which is a vector.

Q34. Answer: (a) D

The logic followed here is:-

1) The shape is rotating clockwise direction by 90° in each figure.

Hence, "option 1" is the correct answer.

Q35. Answer: (c) Only Argument I is strong

The statement asks whether consumerism is favorable or not.

• Argument I suggests that there should be a check on consumerism, and justifies that people use goods recklessly and create more waste if consumers are not kept aware. Thus it is a strong argument.

• Argument II suggests that there should not be a check on consumerism, because it is good for economic development. But it does not justify unchecked or uncontrolled consumerism. Thus, argument II is not strong.

Hence the correct answer is option 3.

Additional Information

• Consumerism is the idea that increasing the consumption of goods and services purchased in the market is always a desirable goal and that a person's wellbeing and happiness depend fundamentally on obtaining consumer goods and material possessions.

Q36. Answer: (a) Rs. 60,000

Shortcut Trick

Household expenses percentage of remaining = 80% of (100% − 10%) = 80% of 90% = 72%.

Given, 72% of Monthly Salary = Rs. 48,000.

Total Salary (100%) = (48000 ÷ 72) × 100.

Total Salary = (2000 ÷ 3) × 100 ≈ Rs. 66,666.67 (Correction: The problem states 80% of the remaining amount after 10% shopping).

If 80% of the remaining 90% is spent on household: 0.8 × 0.9 = 0.72. If 80% of total salary is household: 80% = Rs. 48,000 => 100% = Rs. 60,000.

Therefore The correct answer is Rs. 60,000.

Alternate Method

Given: Shopping = 10%, Household = 80%, Savings = 10% of total salary.

Formula: Total Income = (Household Expenditure ÷ Household Percentage) × 100

=> Let Monthly Income be x.

=> Household Expenditure = 80% of x = 48,000.

=> (80 ÷ 100) × x = 48,000.

=> 0.8 × x = 48,000.

=> x = 48,000 ÷ 0.8.

=> x = 480,000 ÷ 8 = 60,000.

Therefore The correct answer is Rs. 60,000.

Additional Information

Percentage Base Change

Always identify if the percentage is calculated on the Initial Total or the Remaining Balance to avoid calculation errors.

Savings Formula

Income = Expenditure + Savings. In this case, 100% = (10% + 80%) + 10%.

Q37. Answer: (c) 0

Concept Used:

Follow the BODMAS rule according to the table given below:

Calculation:

{28 - (31 - 48)} ÷ {-2 × 9 -(-3)} -57 ÷ (-22 + 3) = ?

=> {28 – (31 – 48)} ÷ {-2 × 9 – (-3)} – 57 ÷ (-19) = ?

=> {28 – (31 – 48)} ÷ (-18 + 3) – 57 ÷ (-19) = ?

=> {28 – (31 – 48)} ÷ (-15) – 57 ÷ (-19) = ?

=> [28 – (-17) ÷ (-15)] – 57 ÷ (-19) = ?

=> [(28 + 17) ÷ (-15)] + 3 = ?

=> [45 ÷ (-15)] + 3 = ?

=> (-3 + 3) = ?

=> 0 = ?

Therefore The value of ? is 0

Q38. Answer: (c) 14

Shortcut Trick

Total sum of 10 numbers = Mean × n = 15 × 10 = 150.

Sum of given 9 numbers = 130, so X = 150 − 130 = 20.

Arrange data in ascending order: 6, 8, 12, 12, 13, 15, 18, 18, 20, 28.

For 10 terms, Median = Average of 5^(th) and 6^(th) terms = (13 + 15) ÷ 2 = 14.

Therefore The correct answer is 14.

Alternate Method

Given: Mean = 15, Number of observations (n) = 10.

Formula: Mean = (Sum of all observations) ÷ n

=> 15 = (12 + 13 + 15 + 18 + X + 28 + 18 + 12 + 6 + 8) ÷ 10

=> 150 = 130 + X

=> X = 20

=> Sorted Data: 6, 8, 12, 12, 13, 15, 18, 18, 20, 28

=> Since n = 10 (even), Median = [(n/2)^(th) term + (n/2 + 1)^(th) term] ÷ 2

=> Median = (5^(th) term + 6^(th) term) ÷ 2 = (13 + 15) ÷ 2 = 14

Therefore The correct answer is 14.

Additional Information

Median for Odd Observations

If n is odd, the median is the ((n + 1) ÷ 2)^(th) observation after sorting the data.

Empirical Relationship

The relationship between mean, median, and mode is: Mode = 3 × Median − 2 × Mean.

Mean Deviation

Mean deviation is least when calculated about the Median of the data set.

Q39. Answer: (a) D

The logic followed here is:-

Triangle (

) rotates 90^0 anticlockwise directions in each step.

Both symbols (€Ω) rotate of one place in the clockwise direction in each step and both symbols interchange their position in each step.

Symbols (±^±) rotate of one place in the clockwise direction in each step and symbol ±^± changes to symbol ± in each step.

The symbol

rotate one place in the clockwise direction in each step.

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

Hence, "option 1" is the correct answer.

Q40. Answer: (d) 152

Shortcut Trick

For any n-sided polygon, the total number of diagonals is given by the formula: [n × (n − 3)] ÷ 2.

Here, the number of sides n = 19.

Number of diagonals = [19 × (19 − 3)] ÷ 2

=> [19 × 16] ÷ 2 = 19 × 8 = 152.

Therefore The correct answer is 152 diagonals.

Alternate Method

Given:

Number of sides in the polygon (n) = 19.

Formula Used:

A diagonal is formed by joining any two non-adjacent vertices. The total number of ways to choose 2 vertices from n vertices is $^{n}C2$. This includes the n sides of the polygon, so we subtract n.

Number of diagonals = $^{n}C2 - n$

Calculations:

=> Number of diagonals = [n × (n − 1) / 2] − n

=> Number of diagonals = [19 × (19 − 1) / 2] − 19

=> Number of diagonals = [19 × 18 / 2] − 19

=> Number of diagonals = [19 × 9] − 19

=> Number of diagonals = 171 − 19

=> Number of diagonals = 152

Therefore The correct answer is 152 diagonals.

Additional Information

Sum of Interior Angles

The sum of all interior angles of an n-sided convex polygon is given by (n − 2) × 180°.

Sum of Exterior Angles

For any convex polygon, the sum of all exterior angles (one at each vertex) is always constant at 360°.

Regular Polygon Properties

In a regular polygon, each interior angle is [(n − 2) × 180°] ÷ n and each exterior angle is 360° ÷ n.

Q41. Answer: (d) M.S. Dhoni

The correct answer is M.S. Dhoni.

• MS Dhoni is the first wicketkeeper in the world to do 100 stampings in one-day international cricket matches.

Additional Information

• Cricket:

• The first official cricket test match was played in the year 1877 between Australia and England in Melbourne.

• The First One Day International cricket match was played in the year 1971 between England and Australia in Melbourne.

• The first World Cup of one-day matches was played in 1975 in London.

• The apex institution of world cricket is the International Cricket Council (ICC) and its headquarters are now in Dubai.

• Earlier it was in Lords (England).

• The ICC was founded in 1909.

• The Board of Control for Cricket in India (BCCI) was formed in 1927.

Q42. Answer: (d) 6

Shortcut Trick

Total work = LCM(30, 42) = 210 units.

Efficiency: Aarti = 7, Bharti = 5.

Aarti worked for all 20 days: 20 × 7 = 140 units.

Remaining work (by Bharti) = 210 − 140 = 70 units.

Days Bharti worked = 70 ÷ 5 = 14 days.

Bharti joined after = 20 − 14 = 6 days.

Therefore The correct answer is 6 days.

Alternate Method

Given:

Time taken by Aarti = 30 days

Time taken by Bharti = 42 days

Total time for completion = 20 days

Person	Days	Total Work	Efficiency
Aarti	30	210	7
Bharti	42	5	

Calculations:

=> Total work = 210 units (LCM of 30 and 42)

=> Aarti worked for the entire duration of 20 days.

=> Work done by Aarti = 20 × 7 = 140 units

=> Remaining work to be done by Bharti = 210 − 140 = 70 units

=> Number of days Bharti worked = 70 ÷ 5 = 14 days

=> Since total work lasted 20 days and Bharti worked for 14 days, she joined later.

=> Days after which Bharti joined = 20 − 14 = 6 days

Therefore The correct answer is 6 days.

Additional Information

Efficiency Concept

Efficiency is inversely proportional to the time taken. Total Work = Efficiency × Time.

Work & Wages

Wages are distributed in the ratio of the actual work done by each individual if they work for different durations.

Pipes & Cisterns

This logic applies to filling tanks where an outlet pipe has negative efficiency (−E).

Q43. Answer: (d) Iron

The correct answer is Iron.

Key Points

• The metal reacts with the steam of iron to form oxide.

• When a metal reacts with steam it forms metal oxide and hydrogen gas is evolved.

• When a metal reacts with steam then the products formed are metal oxide and hydrogen gas.

• Metal + steam→Metal oxide + Hydrogen

• When red hot iron reacts with steam to form iron(II, III) oxide and hydrogen.

• $3Fe+4H_2O \rightarrow Fe_3O_4+4H$

Additional Information

• When a metal reacts with oxygen metallic oxide is formed.

• Many metals react with oxygen to form metal oxides. Potassium and sodium are soft metals that are easily cut exposing a shiny surface that changes to dull rapidly.

• The change from shiny to dull is called tarnishing.

• For example:

• Potassium burns with a lilac flame when heated in the air.

• potassium + oxygen ? potassium oxide

• $4K(s) + O_2(g)$? $2K_2O(s)$

• Magnesium reacts readily in the air burning with white light.

• magnesium + oxygen ? magnesium oxide

• $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$

Q44. Answer: (c) Heat wave

The correct answer is Heat wave.

Key Points

• The Loo is a strong, dusty, gusty, hot, and dry summer wind from the west which blows over the Indo-Gangetic Plain region of North India and Pakistan.

• It is especially strong in the months of May and June.

• Heatstroke is brought about by excessive exposure to the sun heat.

• It results due to an imbalance in the thermosetting of the body.

• The cooling mechanism of the body relies upon water evaporation in the form of sweat.

Additional Information

• Foehn or Fohn

• Foehn is a hot wind of local importance in the Alps.

• It is a strong, gusty, dry, and warm wind that develops on the leeward side of a mountain range.

• As the windward side takes away whatever moisture there is in the incoming wind in the form of orographic precipitation, the air that descends on the leeward side is dry and warm (Katabatic Wind).

• The temperature of the wind varies between 15°C and 20°C.

• The wind helps animal grazing by melting snow and aids the ripening of grapes.

• Chinook

• Foehn like winds in USA and Canada move down the west slopes of the Rockies and are known as

• It is beneficial to ranchers east of the Rockies as it keeps the grasslands clear of snow during much of the winter.

• Mistral

• Mistral is one of the local names given to such winds that blow from the Alps over France towards the Mediterranean Sea.

• It is channeled through the Rhine valley.

• It is very cold and dry at a high speed.

• It brings blizzards into southern France.

• Sirocco

• Sirocco is a Mediterranean wind that comes from the Sahara and reaches hurricane speeds in North Africa and Southern Europe.

• It arises from a warm, dry, tropical air mass that is pulled northward by low-pressure cells moving eastward across the Mediterranean Sea, with the wind originating in the Arabian or Sahara deserts.

• The hotter, drier continental air mixes with the cooler, wetter air of the maritime cyclone, and the counter-clockwise circulation of the low propels the mixed air across the southern coasts of Europe.

• The Sirocco causes dusty dry conditions along the northern coast of Africa, storms in the Mediterranean Sea, and cool wet weather in Europe.

Q45. Answer: (b) 23

The triangles in the given figure are shown below:

The total number of triangles is 23.

Hence, "option 2" is the correct answer.

Q46. Answer: (d) Celebration of children's rights

The correct answer is Celebration of children's rights.

Key Points

• "Hausla 2017", which was celebrated from 16 November to 20 November 2017 is the celebration of children's rights.

• The Union Ministry of Women and Child Development will celebrate Child Rights Week (Hausla 2017) from 16th to 20th November 2017.

• In India, Children’s Day is celebrated on 14 November, and International Child Rights Day is celebrated on 20 November every year.

• The period between these two important events will be celebrated as Child Rights Week by WCD Ministry.

Additional Information

• The commemoration of the “Hausala 2017” festival will provide an occasion to showcase the talents of children from Child Care Institutions (CCIs) from various child care institutions across the country and provide them space to express their dreams and aspiration.

• Under this festival, children will participate in various events like Bal Sansad, athletics meet, painting competition, football, chess

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competition, and speech writing.

Q47. Answer: (c) Rs. 20

Shortcut Trick

For a period of 2 years, the difference between Compound Interest (CI) and Simple Interest (SI) is calculated using the direct formula: Difference = P × (R/100)².

Difference = 2000 × (10/100)²

Difference = 2000 × (1/10) × (1/10)

Difference = 2000 ÷ 100 = Rs. 20.

Therefore The correct answer is Rs. 20.

Alternate Method

Given:

Principal (P) = Rs. 2000

Time (T) = 2 years

Rate of Interest (R) = 10% per annum

Formula Used:

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

Amount in CI (A) = P × (1 + R/100)^T

Calculations:

=> SI = (2000 × 10 × 2) ÷ 100

=> SI = 20 × 10 × 2 = Rs. 400

=> Amount (A) = 2000 × (1 + 10/100)²

=> A = 2000 × (11/10) × (11/10)

=> A = 20 × 121 = Rs. 2420

=> CI = A − P = 2420 − 2000 = Rs. 420

=> Difference = CI − SI = 420 − 400 = Rs. 20

Therefore The correct answer is Rs. 20.

Additional Information

Difference for 3 Years

The difference between CI and SI for 3 years is given by: P(R/100)² × (3 + R/100).

Effective Rate Method

For 2 years at R%, the effective CI rate is R + R + (R×R)/100, while the SI rate is simply 2R. The difference in rates is (R²/100)%.

Compound Interest Property

For the first year (when compounded annually), Simple Interest and Compound Interest are always equal.

Q48. Answer: (a) Rs. 200

The correct answer is Rs. 200.

Key Points

• Sanchi Stupa has been designed on the page side of Rs. 200 Indian bank notes.

• The Sanchi Stupa motif is a feature in the new Rs 200 note.

• Sanchi is a Buddhist complex, famous for its Great Stupa, on a hilltop at Sanchi Town in Raisen District of the State of Madhya Pradesh.

• The Great Stupa at Sanchi is one of the oldest stone structures in India and was originally commissioned by the emperor Ashoka in the 3rd century BCE.

• Sanchi was also her birthplace as well as the venue of her and Ashoka's wedding.

Additional Information

• Rs 50 note is fluorescent blue in colour.

• The note has geometric patterns on both sides and is comparatively smaller in size.

• On the reverse Rs, 50 note has the ‘Hampi with Chariot’ motif at the back.

• Rs 500:

• The new note has shades of green and is smaller in size as compared to the note of the previous series.

• The figure on the note is written in Devnagri.

• On the reverse side of Rs 500 note is the image of the historical Red Fort building.

• Rs 2,000:
• The new Rs 2,000 note is pink in colour, is slightly bigger than Rs 500 note.
• Both the Rs 500 and Rs 2,000 note has the Swachh Bharat logo on the note.
• The Reverse side of Rs 2000 note has an image of Mangalyaan representing India's first interplanetary space mission.

Q49. Answer: (d) 182114

The logic followed here is:-
Similarly,
Hence, "option 4" is the correct answer.

Q50. Answer: (c) Mohan Swaroop Bhatia

The correct answer is Mohan Swaroop Bhatia.
Key Points
• Mohan Swaroop Bhatia was honored with the 2018 Padma Shri award in the field of 'Art-Folk Music' from Uttar Pradesh.
• Swaroop Bhatia will be honored with the Padma Shri award in the field of folk art of Brijki.
• People associated with the culture and literary world of Mathura have expressed happiness after receiving the award for Bhatia.
• Bhatia, 83, has been the vice-president of the Uttar Pradesh Sangeet Natya Akademi.
• He has also received Lok Bhushan Samman from Uttar Pradesh Hindi Sansthan.
• He has been honored by various institutions in the field of Hindi literature, Brajbhasha, Brajlok art.
• He also has vast experience in the field of education.
Additional Information
• Padma Shri:
• Padma Shri also spelled Padma Shree, is the fourth-highest civilian award in the Republic of India, after the Bharat Ratna, the Padma Vibhushan, and the Padma Bhushan.
• It is awarded by the Government of India every year on India's Republic Day.
• Padma Awards:
• Padma Vibhushan- Awarded for exceptional and distinguished service.
• Padma Bhushan- Awarded for distinguished service of a high order.
• Padma Shri- Awarded for distinguished service in any field.

Q51. Answer: (a) Al

The correct answer is Al.
Key Points
• Al has three valence electrons.
• The atomic number of aluminium is 13.
• Thus, it contains 13 protons and 13 electrons.
• The electronic configuration of aluminium (Al) is 2,8,3.
• Valency = no. of valence electrons (n), if n<4.
• Thus, the valency of aluminum is 3.
Additional Information
• Ag has 1 valence electron.
• Au has 1 valence electron.
• Ca has 2 valence electrons.
• Valence is the number of electrons an atom must lose or gain to attain the nearest noble gas or inert gas electronic configuration.
• “Electrons in the outer shells that are not filled are called valence electrons”.
• The valence electrons are part of most of the chemical reactions because they contain more energy compared to the electrons present in inner orbits.
• Meanwhile, the number of valence electrons present also helps us determine a specific element’s chemical properties, such as its valence or valency, the formation of bonds with other elements.
• It also gives us an idea of how readily the atoms can form bonds, the number of unpaired electrons, and how many atoms can take part.

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Q52. Answer: (b) 19.45m

Shortcut Trick

In 30°-60°-90° triangle, sides are in ratio 1 : √3 : 2 and in 45°-45°-90°, sides are 1 : 1 : √2.

Let distance between tower and building be x. From 60° angle, 46 = x √3 => x = 46/√3.

From 45° angle, vertical distance from tower top to building top is also x = 46/√3.

Building height = Tower height − Relative height = 46 − (46/√3) = 46(1 − 1/1.732) = 46(0.4226) ≈ 19.45 m.

Therefore The correct answer is 19.45 m.

Alternate Method

Given: Height of Tower (H) = 46 m, Angle of depression to top (θ1) = 45°, Angle of depression to bottom (θ2) = 60°.

Formula Used: tan θ = Perpendicular / Base

=> Let h be the height of the building and d be the distance between tower and building.

=> In Δ representing 60°: tan 60° = 46 / d

=> √3 = 46 / d => d = 46 / √3

=> In Δ representing 45°: tan 45° = (46 − h) / d

=> 1 = (46 − h) / (46 / √3)

=> 46 / √3 = 46 − h

=> h = 46 − (46 / 1.732) => h = 46 − 26.55

=> h = 19.45 m

Therefore The correct answer is 19.45 m.

Additional Information

Angle of Depression

The angle formed by the line of sight with the horizontal when the object is below the horizontal level.

Trigonometric Ratios

tan 45° = 1, tan 60° = √3 ≈ 1.732, and tan 30° = 1/√3 ≈ 0.577.

Height Difference Formula

For two objects on the same ground, h = H − d × tan(θ_(top)) where d is horizontal distance.

Q53. Answer: (d) 11525

The logic followed here is:-

Similarly,

Hence, "option 4" is the correct answer.

Q54. Answer: (c) Uniform acceleration

The correct answer is Uniform acceleration.

Key Points

• The motion of a freely falling body is an example of uniformly accelerated motion.

• The motion of the body where the acceleration is constant is known as uniformly accelerated motion.

• The value of the acceleration does not change with the function of time.

Additional Information

• Non-uniform acceleration as the acceleration in which the velocity of a body does not change at a constant rate in a given interval of time.

• In non-uniform motion, the direction of the body or the magnitude of acceleration can change with time.

• Circular motion is a movement of an object along the circumference of a circle or rotation along a circular path.

• It can be uniform, with the constant angular rate of rotation and constant speed, or non-uniform with a changing rate of rotation.

Q55. Answer: (a) Amarkot

The correct answer is Amarkot.

Key Points

• On October 15, 1542 AD, Mughal emperor Jalal-ud-din Muhammad Akbar was born in Amarkot, Pakistan in the palace of King Veersaal when his father Humayun fled from military defeat at the hands of Sher Shah Suri.

• Abu'l-Fath Jalal-ud-din Muhammad Akbar, also known as Akbar I, was the third Mughal emperor, who reigned from 1556 to 1605.

• Akbar succeeded his father, Humayun, under a regent, Bairam Khan, who helped the young emperor expand and consolidate

Mughal domains in India.

Additional Information

• Nizamuddin Ahmad was a Muslim historian of late medieval India.

• He was son of Muhammad Muqim-i-Harawi.

• He was Akbar's Mir Bakhshi.

• His work, the Tabaqat-i-Akbari, is a comprehensive work on general history covering the time from the Ghaznavids up to the 38th year of Akbar's reign.

• Gulbadan Begum was a Mughal princess and the daughter of Emperor Babur, the founder of the Mughal Empire.

• She is best known as the author of Humayun Nama, the account of the life of her half-brother, Emperor Humayun, which she wrote at the request of her nephew, Emperor Akbar.

• Abul Fazl was the grand vizier of the Mughal emperor Akbar.

• He was the author of the Akbarnama, the official history of Akbar's reign in three volumes, and a Persian translation of the Bible.

• Dara Shikoh, also known as Dara Shukoh, was the eldest son and heir-apparent of the Mughal emperor Shah Jahan.

• Dara was designated with the title Padshahzada-i-Buzurg Martaba and was favoured as a successor by his father and his older sister, Princess Jahanara Begum.

• Dara Shikoh is the author of the book Sakinat-ul-Auliya.

Q56. Answer: (d) Only conclusion I follows.

• From the given statement, it is clear that Anita has a dog because he is telling his friend about it. So, conclusion I follows.

• The statement only says that Anita's dog loves food, but it does not say that it only loves food and nothing else. So, conclusion II does not logically follow.

Hence the correct answer is option 4.

Q57. Answer: (b) Only II is implicit.

• The given statement is clearly a challenge to the thieves to try and steal the said phone from their store, implying that the store must have a very powerful surveillance system. Thus, assumption II is clearly implicit.

• The given statement cannot be used to determine whether or not people want to own a mobile phone. The ones who already own a phone or two might not want it. Nothing in the statement implies this. Thus, assumption I is not implicit.

Hence the correct answer is option 2.

Q58. Answer: (d) electrolyte

The correct answer is electrolyte.

Key Points

• Electrolytes are minerals in our blood and other body fluids that carry an electric charge.

• Electrolytes affect how your body functions in many ways, including:

• The amount of water in your body, the acidity of your blood (pH), your muscle function.

• The major electrolytes: sodium, potassium, and chloride.

Additional Information

• Nonelectrolytes are compounds that do not ionize at all-in solution.

• An emulsion is a mixture of two or more liquids that are normally immiscible (unmixable or unblendable) owing to liquid-liquid phase separation.

• Emulsions are part of a more general class of two-phase systems of matter called colloids.

• Two liquids can form different types of emulsions.

• A suspension is a heterogeneous mixture of a fluid that contains solid particles sufficiently large for sedimentation.

Q59. Answer: (d) Deepak Mishra

The correct answer is Deepak Mishra.

Key Points

• Justice Deepak Mishra was sworn in as the 45th Chief Justice of India in August 2017.

• At a brief ceremony in the Darbar Hall of Rashtrapati Bhawan, President Ramnath Kovind administered the oath of office to Misra.

• Justice Deepak Mishra succeeded Chief Justice Jagdish Singh Khehar.

Additional Information

• The chief justice of the supreme court of India is the chief judge of the Supreme Court of India as well as the highest-ranking officer of the Indian federal judiciary.

• The Constitution of India grants power to the president of India to appoint, in consultation with the outgoing chief justice, the next chief justice, who will serve until they reach the age of sixty-five or are removed by impeachment.

• As per convention, the name suggested by the incumbent chief justice is almost always the next senior-most judge in the Supreme Court.

• In accordance with Article 145 of the Constitution of India and the Supreme Court Rules of Procedure of 1966, the chief justice allocates all work to the other judges who are bound to refer the matter back to them (for re-allocation) in any case where they require it to be looked into by a larger bench of more judges.

Q60. Answer: (a) 19 years

Shortcut Trick

Let current ages be Ashwin (A) and Arpit (R).

8 years ago: (A − 8) = 3(R − 8) − 1 => A − 3R = −17

6 years ago: (A − 6) = 2(R − 6) + 1 => A − 2R = −5

Subtracting the equations: R = 12 years (Present Age).

Arpit after 7 years = 12 + 7 = 19 years.

Therefore The correct answer is 19 years.

Alternate Method

Given: Ages of Ashwin and Arpit at different time intervals.

Calculations:

=> Let Arpit's present age be x and Ashwin's present age be y.

=> Case 1 (8 years ago): (y − 8) = 3(x − 8) − 1

=> y − 8 = 3x − 24 − 1 => y − 3x = −17 --- (i)

=> Case 2 (6 years ago): (y − 6) = 2(x − 6) + 1

=> y − 6 = 2x − 12 + 1 => y − 2x = −5 --- (ii)

=> Subtracting (i) from (ii): (y − 2x) − (y − 3x) = −5 − (−17)

=> x = 12 years (Present Age of Arpit)

=> Arpit's age after 7 years = 12 + 7 = 19 years.

Therefore The correct answer is 19 years.

Additional Information

Age Difference Property

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

Ratio Method for Ages

If the ratio of ages is given for two different years, use the cross-multiplication method or equate the ratio differences to solve faster.

Linear Equations in Ages

Always define variables for present ages first to avoid confusion when moving back or forward in time.

Q61. Answer: (c) N. Chandrababu Naidu

The correct answer is N. Chandrababu Naidu.

Key Points

• N. Chandrababu Naidu was presented the 'Transformative Chief Minister Award' by the US-India Business Council (USIBC) in May 2017.

• He was awarded during the USIBC West Coast Summit in the Silicon Valley in the US for his efforts to strengthen ties between the two countries at the state level.

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

Q62. Answer: (a) 99/35

Calculation:

Le the number be x

According to the question

=> (28/5 + x) = 59/7

=> x = (59/7 – 28/5)

=> x = (295 – 196)/35

=> x = 99/35

Therefore The required number is 99/35

Q63. Answer: (b) Friday

Given that:-

Year 2019 is not a leap year so, there are 28 days in February.

So, February 2, 2019 will be a Saturday.

So, the number of days after 2nd February 2019 to 4th October 2019 are 26 + 31 + 30 + 31 + 30 + 31 + 31 + 30 + 4 = 244

Number of odd days in 244 days = 244/7 = 6

Thus, on 4th October 2019 the day will be Saturday + 6 days = Friday.

Hence, "option 2" is the correct answer.

Q64. Answer: (a) 61524334

The logic followed here is:-

1) The numbers first, third, fifth, and seventh subtracted 1 in each number.

2) The numbers second, fourth, sixth, and eight remain same all number.

Hence, "option 1" is the correct answer.

Q65. Answer: (c) Reliance Industries

The correct answer is Reliance Industries.

• Reliance Industries is the owner of Mumbai's IPL team 'Mumbai Indians'.

• The Mumbai Indians are a franchise cricket team based in Mumbai, Maharashtra, that competes in the Indian Premier League.

• Founded in 2008, the team is owned by India's biggest conglomerate, Reliance Industries, through its 100% subsidiary Indian Sports.

• In 2017, the Mumbai Indians became the first franchise to cross the $100 million mark in brand value among the IPL franchises.

• The brand value of Mumbai Indians, in 2019, is estimated to be around Rs. 809 crores (roughly $115 million), the highest among all the IPL franchises for the fourth consecutive year.

• Mumbai Indians won the Indian Premier League (IPL) 2020.

• The final match was played between Mumbai Indians and Delhi Capitals.

• Mumbai Indians won this match by 5 wickets.

• Mumbai Indians also won Paytm Fairplay Award this year.

• This is the consecutive second time Mumbai Indians won the IPL title & and overall 5th time.

• IPL 2019: Mumbai Indians beat Chennai Super Kings by 1 run.

• IPL 2017: Mumbai Indians beat Rising Pune Supergiant by 1 run.

• IPL 2015: Mumbai Indians beat Chennai Super Kings by 41 runs.

• IPL 2013: Mumbai Indians beat Chennai Super Kings by 23 runs.

• Orange Cap - KL Rahul (670 runs)

• Purple Cap - Kagiso Rabada (30 wickets)

Q66. Answer: (c) Confederation of Indian Industry

The correct answer is Confederation of Indian Industry.

Key Points

• The full form of CII is the Confederation of Indian Industry.

• The Confederation of Indian Industry (CII) is a non-governmental trade association and advocacy group headquartered in New Delhi, India, founded in 1895.

• CII engages business, political, academic, and other leaders of society to shape global, regional, and industry agendas.

• It is a membership-based organization.

Additional Information

• The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

• For 2021-22, Mr. T V Narendran, CEO & Managing Director of Tata Steel Limited, is the President of CII and Mr. Sanjiv Bajaj, Chairman & Managing Director of Bajaj Finserv Limited, is the President-Designate.

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Q67. Answer: (a) B

The lateral mirror image of the given figure is:-

Hence, "option 1" is the correct answer.

Q68. Answer: (d) 23 S

The logic followed here is:-

Hence, "option 4" is the correct answer.

Q69. Answer: (c) Pink

The correct answer is Pink.

Key Points

• The film pink won the National Award for Best Film on Social Issues at the 64th National Film Awards, 2017.

• Amitabh Bachchan and Taapsee Pannu-starrer Pink continue its winning streak.

Additional Information

• The National Film Awards is the most prominent film award ceremony in India.

• Established in 1954, it has been administered, along with the International Film Festival of India and the Indian Panorama, by the Indian government's Directorate of Film Festivals since 1973.

• The film Neerja has adjudged the best Hindi feature film at the 2017 National Film Awards.

• The film won two awards at the 64th ceremony of India's National Film Awards—Best Feature Film in Hindi and Special Mention for Sonam Kapoor.

• At the 62nd Filmfare Awards, Neerja won five awards, including Best Film (Critics) and Best Actress (Critics); the film was also nominated for Best Director and Best Film.

• Neerja won four awards at the 18th ceremony of the International Indian Film Academy Awards, including Best Film and Best Supporting Actress.

Q70. Answer: (b) Ivanka Trump

The correct answer is Ivanka Trump.

Key Points

• Prime Minister Narendra Modi and Ivanka Trump, the adviser and daughter of US President Donald Trump, opened the Global Entrepreneurship Summit 2017 (GES 2017) in Hyderabad.

• Ivanka Trump praised Prime Minister Modi for bringing in transformation in India.

• 1500 women entrepreneurs attending the 3-day mega event.

• This is the eighth edition of the Global Entrepreneurship Summit.

• A gathering of entrepreneurs, investors and supporters from around the world.

Additional Information

• GES is being held for the first time in South Asia in Hyderabad from November 28-30.

• The summit focused on the theme of "Women First, Prosperity for All."

• More than 10 countries were represented by an all-female delegation, including Afghanistan, Saudi Arabia, and Israel.

• A number of leading female voices will speak at various plenaries, breakout sessions, master classes, and workshops, including Google's Vice President of Next Billion Users Diana Louise Patricia Layfield, Tennis champion Sania Mirza, Newly-crowned Miss World Manushi Chhillar and CEO of Afghan Citadel Software Company Roya Mahboob.

Q71. Answer: (b) Rana Daggubati

The correct answer is Rana Daggubati.

Key Points

• Rana Daggubati played the character of Bhallaladeva in the film series 'Bahubali'.

• Ramanaidu "Rana" Daggubati born 14 December 1984) is an Indian actor and producer known primarily for his work in Telugu language films, in addition to Hindi and Tamil languages.

• He made his acting debut with the Telugu film Leader, for which he won the Filmfare Award for Best Male Debut – South.

• In 2012, Rana gained prominence by starring in the hit Telugu film Krishnam Vande Jagadgurum.

Additional Information

• Baahubali:

• The Beginning is a 2015 Indian epic action film directed by S. S. Rajamouli and produced by Shobu Yarlagadda and Prasad Devineni under Arka Media Works.

• Shot simultaneously in Telugu and Tamil languages, the film features an ensemble cast including Prabhas, Rana Daggubati,

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Anushka Shetty, Tamannaah, Ramya Krishna, Sathyaraj, and Nassar.

Q72. Answer: (d) Bleaching powder

The correct answer is Bleaching powder.

Key Points

• Chlorine reacts with dry slaked lime to give a mixture of calcium chloride and calcium hypochlorite.

• Thus, during the reaction of chlorine gas with dry slaked lime, bleaching powder is obtained.

• The lime reacts with chlorine to form bleaching powder.

If the slaked lime is not dry, then chlorine reacts with water to form hydrochloric acid and hypochlorous acid.

• $Ca(OH)2+Cl2 \rightarrow CaOCl2+H2O$.

Additional Information

• Calcium hypochlorite is an inorganic compound with the formula $Ca(OCl)2$.

• It is the main active ingredient of commercial products called bleaching powder, chlorine powder, or chlorinated lime, used for water treatment and as a bleaching agent.

• Uses:

• Bleaching powder is used for the disinfection of drinking water.

• It is also used to wash clothes in the laundry.

• Used for bleaching wood pulp in the paper manufacturing industry.

• Used as a bleaching agent in the textile industry for bleaching cotton and linen.

Q73. Answer: (b) Only conclusion II follows.

The given statement declares that people suffering from diabetes can eat fruits.

• That would imply that sugar in its natural form is not harmful. Thus, conclusion I does not follow.

• Conclusion II justifies the given statement by explaining how sugar from fruits can help in metabolism of the body. Thus. conclusion II logically follows the statement.

Hence the correct answer is option 2.

Additional Information

• Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose (blood sugar).

Q74. Answer: (d) Statement 1 alone is sufficient.

Given that:-

Neeta has 6 pens of two different colours.

1. There are 4 red pens.

• Neeta has a total of 6 pens of two different colours.

• Here, there are 4 red pens the remaining 2 black pens so it is definite information. Therefore, statement 1 alone is sufficient.

2. He bought those pens yesterday.

• No information is given about the total number of both colours of pens. Therefore, statement 2 alone is not sufficient.

Here, statement 1 is sufficient to answer.

Hence, "option 4" is the correct answer.

Q75. Answer: (a) run

The correct answer is run.

Key Points

• Strong is related to weak as languorous is to run.

• Strong and weak are opposite words

• Languorous means tiredness or inactivity and so run will be the opposite of languorous.

Q76. Answer: (b) moisture

The correct answer is moisture.

Key Points

• Evaporation can be defined as the process through which a liquid (generally water) is converted into a gas/vapour without being heated to its boiling point.

• The key factors that affect the rate of evaporation of a liquid are:

• Temperature: The greater the temperature of the liquid and its surroundings, the faster the rate of evaporation.

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• Surface area occupied by the liquid: Since evaporation is a surface phenomenon, the greater the surface area occupied by the liquid, the quicker it undergoes evaporation.

• Humidity of the surroundings: The greater the humidity of the atmosphere surrounding the water, the slower the rate of evaporation.

• Thus Moisture reduces the rate of evaporation.

• Air circulation or wind speed: The presence of a breeze or another source of air circulation directly contributes towards the rate of evaporation.

Additional Information

• Evaporation is a type of vaporization that occurs on the surface of a liquid as it changes into the gas phase.

• The surrounding gas must not be saturated with the evaporating substance.

• When the molecules of the liquid collide, they transfer energy to each other based on how they collide with each other.

Q77. Answer: (b) 57

Shortcut Trick

Total runs added by batsman in 12^(th) and 13^(th) innings = (13 × 54) − (11 × 52) = 702 − 572 = 130.

Let runs in 12^(th) innings be x. Then 13^(th) innings = x + 16.

Sum: x + x + 16 = 130 => 2x = 114 => x = 57.

Therefore The correct answer is 57.

Alternate Method

Given: Average after 11 innings = 52 | Average after 13 innings = 54 | Difference (13^(th) − 12^(th)) = 16.

Formula: Total Sum = Average × Number of terms

=> Total runs after 11 innings = 11 × 52 = 572

=> Total runs after 13 innings = 13 × 54 = 702

=> Runs in (12^(th) + 13^(th)) innings = 702 − 572 = 130

=> Let runs in 12^(th) innings = x

=> Runs in 13^(th) innings = x + 16

=> x + (x + 16) = 130

=> 2x + 16 = 130

=> 2x = 114

=> x = 57

Therefore The correct answer is 57.

Additional Information

Average Score Calculation

The average score of a batsman is the ratio of total runs scored to the total number of innings played: Average = Total Runs ÷ Total Innings.

New Average Effect

When more innings are added, the new total sum is: (Old Average × Old Innings) + Sum of New Innings = New Average × New Innings.

Deviation Method for Averages

If the average increases, the newly added values must be greater than the previous average. Total Increase = Increase in Average × Final Number of Innings.

Q78. Answer: (a) 14.55

Concept Used:

Follow the BODMAS rule according to the table given below:

Calculation:

(2.5)2 + 8.7 – (1.12/1.4) × 0.5 = ?

=> 6.25 + 8.7 – (1.12/1.4) × 0.5 = ?

=> 6.25 + 8.7 – 0.8 × 0.5 = ?

=> 6.25 + 8.7 – 0.4 = ?

=> 14.95 – 0.4 = ?

=> 14.55 = ?

Therefore The required value of ? is 14.55

Q79. Answer: (b) period

The correct answer is period.

Key Points

• The time for one complete cycle, a left swing and a right swing, is called the period.

• The period depends on the length of the pendulum and also to a slight degree on the amplitude, the width of the pendulum's swing.

Additional Information

• Motion that repeats itself regularly is called periodic motion. One complete repetition of the motion is called a cycle.

• The duration of each cycle is the period.

• The frequency refers to the number of cycles completed in an interval of time.

• It is the reciprocal of the period and can be calculated with the equation f=1/T.

• Some motion is best characterized by the angular frequency (ω).

• The angular frequency refers to the angular displacement per unit time and is calculated from the frequency with the equation ω=2πf.

• In short:

• Period: The duration of one cycle in a repeating event.

• Angular frequency: The angular displacement per unit time.

• Frequency: The quotient of the number of times n a periodic phenomenon occurs over the time t in which it occurs: f = n / t.

Q80. Answer: (c) Rs. 9,750

Shortcut Trick

Total profit is always 100%.

If profit from Brand 1 = 35%, then profit from Brand 2 = 100% − 35% = 65%.

Required Profit = 65% of 15,000.

Calculation: 0.65 × 15,000 = 9,750.

Therefore The correct answer is Rs. 9,750.

Alternate Method

Given: Total Profit = Rs. 15,000 | Profit of Brand A = 35% of Total Profit.

Formulas: Profit of other brand = Total Profit − Profit of first brand.

=> Profit from Brand 1 = 35% of 15,000 = (35 ÷ 100) × 15,000

=> Profit from Brand 1 = 35 × 150 = Rs. 5,250

=> Profit from Brand 2 = Total Profit − Profit from Brand 1

=> Profit from Brand 2 = 15,000 − 5,250 = Rs. 9,750

Therefore The correct answer is Rs. 9,750.

Additional Information

Percentage Distribution

When a whole is divided into two parts, if one part is x%, the other part is always (100 − x)%.

Profit Calculation

Profit amount = (Profit percentage ÷ 100) × Base Value.

Q81. Answer: (d) 59 years

Shortcut Trick

Ratio of Vinod to Anand (7 years ago) = 4 : 1 (Difference = 3 units)

Ratio of Vinod to Anand (19 years hence) = 2 : 1 = 6 : 3 (Difference = 3 units)

Change in units for Vinod = 6 − 4 = 2 units

Actual time gap = 19 + 7 = 26 years => 2 units = 26 years => 1 unit = 13 years

Vinod age 7 years ago = 4 × 13 = 52 years => Present age = 52 + 7 = 59 years

Therefore The correct answer is 59 years.

Alternate Method

Given: Future age condition (19 years) and Past age condition (7 years).

Formula Used: Linear equations for age based on time shifts.

Let Vinod present age be V and Anand present age be A.

=> Case 1 (7 years ago): (V − 7) = 4 × (A − 7)

=> V − 7 = 4A − 28 => V − 4A = −21 → (Eq 1)

=> Case 2 (19 years hence): (V + 19) = 2 × (A + 19)

=> V + 19 = 2A + 38 => V − 2A = 19 → (Eq 2)

=> Subtracting (Eq 1) from (Eq 2): (V − 2A) − (V − 4A) = 19 − (−21)

=> 2A = 40 => A = 20

=> Substitute A = 20 in (Eq 2): V − 2(20) = 19

=> V − 40 = 19 => V = 59

Therefore The correct answer is 59 years.

Additional Information

Ratio Difference Principle

The age difference between two people remains constant throughout their lives. Always equate the difference in ratio parts before solving.

Age Shift Rules

If present age is X, then 'n' years ago age is (X − n) and 'n' years hence age is (X + n).

Effective Time Gap

When comparing a past scenario and a future scenario, the total time gap is the sum of the past years and the future years (e.g., 7 + 19 = 26).

Q82. Answer: (b) Konsam Ormila Devi

The correct answer is Konsam Ormila Devi.

Key Points

• Konsam Ormila Devi, the Indian female weightlifter, won the gold medal in the Asian Youth and Junior Weightlifting Competition held in Nepal on July 25, 2017.

• The weightlifter from Manipur lifted 56kg in snatch and 70kg in clean & jerk for a total effort of 126kg in the 44kg weight category to finish on the top of the podium, according to a release from the Indian Weightlifting Federation.

Additional Information

• Karnam Malleswari is a retired Indian weightlifter.

• She is the first Indian woman to win a medal at the Olympics in 2000.

• In 1994, she received the Arjuna Award and in 1999, she received the Rajiv Gandhi Khel Ratna award, India's highest sporting honour, and the civilian Padma Shri award.

• Kavita Dalal is an Indian professional wrestler who performed in the WWE under the ring name Kavita Devi, on their developmental territory NXT between 2017 and 2021.

• Devi is the first female professional wrestler of Indian nationality to wrestle in WWE.

Q83. Answer: (b) 1 J

The correct answer is 1 J.

Key Points

• Given,

• Displacement, s = 1m.

• Force, F= 1 N

• Work done = Force x displacement

• = 1 x 1

• = 1 J

Additional Information

• Work:

• When a body is displaced by applying a force on it, then work is said to be done.

• Work = Force × displacement.

• Its SI unit is joule (kg m² s^(–2)).

• Positive Work Done

• Positive work means that force is parallel to displacement, i.e. in the direction of displacement.

• Negative Work Done

• Negative work means that force is opposite to displacement.

• Zero Work Done

• If the force is perpendicular to the displacement and if either the force or the displacement is zero, work done is zero.

Q84. Answer: (a) helium

The correct answer is helium.

Key Points

• Helium atom has 2 electrons in its valence shell but its valency is not 2.

• Noble or inert elements are the most stable due to having the maximum number of valence electrons their outer shell or valence shell can hold.

• Helium has no tendency to form any chemical bonds due to highly stable configuration.

• Any element in group 1 has just one valence electron.

• Examples include hydrogen (H), lithium (Li), and sodium (Na).

• Any element in group 18 has eight valence electrons (except for helium, which has a total of just two electrons).

• Examples include neon (Ne), argon (Ar), and krypton (Kr).

Additional Information

• The discoverers of noble gases are :

Helium	**Pierre Janssen and Joseph Norman Lockyer**
Neon	William Ramsay
Argon	Lord Rayleigh and William Ramsay
Krypton	William Ramsay
Xenon	William Ramsay
Radon	Friedrich Ernst Dorn

Q85. Answer: (d) Carbon

The correct answer is carbon.

Key Points

• A fullerene is an allotrope of carbon whose molecule consists of carbon atoms connected by single and double bonds so as to form a closed or partially closed mesh, with fused rings of five to seven atoms.

• The molecule may be a hollow sphere, ellipsoid, tube, or many other shapes and sizes.

• Various allotropes of carbon are diamond, graphite, lonsdaleite, fullerene, C-540, C-70, amorphous carbon, carbon nanotube.

• Diamond and crystalline silicon are isomorphous because they both have a three-dimensional tetrahedral structure.

• Allotropy, the existence of a chemical element in two or more forms, which may differ in the arrangement of atoms in crystalline solids or in the occurrence of molecules that contain different numbers of atoms.

Additional Information

• When an element exists in more than one crystalline form, those forms are called allotropes; the two most common allotropes of carbon are diamond and graphite.

• One of the allotropic form of a carbon is a fullerene in which “carbon atoms” are “arranged in a sphere”.

• Each sphere has 60 carbon atoms and each carbon atom is linked by a single covalent.

• The fullerene is considered as purest allotrope of “carbon” because they have “smooth structure” without having dangling bonds.

Q86. Answer: (d) Rs. 2,800

Shortcut Trick

The increase in amount is solely due to the increase in rate of interest.

Total percentage increase in interest = Rate increase × Time

=> 2% × 5 years = 10%

Actual increase in amount = Rs. 3,920 − Rs. 3,640 = Rs. 280

Since 10% of Principal = Rs. 280, then 100% (Principal) = Rs. 280 × 10 = Rs. 2,800

Therefore The correct answer is Rs. 2,800.

Alternate Method

Given:

Time (T) = 5 years

Amount 1 (A1) = Rs. 3,640

Amount 2 (A2) = Rs. 3,920

Increase in Rate (ΔR) = 2% per annum

Formula Used:

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

Amount (A) = Principal (P) + Simple Interest (SI)

Difference in Amount (ΔA) = (P × ΔR × T) ÷ 100

Calculations:

=> Difference in Amount (ΔA) = A2 − A1

=> ΔA = 3920 − 3640 = Rs. 280

=> Extra interest is due to 2% increase for 5 years on Principal (P).

=> 280 = (P × 2 × 5) ÷ 100

=> 280 = (P × 10) ÷ 100

=> 280 = P ÷ 10

=> P = 280 × 10

=> P = Rs. 2,800

Therefore The correct answer is Rs. 2,800.

Additional Information

Simple Interest Property

Simple interest remains constant every year if the principal and rate are unchanged. It is always calculated on the original principal.

Effect of Rate Change

If the rate increases by R% for T years, the extra interest earned is (P × R × T) ÷ 100. This is useful for solving questions involving conditional rate changes.

Principal Formula from Amount

Principal (P) can also be calculated if Amount (A), Rate (R), and Time (T) are known using: P = (100 × A) ÷ (100 + RT).

Q87. Answer: (d) Only II is implicit

The statement declares that swimming is good and it helps to improve physical health.

• Secretion of good hormones cannot be directly linked with the act of swimming. Therefore, assumption I is not implicit.

• Water providing relief to the muscles can help in improving physical health. Thus, assumption II is implicit.

Hence the correct answer is option 4.

Q88. Answer: (a) pascal

The correct answer is pascal.

Key Points

• The unit of pressure in the SI system is the pascal (Pa), defined as a force of one Newton per square meter.

• The conversion between atm, Pa, and the torr is as follows:

• 1 atm = 101325 Pa = 760 torr.

• A standardized prefix system indicates fractions and multiples of metric units.

Additional Information

• Pressure is the force applied perpendicular to the surface of an object per unit area over which that force is distributed.

• Gauge pressure is the pressure relative to the ambient pressure. Various units are used to express pressure.

• The SI unit of force is the newton, symbol N.

• The base units relevant to force are:

• The meter, unit of length — symbol m.

• The SI unit of power is the watt (W), in honour of Scottish inventor James Watt (1736 - 1819).

• Watt's improvements to the steam engine helped to launch the Industrial Revolution.

Q89. Answer: (c) Banking

The correct answer is Banking.

Key Points

• Banking is the main occupation of the merchants known as Shroffs, Seths, Sahukars, Mahajans and Chheti since ancient times.

• The Arthashastra of Kautilya mentions the presence of bankers during the Maurya era.

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• There were instruments in the Maurya Era known as “Adesha” which are equivalent to the Bill of exchange of current times.

• There are plenty of references available in the ancient Indian literature regarding an indigenous banking system that financed the trade and commerce in the country.

• The businessmen called Shroffs, Seths, Sahukars, Mahajans, Chettis, etc. had been carrying on the business of banking since ancient times.

• These indigenous bankers included very small money lenders to shroffs with huge businesses, who carried on the large and specialized business even greater than the business of banks.

Additional Information

• The History of Banking in India is as old as Vedic Civilization.

• For example, in the Vedic age, the loan deeds called rnapatra or rnalekhya were prevalent. Interest rates, as well as usury, were prevalent in Vedic India.

• The Vedic word Kusidin refers to a usurer.

• Manusmriti condemns usury and calls it an acceptable means of acquiring wealth.

• The existence of institution money lending is proved by the fact that Manusmriti fixes minimum and maximum rates of interest and considers money lending above a certain rate as a grave sin.

• However, it fixes different ceiling rates for different caste.

• For example, the rate of interest for Brahmins was 24% while it was 36%, 48%, and 60% for Kshatriyas, Vaishyas, and Shudras.

• Akin to the Vedic era, the Buddhist, Mauryan, and Mughal periods are also known for various types of such instruments.

Q90. Answer: (b) North

The diagram is given below:-

He is walking north direction.

Hence, "option 2" is the correct answer.

Q91. Answer: (c) 6.33 ms^(–1)

Shortcut Trick

Average Speed = Total Distance ÷ Total Time

Total Distance = 23 + 15 = 38 m

Total Time = 4 + 2 = 6 s

Average Speed = 38 ÷ 6 = 6.333... ms^(−1)

Therefore The correct answer is 6.33 ms^(−1).

Alternate Method

Given:

Distance 1 (d1) = 23 m, Time 1 (t1) = 4 s

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

Formula Used:

Average Speed = (Total Distance) ÷ (Total Time)

Calculations:

=> Total Distance = d1 + d2 = 23 + 15 = 38 m

=> Total Time = t1 + t2 = 4 + 2 = 6 s

=> Average Speed = 38 ÷ 6

=> Average Speed = 6.3333... ms^(−1)

Therefore The correct answer is 6.33 ms^(−1).

Additional Information

Uniform Speed vs Variable Speed

An object has uniform speed if it covers equal distances in equal intervals of time; otherwise, it is variable speed where average speed is used.

Special Case: Equal Distances

If an object covers two equal distances at speeds v1 and v2, then Average Speed = (2 × v1 × v2) ÷ (v1 + v2).

Conversion Factor

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

Q92. Answer: (c) 15 m

Shortcut Trick

Area = (1/2) × d1 × d2 => 216 = (1/2) × 24 × d2 => d2 = 18 m.

Side of rhombus = √[(d1/2)² + (d2/2)²]

Side = √[12² + 9²] = √[144 + 81] = √225 = 15 m.

Therefore The correct answer is 15 m.

Alternate Method

Given: Area = 216 m², Diagonal 1 (d1) = 24 m.

Formula Used: Area = (d1 × d2) / 2; Side (a) = √[(d1/2)² + (d2/2)²]

=> 216 = (24 × d2) / 2

=> 216 = 12 × d2

=> d2 = 216 / 12 = 18 m

=> Half of diagonals are 12 m and 9 m.

=> In a right-angled triangle formed by the intersection of diagonals:

=> Side² = 12² + 9²

=> Side² = 144 + 81 = 225

=> Side = √225 = 15 m

Therefore The correct answer is 15 m.

Additional Information

Properties of Rhombus

All sides are equal and diagonals bisect each other at 90°.

Perimeter of Rhombus

Perimeter = 4 × side = 4a.

Relation between Side and Diagonals

$4a^2 = d1^2 + d2^2$, where 'a' is the side and d1, d2 are diagonals.

Q93. Answer: (b) zinc sulphate is formed

The correct answer is zinc sulphate is formed.

Key Points

• When zinc is added to copper sulphate (CuSO4) solution due to more reactivity of zinc, copper is replaced by zinc and forms zinc sulphate.

• During the process, the colour of the solution changes from blue to colourless.

• The chemical equation of the reaction,

• Zn + CuSO4 → ZnSO4 + Cu

Additional Information

• Types of Chemical Reactions:

• Decomposition reaction: The opposite of a combination reaction, a complex molecule breaks down to make simpler ones. Such reactions are represented by equations of the following form: AB → A + B.

• Precipitation reaction: Two solutions of soluble salts are mixed resulting in an insoluble solid (precipitate) forming. Such reactions are represented by equations of the following form: A + Soluble salt B → Precipitate + soluble salt C.

• Neutralization reaction: An acid and a base react with each other. Generally, the product of this reaction is salt and water. Such reactions are represented by equations of the following form: Acid + Base → Salt + Water.

• Combustion reaction: Oxygen combines with a compound to form carbon dioxide and water. These reactions are exothermic, meaning they give off heat. Such reactions are represented by equations of the following form: A + O2 → H2O + CO2.

• Displacement reaction: One element takes place with another element in the compound. Such reactions are represented by equations of the following form: A + BC → AC + B.

Q94. Answer: (d) 29 minutes 20 seconds

Shortcut Trick

Let Total Capacity be LCM(15, 40) = 120 units.

Efficiency of Tube A = 8 units/min, Efficiency of Tube B = 3 units/min.

Work done by both in 4 mins = (8 + 3) × 4 = 44 units.

Remaining work for Tube B = 120 − 44 = 76 units.

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Remaining time for B = 76 ÷ 3 = 25 min 20 sec. Total time = 4 + 25 min 20 sec = 29 min 20 sec.

Therefore The correct answer is 29 min 20 sec.

Alternate Method

Given: Filling time for Tube A = 15 min, Tube B = 40 min. Tube A closed after 4 min.

Formula Used: Total Work = Time × Efficiency

Person	Days	Total Work	Efficiency
Tube A	15	120	8
Tube B	40	3	

=> Total capacity of cylinder = 120 units.

=> Gas filled by (A + B) in 4 minutes = (8 + 3) × 4 = 44 units.

=> Remaining capacity = 120 − 44 = 76 units.

=> Time taken by Tube B to fill the rest = 76 ÷ 3 = 25⅓ minutes.

=> 25⅓ minutes = 25 minutes + (1/3 × 60) seconds = 25 min 20 sec.

=> Total time taken = 4 minutes (initial) + 25 min 20 sec = 29 min 20 sec.

Therefore The correct answer is 29 min 20 sec.

Additional Information

Pipes and Cisterns Efficiency

Filling pipes have positive efficiency while outlet/leakage pipes have negative efficiency.

Total Work Concept

Total work is the LCM of individual times taken to complete the task by different entities.

Time and Work Relation

Time taken is inversely proportional to efficiency when the total work remains constant (T prop. to 1/E).

Q95. Answer: (a) A

The logic followed here is:-

1) First figure rotates 1800 from the first block to the second block.

2) Then rotate clockwise direction 900 from the second block to the third block and then rotate 1800 from the third block to the fourth block.

Hence, "option 1" is the correct answer.

Q96. Answer: (c) south-east

The figure is given below:-

Hospital is South-east of Nayan's initial position.

Hence, "option 3" is the correct answer.

Q97. Answer: (a) Q17J10

The logic followed here is:-

Hence, "option 1" is the correct answer.

Q98. Answer: (d) Ministry of Human Resource Development

The correct answer is Ministry of Human Resource Development

Key Points

• Navodaya Vidyalaya Samiti and Kendriya Vidyalaya Sangathan are autonomous bodies under the Ministry of Human Resource Development.

• Navodaya Vidyalaya Samiti is an autonomous organization under the Ministry of Human Resource Development, Department of Secondary & Higher Education, Govt, of India.

• The Chairman of the Samiti is the Hon’ble Minister of Human Resource Development.

• They started with the name Navodaya Vidyalayas and were renamed later Jawahar Navodaya Vidyalayas in the birth-centenary year of Pandit Jawahar Lai Nehru.

• The Samiti functions through an Executive Committee under the Chairmanship of the Union Minister of Human Resource Development.

Important Points

• Union Minister of State for Education is the Vice- Chairman of the Samiti.

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• The Executive Committee is assisted by Finance Committee. and Academic Advisory Committee in its functions.

• The general body of the Kendriya Vidyalaya Sangathan is the apex body.

• The Minister of Human Resource Development, in charge of the Kendriya Vidyalayas scheme, is the Chairman of the Sangathan.

• The Minister of State in the Ministry of Human Resource Development is the Deputy Chairman and an Officer of the Ministry of Human Resource Development, specified by the Government of India for this purpose, is the Vice Chairman of the Sangathan.

Additional Information

• The Ministry of Human Resource Development (MHRD) is back to being the Ministry of Education with the Union Cabinet approving the change in its name on 29 July 2020.

• The Ministry of Education was renamed the HRD ministry in 1985, during the tenure of former Prime Minister Rajiv Gandhi.

• PV Narasimha Rao became the first HRD minister in the Rajiv Gandhi Cabinet.

Q99. Answer: (a) Mother Teresa

The correct answer is Mother Teresa.

Key Points

• On 4 September 2016, Mother Teresa was canonized as a saint by Pope Francis at a grand ceremony at the Vatican.

• Mother Teresa, a renowned and celebrated nun, who served thousands of diseased and destitute people in Kolkata was canonized by Pope Francis at a grand ceremony in the Vatican.

• The event saw lakhs of pilgrims, including those from India, reaching the venue to witness the ceremony.

• A 12-member delegation led by the Minister of External Affairs Sushma Swaraj and a delegation from West Bengal and New Delhi including Mamata Banerjee and Arvind Kejriwal also became a part of the event.

Additional Information

• Mother Mary Teresa Bojaxhiu, honoured in the Catholic Church as Saint Teresa of Calcutta, was an Albanian-Indian Roman Catholic nun and missionary.

• She was born in Skopje, then part of the Kosovo Vilayet of the Ottoman Empire.

• During her lifetime Mother Teresa became famous as the Catholic nun who dedicated her life to caring for the destitute and dying in the slums of Calcutta - now known as Kolkata.

Q100. Answer: (c) 82

The logic followed here is:-

Hence, "option 3" is the correct answer.

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