RRC Group D Previous Year Paper 9 (Held On: 27 Sep 2018 Shift 1)

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

Take this paper as a timed mock test

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

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Scan the QR code or click the link to open it.

CBT

Q1. You are given a question and two statements. Identify which of the statements is/are sufficient to answer the question.

Question:

What is the total age of the sisters 10 years from now?

Statements:

1. Lina is 20 years old now.
2. Lina's sister's age is twice that of 1/4^(th) of the age of Lina.

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

Q2. Who has won the Best Actor award in the 90^(th) Oscar awards 2018?

(a) Garry Oldman
(b) Denzel Washington
(c) Daniel Day Lewis
(d) Daniel Kaluuya

Q3. A person clapped his hands near a cliff and heard echo after 6 s. The distance of the cliff from the person is:

[take v = 346 ms^(-1)]

(a) 1038 m
(b) 1083 m
(c) 2076 m
(d) 2706 m

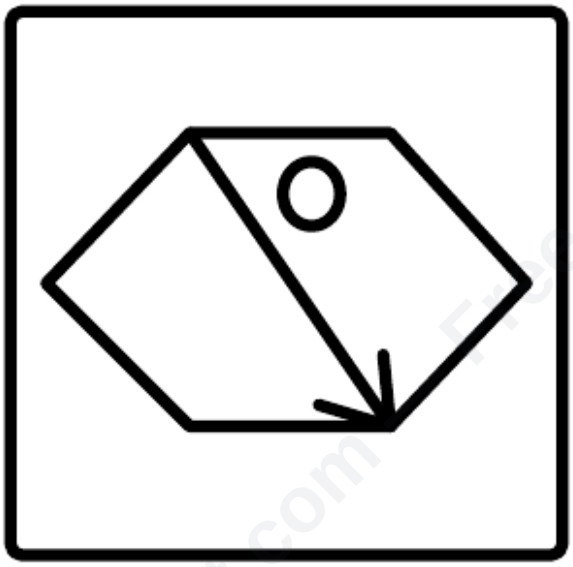
Q4. A car accelerates uniformly from 18 kmh^(-1) to 72 kmh^(-1) in 5 s. The acceleration of the car is:

(a) 3 ms²
(b) 10.8 ms^(-2)
(c) 10.8 ms²
(d) 3 ms^(-2)

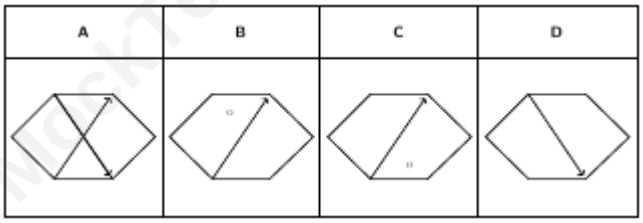
Q5. Which of the option figures bears the closest resemblance to the question figure?

Question Figure:

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Option figures:



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

Q6. What is the percentage of oxygen in Al2(SO4)3?

(a) 57.7%
(b) 56.1%
(c) 53.1%
(d) 52.6%

Q7. Given is a question followed by two arguments. Decide which of the arguments is/are strong with respect to the question.

Question:

Should we avoid overuse of air conditioners?

Arguments:

Yes, it weakens the human system.

No, the comfort cannot be forsaken.

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

Q8. Prime Minister Narendra Modi laid the foundation stone of Char Dham highway development project or Chardham Mahamarg Vikas Pariyojna at _____.

(a) Rishikesh
(b) Dehradun
(c) Manikaran
(d) Haridwar

Q9. Pond is related to Water in the same way as Mountain is related to:

(a) Birds
(b) Rocks
(c) Animals
(d) Climb

Q10. Who became the first Indian woman to win the Korea open series in Badminton?

(a) Saina Nehwal
(b) Jwala Gutta
(c) Ashwini Ponnappa
(d) P. V. Sindhu

Q11. You are given a question and two statements. Identify which of the statements is/are necessary/sufficient to answer the question.

Question:

Among the bags A, B, C and D which one is the lightest bag?

Statements:

1. B is heavier than A.

2. A is lighter than C and D.

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

Q12. Name the country which won the 2017 Women's Hockey Asia Cup title?

(a) Nepal
(b) Pakistan
(c) India
(d) Bangladesh

Q13. The median of the numbers 14, 12, 12, 16, 13 and 18 is:

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

Q14. PM Modi's Birthday has been celebrated as _____ across India.

(a) Kisan Diwas
(b) Sewa Diwas
(c) Hindi Diwas
(d) Bal Diwas

Q15. The Chola kings were prolific temple builders who built the _____ temple at Tanjavur.

(a) Brahmeshvara
(b) Brihadeesvara
(c) Lingaraja
(d) Dilwara

Q16. _____ gas is used as an illuminating gas.

(a) Methyl
(b) Propane
(c) Acetylene
(d) Ethyne

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Q17. 80 ÷ [48 - {56 - (60 - 36 ÷ 12 × 4)}] = ?

(a) 5
(b) 8
(c) 4
(d) 2

Q18. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) from the statement.

Statement:

"Kirti played a very good shot on the pitch," says a friend to Sajit.

Conclusions:

I. Sajit likes cricket.

II. Kirti might be a good player.

(a) Conclusion I alone follows
(b) Conclusion II alone follows
(c) Neither I nor II follows
(d) Both the conclusions follow

Q19. 3/4 + {3/4 + 3/4 ÷ (3/4 + 3/4)} = ?

(a) 3/4
(b) 1
(c) 2
(d) 23/4

Q20. A water tank is 2/5^(th) full. Inlet A can fill the tank in 12 minutes while an outlet pipe B can empty it in 6 minutes. If both the pipes are open, how long will it take to empty or fill the tank completely?

(a) It fills in 4.8 min
(b) It empties in 4.8 min
(c) It fills in 5.6 min
(d) It empties in 5.6 min

Q21. 38% of a number is 133. What is the number?

(a) 340
(b) 350
(c) 360
(d) 355

Q22. Who among the following had been roped in June 2017 by the Union Government of India to promote GST?

(a) Sachin Tendulkar
(b) Salman Khan
(c) Amitabh Bachchan
(d) Aishwarya Rai Bachchan

Q23. Find the square root of 15625.

(a) 125
(b) 145
(c) 150
(d) 135

Q24. Complete the number series by choosing the missing terms from the options.

32, 64, 256, 1536, ?, 122880, 1474560

(a) 122860
(b) 12268
(c) 12285

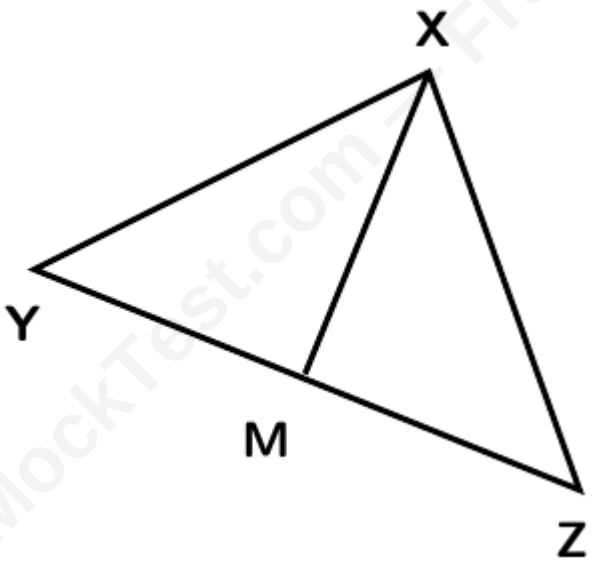
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(d) 12288

Q25. If tanα = √3 + 2, then the value of tanα - cotα =? is

(a) 2
(b) 2√3
(c) √3 - 2
(d) 4

Q26. In the diagram, M is the midpoint of YZ, angle XMZ = 32°, and angle XYZ = 16°. The measure of angle XZY is:



(a) 68°
(b) 84°
(c) 81°
(d) 74°

Q27. Soft drinks contain:

(a) Oxalic acid
(b) Tartaric acid
(c) Carbonic acid
(d) Citric acid

Q28. Raghu has invested Rs. 1000 and received Rs. 1300 at 6% per annum simple interest after X years. Find the value of X.

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

Q29. Thorn Forests are found in _____.

(a) Kashmir
(b) Kerala
(c) Sikkim
(d) Rajasthan

Q30. Bending of light rays in the denser medium is termed as _____.

(a) Reflection
(b) Dispersion
(c) Refraction
(d) Deflection

Q31. In a shop 4.5% of 1500 kg toor dal was sold. Find the quantity sold.

(a) 64.5 kg
(b) 63.5 kg
(c) 70 kg
(d) 67.5 kg

Q32. Consider the given statement(s) and decide which of the given assumption(s) is/are implicit in the statement.

Statement:

School students are more influenced by their faculty nowadays.

Assumption:

I. School students consider their faculty as role models.

II. More time is spent at schools by students

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

Q33. An object travels 23 m in 3 s and then another 15 m in 2 s. What is the average speed of the object?

(a) 7.6 ms^(-1)
(b) 7.6 s^(-1)
(c) 8.0 ms^(-1)
(d) 7.6 m

Q34. Find the next term in the following series:

X24C, V22E, T20G, _____

(a) RI19
(b) R19I
(c) R18I
(d) RI18

Q35. Pipe A is an inlet pipe that can fill an empty cistern in 69 hours. Pipe B can drain the filled cistern in 46 hours. When the cistern is filled, the two pipes are opened one at a time for an hour each, starting with Pipe B. How long will it take for the cistern to be empty?

(a) 11 days 10 hours
(b) 11 days 7 hours
(c) 11 days 12 hours
(d) 1 days 13 hours

Q36. When a constant force acts on an object with a mass of 8 kg for a duration of 3 s, it increases the object's velocity from 4 ms^(-1) to 6 ms^(-1). What is the magnitude of the applied force?

(a) 5.33 N
(b) 4.33 N
(c) 6.33 N
(d) 3.33 N

Q37. Find the next term in the following series.

Z26, X24, V22, _____

(a) T20
(b) W23
(c) K15
(d) J20

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Q38. An object of 10 kg is moving with a speed of 2 m/s. The kinetic energy of the object is:

(a) 20 J
(b) 5 J
(c) 10 J
(d) 40 J

Q39. If a is positive and $a^2 + 1/(a^2) = 7$, then find $a^3 + 1/(a^3)$.

(a) 21
(b) $3\sqrt{7}$
(c) 18
(d) $7\sqrt{7}$

Q40. _____ elements have the largest atoms.

(a) F
(b) O
(c) H
(d) Li

Q41. West Bengal shares boundaries with _____ countries.

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

Q42. Find the odd one out.

A	B	C	D
1595	1425	1725	1325
AEIE	ADBE	AGBE	ACBE

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

Q43. If a person moves a trolley for a distance of 10 m with a force of 50 N, then the work done is:

(a) 0.2 J
(b) 5 J
(c) 20 J
(d) 500 J

Q44. A and B can complete a task in 1.5 days. However, A had to leave a few days before the task was completed and hence it took 2 days in all to complete the task. If A alone could complete the work in 2.625 days, how many days before the work getting over did A leave?

(a) 1.125
(b) 0.625
(c) 0.375
(d) 0.875

Q45. A/An _____ tissue is formed beneath the skin and between internal organs.

(a) Epithelial
(b) Nervous
(c) Muscular
(d) Adipose

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Q46. If MEAT is coded as 135120, then what will be the code for ZEBRA?

(a) 2652181
(b) 2652191
(c) 2662181
(d) 2662191

Q47. Who among the following hosted the Hindi version of “Bigg Boss-11”?

(a) Aamir Khan
(b) Salman Khan
(c) Shilpa Shetty
(d) Farhan Akhtar

Q48. _____ is the property of attracting electrons by the halogen atoms in a molecule.

(a) Electron affinity
(b) Electropositivity
(c) Electrochemistry
(d) Electronegativity

Q49. The headquarter of the Board of Control for Cricket in India (BCCI) is located in:

(a) Delhi
(b) Mumbai
(c) Chennai
(d) Kolkata

Q50. Which of the following inert gases is placed in period 4 of the periodic table?

(a) Kr
(b) Rn
(c) Xe
(d) Ar

Q51. In a code language, AILMENT is written as 1923540. What is the code for DISEASE?

(a) 4985195
(b) 4995195
(c) 4905195
(d) 4995196

Q52. Sabrina travelled 8 km/hr on foot and 13 km/hr on cycle. She travelled a distance of 84 kms in 8 hours. For how many hours did she cycle?

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

Q53. Venu is the Son of Avani and Amit is the son of Avani’s brother. How is Amit’s Mother related to Venu?

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

Q54. Who is considered as the father of taxonomy?

(a) Darwin
(b) Einstein
(c) Mandelbrot
(d) Linnaeus

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Q55. 5^(th) January 2018 was a Friday. Which of the following years will also have 5^(th) January on a Friday?

(a) 2022
(b) 2020
(c) 2024
(d) 2023

Q56. As per the RBI Annual Report 2016-17, what is the estimated value of demonetised banknotes received?

(a) Rs. 12.25 lakh crore
(b) Rs. 15.28 lakh crore
(c) Rs. 19.48 lakh crore
(d) Rs. 13.35 lakh crore

Q57. Who among the following was crowned with the Miss World 2017 title?

(a) Andrea Meza
(b) Rolene Strauss
(c) Manushi Chillar
(d) Aurore Kichenin

Q58. For the data given below, find the sum of mode, median and mean.

6, 3, 8, 4, 3, 11, 7, 4, 5, 4.

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

Q59. Vishal is 20 years younger to Arya. Twelve years hence Arya's age will be 1.25 times that of Vishal. Arya is now _____ years old.

(a) 78
(b) 68
(c) 88
(d) 72

Q60. Read the given statement(s) and conclusions carefully and select which of the conclusions logically follow(s) from the statement(s).

Statement:

Looking at Limay's new watch, Nita comments, "Oh, that's so awesome. Where did you buy it from?"

Conclusions:

I. Limay's watch is attractive

II. Nita wants to know where to buy a similar watch from.

(a) Both the conclusions follow
(b) Conclusion II alone follows
(c) Neither I nor II follows
(d) Conclusion I alone follows

Q61. In _____, Sher Khan (Sher Shah) attacked Bengal and defeated Ghiyashuddin Shah.

(a) 1358
(b) 1583
(c) 1538
(d) 1540

Q62. By selling a used phone for Rs. 7,260, Sanjan got 34% less than what it cost him to buy it a few years ago. At what price should Sanjan have sold the phone to gain a profit of 5%?

(a) Rs. 11,460
(b) Rs. 11,550

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(c) Rs. 11,440
(d) Rs. 11,560

Q63. You are given a question and three statements. Identify which of the statements is/are necessary/sufficient to answer the question.

L, M, N, O and P are standing in a circle facing the centre. Who is standing to the right of L?

Statements:

1. Next to L are P and M
2. O is standing to the right of P
3. O is standing to the left of N

(a) Statement 1 and 2 are not sufficient
(b) Statements 1 and 2 together are sufficient
(c) The statements are insufficient
(d) Statement 1 alone is sufficient

Q64. In a code language, FATE is written as 61205. What is the code for LEAN?

(a) 125114
(b) 125115
(c) 126114
(d) 135114

Q65. Which of the following numbers is irrational?

(a) 10√1024
(b) 4√1024
(c) √1024
(d) 5√1024

Q66. Find the next term in the given series.

B2, K12, T72, _____

(a) C432
(b) A434
(c) A432
(d) C434

Q67. The famous activist Irom Chanu Sharmila is better known as 'The Iron Lady of _____.'

(a) Manipur
(b) Mizoram
(c) Nagaland
(d) Tripura

Q68. _____ helps the eye to adjust the focal length of the lens.

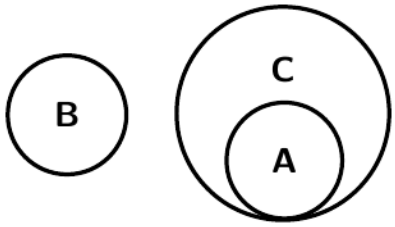
(a) Lens
(b) Ciliary body
(c) Retina
(d) Entire eye ball

Q69. Which of the following correctly represents the relationship between the following classes?

A) Bell
B) Water
C) Brass

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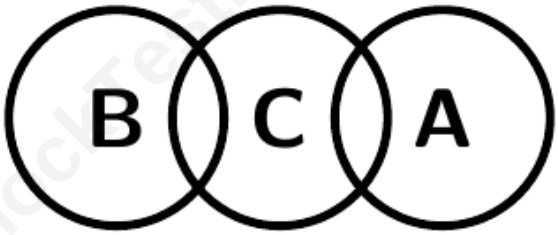
(a)



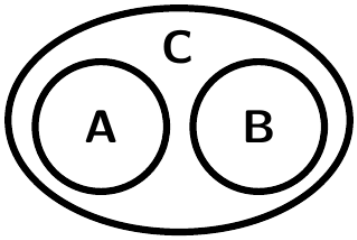
(b)



(c)



(d)



Q70. Name the Chief Minister of Telangana who was honoured with the Global Agricultural Leadership Award 2017.

(a) Siddaramaiah
(b) K. T. Rama Rao
(c) N. Chandrababu Naidu
(d) K. Chandra Shekhar Rao

Q71. What is the full form of ASSOCHAM?

(a) Associated Chambers of Commerce and Industry
(b) Association of Commerce
(c) Associated Commerce
(d) Associated Chambers in India

Q72. Name the Bollywood actor who received Kala Ratan Award in March 2017?

(a) Naseeruddin Shah
(b) Akshay Kumar
(c) Anupam Kher
(d) Jitendra

Q73. Where the mature sperm are produced?

(a) Scrotum
(b) Vas deferns
(c) Prostate gland

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(d) Testes

Q74. Asexual reproduction takes place in:

(a) Plants
(b) Higher animals
(c) Lower animals
(d) Lower animals and plants

Q75. Tribeni had to travel 175 km in 3.5 hours. However, she travelled at the rate of 58 km/hr for 2.5 hours and then rested for 20 minutes before completing the journey. If Tribeni managed to reach on time, her speed during the last stretch would have been _____.

(a) 36 km/hr
(b) 30 km/hr
(c) 42.5 km/hr
(d) 45 km/hr

Q76. Who among the following was sworn in as the Chief Minister of Manipur in 2017?

(a) M Koireng Singh
(b) N Biren Singh
(c) Longjam Thambou
(d) M Alimuddin Singh

Q77. An object travels 23 m in 3 s and then another 15 m in 2 s. What is the average speed of the object?

(a) 7.6 ms^(-1)
(b) 6.6 ms^(-1)
(c) 8.0 ms^(-1)
(d) 7.6 m

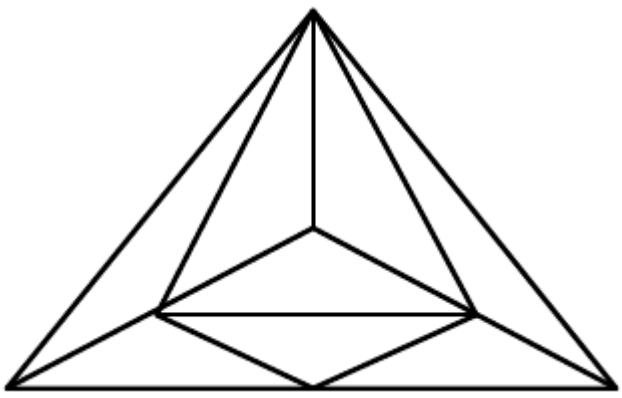
Q78. (-12)[11 + {7 × (-3)}] ÷ [4 {13 - (-3) × (-6)}] = ?

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

Q79. An object having the capability to do work is said to possess_____.

(a) Inertia
(b) Force
(c) Pressure
(d) Energy

Q80. How many triangles are there in this figure?



(a) 21
(b) 23
(c) 22

(d) 20

Q81. _____ is displaced when zinc is added to the solution of copper sulphate.

(a) Copper
(b) Hydrogen
(c) Zinc
(d) Sulphate

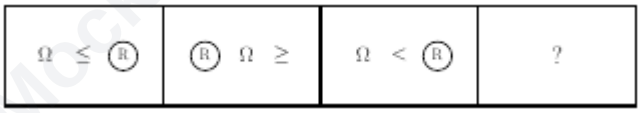
Q82. Atomic radius is measured in:

(a) Micrometres
(b) Nanometres
(c) Millimetres
(d) Centimetres

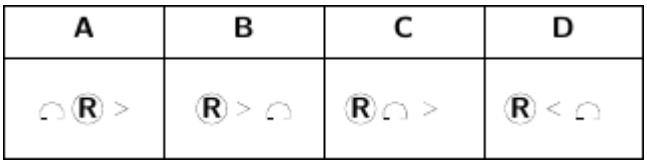
Q83. _____ compound is used as a drying agent.

(a) Calcium oxide
(b) Calcium carbide
(c) Gypsum
(d) Calcium carbonate

Q84. What will come in the place of question mark (?) in the below series?



Option figure:



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

Q85. Consider the given statement(s) and decide which of the given assumption(s) is/are implicit in the statement.

Statement:

"The use of antibiotic tablets destabilises the gut bacteria".

Assumptions:

I. There are friendly bacteria in the gut.

II. Gut health is foremost for overall health.

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

Q86. A mass of 20 kg is at a height of 8 m above the ground. Then the potential energy possessed by the body is:

[Given g = 9.8 ms^(-2)]

(a) 1568 J
(b) 1568 C
(c) 1568 W
(d) 1568 N

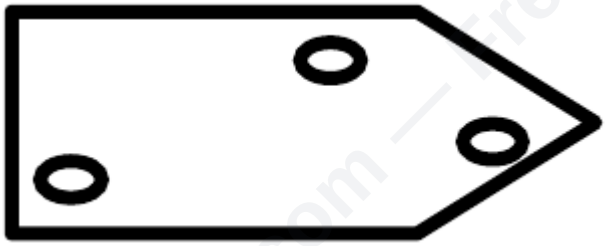
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Q87. 1 kWH = _____ J

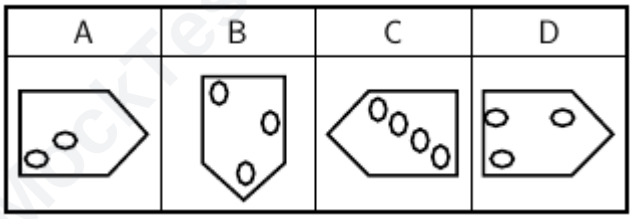
(a) 3.6 × 10^(-8)
(b) 3.6 × 10^(-6)
(c) 3.6 × 10^8
(d) 3.6 × 10^6

Q88. Which of the option figures bears the closest resemblance to the question figure?

Question figure:



Option figures:



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

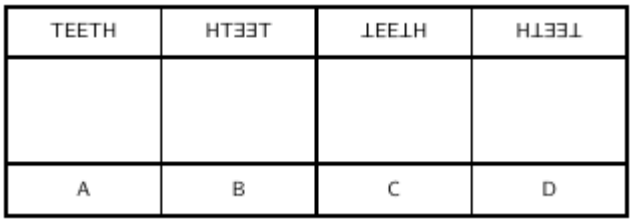
Q89. What is the average price difference per kg (in Rs.) for vegetables between two years for the three months given in the following table?

Months	Price per kg - Year 1	Price per kg - Year 2
Jan	40	35
Feb	40	50
Mar	40	35

(a) Average price of vegetables in Year 1 is less than that in Year 2.
(b) There is no difference in the average price.
(c) Average price of vegetables in Year 2 is less than that in Year 1.
(d) We cannot compare the prices.

Q90. Select the lateral mirror image of TEETH from the given option figures?

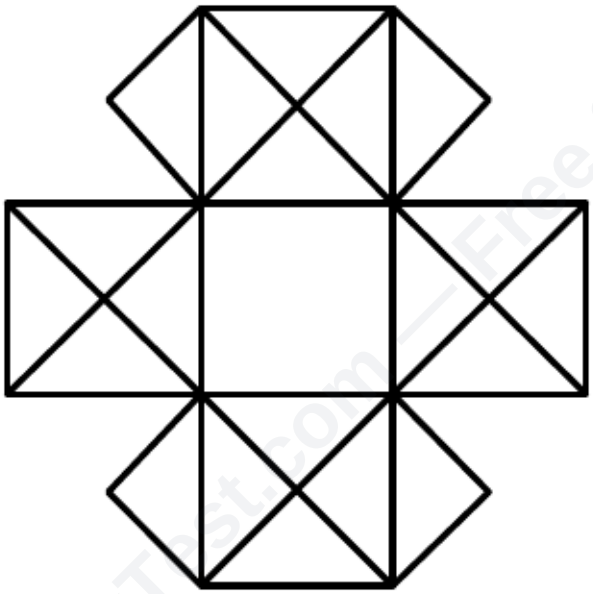
Option figures.



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

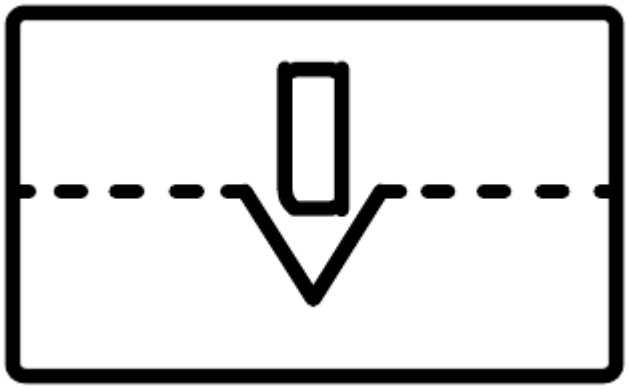
(d) B

Q91. How many triangles are there in the following figure?

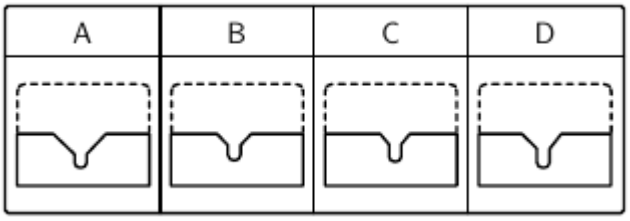


(a) 44
(b) 32
(c) 46
(d) 30

Q92. Which pattern will the given transparent sheet resemble when it is folded at the dotted line?



Option figure:



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

Q93. In the year 2016, there were 52 weeks and P days. Find the value of P.

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

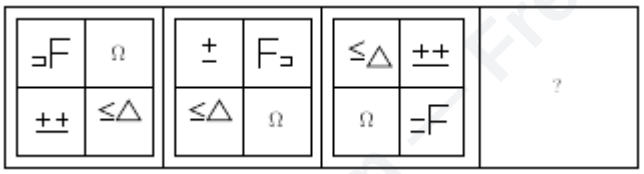
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(d) 5

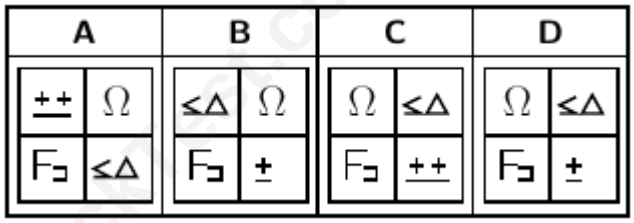
Q94. Which of the fractions given below is not equal to 4/11?

(a) 32/88
(b) 84/219
(c) 64/176
(d) 20/55

Q95. Select the option that can replace the question mark (?) in the following series.



Option figure:



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

Q96. Alarms from 3 different clocks sound out after every 2, 4 and 6 hours, respectively. If all the clocks are started at the same time, how many times will the alarms ring together in a span of 3 days?

(a) 6
(b) 3
(c) 9
(d) 2

Q97. Meet starts cycling early in the morning, facing the Sun. After some time, he takes a 45° turn to his left and then again turns 80° towards his left. In which direction is he now ?

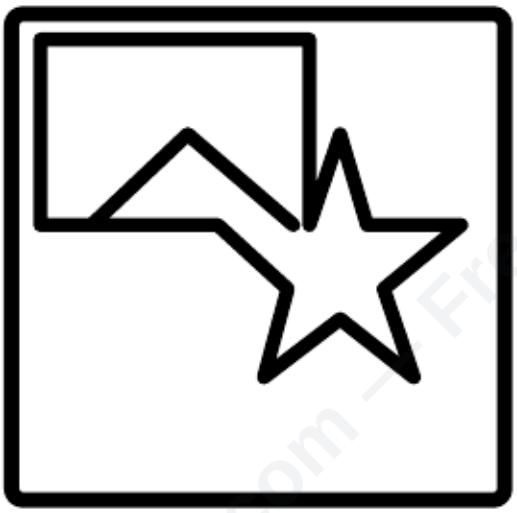
(a) South - East
(b) South - West
(c) North - West
(d) North - East

Q98. As of August 2018, what is the portfolio held by the current Union Minister Ravi Shankar Prasad?

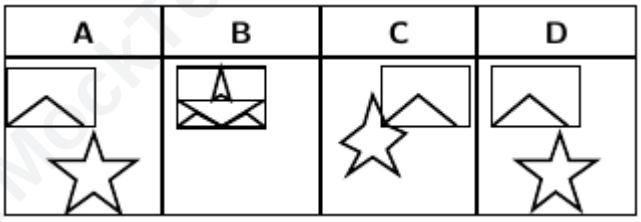
(a) Human Resource Development
(b) Petroleum
(c) Law and Telecommunications
(d) Coal

Q99. Which of the option figures bears the closest resemblance to the question figure?

Question figure:



Option figures:



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

Q100. (-18) [36 ÷ {7 - (-2)}] ÷ [(-4){19 - (-3) × (-5)}] = ?

(a) -4.5
(b) 4.5
(c) 2.5
(d) -2.5

ANSWER KEY

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

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SOLUTIONS

Q1. Answer: (d) Statement 1 and 2 together are sufficient.

Shortcut Trick

From Statement 1: Lina's age = 20 years.

From Statement 2: Sister's age = 2 × (1/4 × 20) = 10 years.

Total age after 10 years = (20 + 10) + (10 + 10) = 30 + 20 = 50 years.

Both statements are required to find the unique value of the sister's age and the total.

Therefore The correct answer is Statement 1 and 2 together are sufficient.

Alternate Method

Given:

Current age of Lina = 20 years (from Statement 1).

Sister's age relation = 2 × (1/4^(th) of Lina's age) (from Statement 2).

Calculations:

=> Let L be Lina's age and S be Sister's age.

=> L = 20

=> S = 2 × (1/4 × 20) = 2 × 5 = 10 years.

=> Lina's age after 10 years = 20 + 10 = 30 years.

=> Sister's age after 10 years = 10 + 10 = 20 years.

=> Total age after 10 years = 30 + 20 = 50 years.

Therefore The correct answer is Statement 1 and 2 together are sufficient.

Additional Information

Data Sufficiency Rules

In data sufficiency, if a question asks for a specific value, the statements are sufficient only if they lead to a single unique numerical value.

Age Difference Property

The difference between the ages of two people remains constant throughout their lives, regardless of how many years pass.

Future Age Formula

If the current age is x, then the age after n years is x + n. If there are k people, the sum of their ages increases by k × n after n years.

Q2. Answer: (a) Garry Oldman

• Garry Oldman won the Best Actor award in the 90^(th) Oscar awards in the year 2018.

• He won the best for his film ‘Darkest Hour’.

• The Oscar for Best film was won by ‘The Shape of Water’.

• Rami Malek won the best actor award in the 91^(st) Oscar Award for his film Bohemian Rhapsody in the year 2019.

• The Oscar for Best film was won by ‘Green Book’ in the year 2019.

Q3. Answer: (a) 1038 m

CONCEPT:

• Echo: If we shout or clap near a suitable reflecting object such as a tall building or a mountain, we will hear the same sound again a little later. This sound which we hear is called an echo.

• Echoes are heard due to the phenomenon of Reflection of sound waves.

• To hear the echo clearly, the reflecting object must be more than 17.2 m from the sound source for the echo to be heard by a person standing at the source.

Calculation:

Given that,

The time taken by the echo to reach back to the source (t)= 6s.

Velocity of the sound (v) = 346 m/s.

Distance between person and cliff (d) = v x t_a

As sound travels back and forth to form an echo and hence time is twice.

Now dividing the time take by 2 we get actual time (T_a)= 6/2 => 3

Therefore, the distance from person to the cliff (d) = 346 x 3 => 1038 m.

The distance between the person and the cliff is 1038 meters.

Q4. Answer: (d) 3 ms^(-2)

CONCEPT:

Acceleration (a):

• The time rate of change of velocity of an object is called the acceleration of the object. i.e.

a=(v2-v1)/(t2-t1)

Where v2 = velocity of an object at time t2 and v1 = velocity of an object at time t1

• It is a vector quantity.

• It's direction is same as that of change in velocity.

CALCULATION:

Given that,

=> Initial velocity of the car (u) = 18 km/h

=> Final velocity of the car (v) = 72 km/h

=> Acceleration is defined as change in velocity with respect to time i.e. a = v_f/t

=> Change in velocity is final velocity – initial velocity (v_f)= 72- 18 => 54 Km/h = 54 × 5 /18

=> 15 m/s.

=> Acceleration of the car (a) = 15/5 = 3m/s².

=> Therefore, the acceleration of the car (a) = 3m/s²or 3 ms^(-2)

Q5. Answer: (c) C

Figure C is the exact Water image of the given question.

Hence, the closest resemblance to the question figure is "figure C".

Q6. Answer: (b) 56.1%

• Given compound is Aluminium Sulphate Al2(SO4)3

• _-the Atomic mass of Aluminium (Al) = 27.

• The atomic mass of Sulphur (S) = 16 x 2 = 32

• The atomic mass of oxygen (O) = 8 x 2 = 16.

• Total molar mass of the compound is (27 x 2) + (32 x 3) + (16 x12) =>342 gm/mole.

• Molar Mass of the oxygen = 12 x 16 => 192 gm/mole.

• Percentage of oxygen in total compound = (192/342) x 100 => 56.140%

• Therefore, the percentage of oxygen in Aluminium Sulphate is 56.1 %

Q7. Answer: (a) Only argument I is strong.

The argument I holds strong because it gives factual information about "human system being weaken due to use of air conditioner".

While argument II only talks about "comfort" which can be achieved by using air conditioner normally and thus it does not provide any strong fact or basis to be hold strong.

Hence, "only argument I is strong".

Q8. Answer: (b) Dehradun

• Prime Minister laid the foundation stone of Char Dham highway development project or Chardham Mahamarg Vikas Pariyojna at Dehradun.

• The project aims at improving the connectivity to the Char Dham pilgrimage centres in the Himalayas.

• It includes developing around 900 km of national highways in Uttarakhand at a total cost of Rs. 12000 crores.

Q9. Answer: (b) Rocks

Pond consists of water mainly and in the same way mountains consists of rocks mainly as per the given options.

Hence, "rocks" is the correct answer.

Q10. Answer: (d) P. V. Sindhu

• P.V. Sindhu became the first Indian Woman to win the Korean open Series in Badminton.

• In the year 2017, she won against Nozomi Okuhara of Japan to become the first Indian women to win Korean open Series in

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Badminton.

• She also won silver medal at Rio Olympics in the year 2016.

Q11. Answer: (b) Statement 1 and 2 together are necessary

We can check statements one by one.

Statements:

B is heavier than A → information about other two bags is not given.

So, the statement I is not sufficient alone.

A is lighter than C and D → information about B- bag and relation between bag C and D is not given. So, we cannot find which bag is lightest. Thus, statement II is not sufficient alone.

On combining both the statements I and II we get,

C, D, B > A. → thus we can find A is lightest among all the bags.

Hence, “Statement 1 and 2 together are necessary”.

Q12. Answer: (c) India

• India won the 2017 Women’s Hockey Asia Cup title.

• India beat China in the final in a penalty shootout.

• Women’s Hockey Asia Cup title was held in Japan.

• Women’s Hockey Asia Cup title 2018 was won by South Korea.

Q13. Answer: (d) 13.5

Shortcut Trick

Arrange the data in ascending order: 12, 12, 13, 14, 16, 18.

Since the number of terms (n = 6) is even, the median is the average of the middle two terms.

The middle terms are the 3^(rd) (13) and 4^(th) (14) values.

Median = (13 + 14) ÷ 2 = 13.5.

Therefore The correct answer is 13.5.

Alternate Method

Given: Data set = {14, 12, 12, 16, 13, 18}

Formula: Median (for even n) = [(n/2)^(th) term + (n/2 + 1)^(th) term] ÷ 2

=> Arrange in ascending order: 12, 12, 13, 14, 16, 18

=> Total number of observations (n) = 6

=> Median = (3^(rd) term + 4^(th) term) ÷ 2

=> Median = (13 + 14) ÷ 2

=>

Q14. Answer: (b) Sewa Diwas

• Prime Minister Modi’s Birthday has been celebrated as Sewa Divas across India.

• His party, Bharatiya Janata Party (BJP) celebrated 17 September (Modi Birthday) as Sewa Divas by organising blood donation camps and cleaning streets etc.

Q15. Answer: (b) Brihadeesvara

• The Chola Kings built Brihadeesvara temple at Tanjavur.

• It was built by RajaRaja – I in the year 1010 A.D.

• His son Rajendra I built a city called Gangaikondacholapuram and excavated a tank called Cholagangam.

• Chola dynasty was founded by Vijayalaya.

Q16. Answer: (b) Propane

• Propane gas is used as illuminating gas.

• The molecular formula Propane is C3H8.

• Propane is the gas normally used for cooking in the form of Liquified Natural Petroleum (LPG).

Additional Information

• https://www.scientificamerican.com/article/illuminating-gas-what-it-is-and-how/

Compound	Molecular Formula

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Methyl	CH3
Butene	C4H8
Ethyne or Acetylene	C2H2

Q17. Answer: (d) 2

=> 80 ÷ [48 - {56 - (60 - 36 ÷ 12 × 4)}]

=> 80 ÷ [48 - {56 - (60 - 3 × 4)}]

=> 80 ÷ [48 - {56 - (60 - 12)}]

=> 80 ÷ [48 - {56 - 48}]

=> 80 ÷ [48 - 8]

=> 80 ÷ 40

=> 2

Q18. Answer: (b) Conclusion II alone follows

• From the statement given, Sajit is saying only about how kirti played and there is no information given about “Sajit likes cricket” or not. So, we cannot assume that “Sajit likes cricket”.

• However, as it is stated that, “Kirti played a very good shot on the pitch”, Kirti is capable of playing good shots. This gives rise to the possibility that Kirti could be a good player.

Hence, “Conclusion II alone follows”.

Note: The official question has a discrepancy; it has been updated to remove the ambiguity.

Q19. Answer: (c) 2

Concept Used:

Using the BODMAS principle,

Calculation:

=> 3/4 + {3/4 + 3/4 ÷ (3/4 + 3/4)}

=> 3/4 + {3/4 + 3/4 ÷ (6/4)}

=> 3/4 + {3/4 + 1/2}

=> 3/4 + {3/4 + 1/2}

=> 8/4

=> 2

Q20. Answer: (b) It empties in 4.8 min

Shortcut Trick

Net efficiency = Inlet A − Outlet B = (1/12) − (1/6) = −1/12 (Negative sign means emptying).

Tank capacity to be emptied = 2/5 of total volume.

Time required = (2/5) × 12 minutes.

Time = 24/5 = 4.8 minutes.

Therefore The correct answer is It empties in 4.8 min.

Alternate Method

Given: Filling time of Inlet A = 12 min, Emptying time of Outlet B = 6 min. Initial level = 2/5.

Formula: Total Work = LCM of individual times; Efficiency = Work ÷ Time.

Pipe	Time (min)	Total Capacity (LCM)	Efficiency
Inlet A	12	12 units	+1
Outlet B	6	−2	

=> Combined Efficiency of A and B = (+1) + (−2) = −1 unit/min.

=> Since the efficiency is negative, the tank will be emptied.

=> Initial water in tank = 2/5 × 12 units = 4.8 units.

=> Time to empty = (Water to be removed) ÷ (Combined Efficiency) = 4.8 ÷ 1 = 4.8 minutes.

Therefore The correct answer is It empties in 4.8 min.

Additional Information

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Inlet vs Outlet Pipes

Inlet pipes fill the tank (positive efficiency) while outlet pipes empty the tank (negative efficiency).

Net Rate Formula

If Pipe A fills in 'x' and Pipe B empties in 'y', net work per hour = (1/x) − (1/y). If the result is negative, the tank empties.

Pipes and Cisterns Logic

The concept is identical to Time & Work, where work done is the capacity of the tank and negative work represents emptying.

Q21. Answer: (b) 350

Shortcut Trick

Given that 38% → 133

Divide both sides by 19: 2% → 7

Multiply by 50 to get 100%:

100% → 7 × 50 = 350

Therefore The correct answer is 350.

Alternate Method

Given:

38% of a number = 133

Formula Used:

Number = (Given Value ÷ Percentage) × 100

Calculations:

=> Let the number be x.

=> (38/100) × x = 133

=> x = (133 × 100) ÷ 38

=> x = (7 × 100) ÷ 2 (Dividing 133 and 38 by 19)

=> x = 700 ÷ 2

=> x = 350

Therefore The correct answer is 350.

Additional Information

Percentage to Fraction Conversion

To convert a percentage to a fraction, divide by 100 and simplify. Example: 38% = 38/100 = 19/50.

Base Value Concept

In percentage problems, the original number always represents the 100% base value.

Percentage Change Formula

Percentage Change = [(New Value − Old Value) ÷ Old Value] × 100.

Q22. Answer: (c) Amitabh Bachchan

• Amitabh Bachchan was made as brand ambassador in June 2017 by the Union Government of India to promote GST (Goods and Services Tax).

• Before Amitabh Bachchan, P.V. Sindhu used to be a Brand ambassador of GST.

Q23. Answer: (a) 125

Shortcut Trick

For numbers ending in 25, the square root always ends in 5.

Split 15625 into 156 and 25.

The square root of 25 is 5 (last digit).

Find the largest square less than or equal to 156, which is 144 (12^2).

Prefix 12 to 5 → 125.

Therefore The correct answer is 125.

Alternate Method

Given: Number = 15625

Method: Prime Factorization Method

=> 15625 = 5 × 3125

=> 15625 = 5 × 5 × 625

=> 15625 = 5 × 5 × 5 × 125

=> 15625 = 5 × 5 × 5 × 5 × 25

=> 15625 = 5 × 5 × 5 × 5 × 5 × 5

=> 15625 = 5^6

=> √15625 = √(5^6) = 5^((6/2)) = 5^3

=> 5 × 5 × 5 = 125

Therefore The correct answer is 125.

Additional Information

Square Root of Numbers ending in 5

If a number ends in 25, its square root ends in 5. The remaining part of the number is always a product of two consecutive integers n × (n + 1).

Long Division Method

This method is used for finding square roots of large numbers by grouping digits in pairs from the right and dividing systematically.

Perfect Square Property

A perfect square never ends with the digits 2, 3, 7, or 8 at the unit place.

Q24. Answer: (d) 12288

We have,

=> 32 × 2 = 64

=> 64 × 4 = 256

=> 256 × 6 = 1536

=> 1536 × 8 = ?

=> ? × 10 = 122880

=> 12880 × 12 = 1474560

Therefore ? = 1536 × 8 = 12288

Q25. Answer: (b) 2√3

Shortcut Trick

If tanα = 2 + √3, then its reciprocal cotα = 1 / (2 + √3).

Rationalizing cotα gives 2 − √3 because $2^2 - (\sqrt{3})^2 = 1$.

tanα − cotα = (2 + √3) − (2 − √3) = 2 + √3 − 2 + √3 = 2√3.

Therefore The correct answer is 2√3.

Alternate Method

Given: tanα = √3 + 2 (or 2 + √3)

Formula Used: cotα = 1 / tanα

=> cotα = 1 / (2 + √3)

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

=> cotα = (2 − √3) / (2^2 − (√3)²)

=> cotα = (2 − √3) / (4 − 3) = 2 − √3

=> tanα − cotα = (2 + √3) − (2 − √3)

=> tanα − cotα = 2 + √3 − 2 + √3 = 2√3

Therefore The correct answer is 2√3.

Additional Information

Reciprocal Identities

The cotangent of an angle is the reciprocal of its tangent: cotθ = 1 / tanθ.

Rationalization Rule

For a denominator of the form (a + √b), multiply both numerator and denominator by the conjugate (a − √b) to remove the radical.

Specific Angle Value

Note that tan 75° = 2 + √3 and tan 15° = 2 − √3. Thus, α in this problem is 75°.

Q26. Answer: (d) 74°

Shortcut Trick

In ΔXYM, exterior angle XMZ = angle XYZ + angle YXM.

32° = 16° + angle YXM => angle YXM = 16°.
Since angle XYZ = angle YXM = 16°, ΔXYM is isosceles with XM = YM.
Given M is the midpoint of YZ, so YM = MZ. Therefore XM = MZ.
In ΔXMZ, XM = MZ makes it isosceles, so angle MXZ = angle MZX.
angle XZY = (180° − 32°) ÷ 2 = 148° ÷ 2 = 74°.
Therefore The correct answer is 74°.
Alternate Method
Given: M is the midpoint of YZ, angle XMZ = 32°, and angle XYZ = 16°.
Formula Used: Exterior Angle Theorem and Isosceles Triangle Properties.
=> In ΔXYM, angle XMZ is the exterior angle at vertex M.
=> angle XMZ = angle XYM + angle YXM
=> 32° = 16° + angle YXM
=> angle YXM = 32° − 16° = 16°
=> Since angle XYM = angle YXM = 16°, ΔXYM is an isosceles triangle.
=> XM = YM
=> Given M is the midpoint of YZ, so YM = MZ.
=> From the above, XM = MZ.
=> In ΔXMZ, since XM = MZ, it is an isosceles triangle.
=> angle MXZ = angle MZX (Angles opposite to equal sides are equal)
=> In ΔXMZ, angle XMZ + angle MXZ + angle MZX = 180°
=> 32° + 2 × angle XZY = 180°
=> 2 × angle XZY = 180° − 32° = 148°
=> angle XZY = 148° ÷ 2 = 74°
Therefore The correct answer is 74°.
Additional Information
Exterior Angle Theorem
The measure of an exterior angle of a triangle is equal to the sum of the measures of its two remote interior angles.
Isosceles Triangle Property
In a triangle, if two sides are equal, then the angles opposite to those sides are also equal, and vice versa.
Angle Sum Property
The sum of all interior angles of any triangle is always 180°.

Q27. Answer: (c) Carbonic acid

- Soft drinks contain Carbonic acid (H_2CO_3).
- Carbonic Acid is formed when water is mixed with carbon dioxide.
- This reaction is given as $CO_2 + H_2O \rightarrow H_2CO_3$.

Acid	Found in
Oxalic Acid	Spinach, Tomato etc.
Tartaric Acid	Tamarind, Grapes and Unripe Mangoes etc.
Citric Acid	Oranges, lemons etc.

Q28. Answer: (d) 5 years

Shortcut Trick
Total Simple Interest = 1300 − 1000 = Rs. 300.
Interest for 1 year = 6% of 1000 = Rs. 60.
Value of X = Total Interest ÷ Interest per year.
X = 300 ÷ 60 = 5 years.
Therefore The correct answer is 5 years.
Alternate Method
Given:

Principal (P) = Rs. 1000

Amount (A) = Rs. 1300

Rate (R) = 6% per annum

Time (T) = X years

Formula Used:

Simple Interest (SI) = Amount − Principal

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

Calculations:

=> Simple Interest (SI) = 1300 − 1000 = Rs. 300

=> 300 = (1000 × 6 × X) ÷ 100

=> 300 = 10 × 6 × X

=> 300 = 60X

=> X = 300 ÷ 60

=> X = 5

Therefore The correct answer is 5 years.

Additional Information

Simple Interest Concept

Simple interest is calculated only on the principal amount of a loan or deposit. Formula: SI = (P × R × T) ÷ 100.

Total Amount Formula

The total amount (A) at the end of the period is the sum of the principal and the interest: A = P + SI = P(1 + RT/100).

Rate and Time relationship

If the principal doubles itself, the product of Rate (R) and Time (T) is always 100 (i.e., R × T = 100).

Q29. Answer: (d) Rajasthan

• Thorn Forests are found in Rajasthan.

• This type of vegetation is found in dry areas.

• Leaves are in the form of spines to reduce the water loss.

• These types of forest are found in Rajasthan, Punjab, Haryana, Eastern Slopes of the Western Ghats and Gujarat.

• Some of the important trees found in these of forests are Cactus, khair, babool, keekar etc.

Q30. Answer: (c) Refraction

CONCEPT:

• Refraction: The bending of a ray of light when it goes from one medium to another is called refraction of light.

• Refraction occurs when waves or rays of the light bend towards or away from the normal when they travel from one medium to another of a different density.

• When a light ray travels from a lighter to a denser medium, the light ray bends towards the normal.

• When a light ray travels from a denser to a lighter medium the light ray bend away from the normal.

EXPLANATION:

1. Reflection: The phenomena in which light ray is sent back into the same medium from which it is coming, on interaction with boundary, is called reflection.

2. Dispersion of light: The splitting of white light, when it passes through glass prism into its constituent spectrum is known as the dispersion of light.

3. Refraction: The bending of light rays in the denser medium is termed as Refraction. So option 3 is correct.

4. Deflection: There is no such phenomenon as a deflection of light.

Q31. Answer: (d) 67.5 kg

Shortcut Trick

Quantity sold = 4.5% of 1500 kg

=> 4.5 × 15 = 67.5 kg (since 1% of 1500 is 15)

Therefore The correct answer is 67.5 kg.

Alternate Method

Given:

Total quantity of toor dal = 1500 kg

Percentage sold = 4.5%

Formula Used:

Value = (Percentage ÷ 100) × Total Value

Calculations:

=> Quantity sold = (4.5 ÷ 100) × 1500

=> Quantity sold = 4.5 × 15

=> Quantity sold = 67.5 kg

Therefore The correct answer is 67.5 kg.

Additional Information

Percentage Change

Percentage change is calculated as (Change ÷ Original Value) × 100.

Successive Percentage

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

Fraction Conversion

To convert percentage to fraction, divide by 100. Example: 4.5% = 4.5/100 = 9/200.

Q32. Answer: (c) Only I is implicit

From the statement given, as the students are influenced by their faculty, we can assume that “School students consider their faculty as role models”.

But the information about the time spent by the students in the school is not provided. So, we cannot assume that “More time is spent at schools by students”.

Hence, “Only assumption I is implicit”.

Q33. Answer: (a) 7.6 ms^(-1)

Concept:

• Speed: The distance travelled by the body in unit time.

• Speed = Distance/Time

• Also, Time= Distance/Speed

• Average Speed: Since the body does not always have the same speed, So we use the concept of average speed. It is the ratio of total distance covered to total time taken by the body.

• Average Speed = (Total Distance)/(Total Time)

Calculation:

Given that,

The object travels 23 m in 3 sec.

The object again travels 15 m in 2s.

Thus total distance travelled by the object = 23 + 15 => 38m

Total time = 3 + 2 => 5s

Average speed = distance/ time

= 38/5 => 7.6 m/s

The average speed of the object is 7.6 m/s or 7.6 ms^(-1)

Q34. Answer: (c) R18I

The pattern followed here is as follows,

The number in the middle is the positional value of the letter in the 1^(st) position.

Hence, “R18I” is the correct answer.

Q35. Answer: (b) 11 days 7 hours

Shortcut Trick

Total Capacity (LCM of 69, 46) = 138 units.

Efficiency: A = +2, B = −3. Net work in 2 hours = −3 + 2 = −1 unit.

To empty 138 units: Last hour Pipe B drains 3 units. Remaining 135 units at −1 unit/2h.

Time = (135 × 2) + 1 = 271 hours.

271 hours = 11 days (264h) + 7 hours.

Therefore The correct answer is 11 days 7 hr.

Alternate Method

Pipe	Time (hr)	Total Work (LCM)	Efficiency
Pipe A (Inlet)	69	138 units	+2
Pipe B (Outlet)	46	−3	

=> Cycle: 1st hour B (−3), 2nd hour A (+2). Net efficiency in 2 hours = −1 unit.

=> Target work before the final stroke = Total Capacity − efficiency of B = 138 − 3 = 135 units.

=> Time to empty 135 units = 135 cycles × 2 hours/cycle = 270 hours.

=> Remaining work = 138 − 135 = 3 units. This is completed by Pipe B in the next 1 hour.

=> Total time = 270 + 1 = 271 hours.

=> Convert to days: 271 ÷ 24 = 11 days and 7 hours.

Therefore The correct answer is 11 days 7 hr.

Additional Information

Alternate Pipe Logic

When pipes operate alternately, always subtract the positive/negative work of the first pipe from total capacity to find the point where the cycle stops repeating.

Pipes & Cisterns Efficiency

Inlet pipes have positive efficiency (+) and outlet/drain pipes have negative efficiency (−). Total work = Time × Efficiency.

Q36. Answer: (a) 5.33 N

CONCEPT:

• Equation of motion: The mathematical equations used to find the final velocity, displacements, time, etc of a moving object without considering force acting on it are called equations of motion.

• These equations are only valid when the acceleration of the body is constant and they move on a straight line.

There are three equations of motion:

$V = u + at$

$V2 = u2 + 2 a S$

$S = ut + 1/2at^2$

Force: It is a kind of push or pulls applied to an object which causes it to accelerate at a certain rate

i.e., Force produces acceleration in a body.

Therefore $F = m \times a$

Where,

V = final velocity,

u = initial velocity,

s = distance travelled by the body under motion,

a = acceleration of body under motion,

t = time taken by the body under motion.

Calculation:

Given that,

Mass of the object = 8kg.

Time in which force acting on the body (t) = 3s

initial Velocity of the object (u) = 4m/s

Final Velocity of the object (v) = 6m/s

Force applied on the object = F

Acceleration of the object v = u +at.

6 = (4) +(a) (3).

= 2/3.

Now from newton second law, we get F = ma

F = (8) (2/3) => 5.33

The magnitude of the applied force is 5.33N.

Q37. Answer: (a) T20

The pattern followed here is as follows,

The number is the positional value of the letter.

Hence, “T20” is the correct answer.

Q38. Answer: (a) 20 J

CONCEPT:

• Kinetic energy (KE): The energy possessed by a body due to the virtue of its motion is termed as kinetic energy.

i.e., KE = 1/2mv²

Where

m = mass of the body

v = velocity of the body

KE = kinetic energy of the body

Calculation:

Given that,

Mass of the object (m) = 10kg

Speed of the object (v) = 2 m/s.

Kinetic Energy (K.E) = ½ mv².

= ½ (10)(2)² => 20 joules.

The kinetic energy of the object is 20 J.

Q39. Answer: (c) 18

Shortcut Trick

If a2 + 1/a2 = k, then a + 1/a = √(k + 2) = p.

Given k = 7, we get p = √(7 + 2) = 3.

The value of a3 + 1/a3 = p3 − 3p.

Substituting p = 3: 33 − 3(3) = 27 − 9 = 18.

Therefore The correct answer is 18.

Alternate Method

Given:

a2 + 1/a2 = 7, where a is positive.

Formula Used:

1. (a + 1/a)2 = a2 + 1/a2 + 2

2. a3 + 1/a3 = (a + 1/a)3 − 3(a + 1/a)

Calculations:

=> (a + 1/a)2 = (a2 + 1/a2) + 2

=> (a + 1/a)2 = 7 + 2 = 9

=> a + 1/a = √9 = 3 (taking positive root as a > 0)

=> a3 + 1/a3 = (a + 1/a)3 − 3 × (a + 1/a)

=> a3 + 1/a3 = 33 − 3 × 3

=> a3 + 1/a3 = 27 − 9 = 18

Therefore The correct answer is 18.

Additional Information

Algebraic Reciprocal Identities

If x + 1/x = k, then x2 + 1/x2 = k2 − 2 and x3 + 1/x3 = k3 − 3k.

Negative Reciprocal Identities

If x − 1/x = k, then x2 + 1/x2 = k2 + 2 and x3 − 1/x3 = k3 + 3k.

Higher Powers

x4 + 1/x4 can be found by squaring the identity for x2 + 1/x2 and subtracting 2.

Q40. Answer: (d) Li

• Lithium (Li) element has the largest atom.

• Largest atom is defined by its atomic radius i.e. the distance between nucleus to its outermost orbit/ valency shell.

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• As we move from left to right in the periodic table the atomic radius decreases.
• But as we go down the period in the periodic table the atomic radius increases.
• Hence lithium has the largest atom and it is greater than Hydrogen (H), Oxygen (O) and Fluorine(F).

Q41. Answer: (d) 3

• West Bengal shares boundaries with 3 countries.
• West Bengal shares its boundaries with Nepal, Bhutan, and Bangladesh.
• West Bengal, Mizoram, Assam, Tripura, and Meghalaya are the Indian states that share their borders with Bangladesh.
• Bangladesh is the country that India has the largest border with.

Q42. Answer: (c) A

The pattern followed here is every term is having only “two vowels” except option A.

In option A “AEIE” all four are vowels.

Hence, “option A” is odd one

Q43. Answer: (d) 500 J

Concept:

The work done by a force is defined as: The product of the component of the applied force on the block in the direction of the displacement and the magnitude of this displacement is called work done.

When a force is applied on an object which causes displacement along the direction of force then the work is said to be done by that force.

i.e., W = vec F.dvec x = Fdxcos θ

Here both force and displacement will be along the same direction since force is causing this displacement thus Work done is a scalar quantity.

Calculation:

Given that,

• Force acting on the trolley (F) = 50 N
• Distance travelled by trolled (s) = 10 m
• Total work is done W = F x s

= 50 x 10 => 500 J

• The total work done is 500 joules.

Q44. Answer: (d) 0.875

Shortcut Trick

Total work = LCM of (1.5, 2.625) = LCM (12/8, 21/8) = 84/8 = 10.5 units.

Efficiency of (A+B) = 10.5 ÷ 1.5 = 7; Efficiency of A = 10.5 ÷ 2.625 = 4.

Efficiency of B = 7 − 4 = 3 units/day.

B worked for all 2 days, work done by B = 3 × 2 = 6 units.

Remaining work done by A = 10.5 − 6 = 4.5 units. Time A worked = 4.5 ÷ 4 = 1.125 days.

A left before completion = 2 − 1.125 = 0.875 days.

Therefore The correct answer is 0.875 days.

Alternate Method

Person	Days	Total Work	Efficiency
A + B	1.5	10.5	7
A	2.625	4	

Given: A and B together take 1.5 days. A alone takes 2.625 days. Total completion time = 2 days.

Formula: Total Work = Efficiency × Time; Efficiency of B = (A+B)_(eff) − A_(eff)

=> Efficiency of B = 7 − 4 = 3 units/day.

=> Since B worked for the entire duration of 2 days, Work by B = 3 × 2 = 6 units.

=> Work done by A = Total Work − Work by B = 10.5 − 6 = 4.5 units.

=> Time for which A worked = 4.5 ÷ 4 = 1.125 days.

=> Number of days before completion A left = Total time − A's working time = 2 − 1.125 = 0.875 days.

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Therefore The correct answer is 0.875 days.

Additional Information

Efficiency and Time Relation

Efficiency is inversely proportional to the time taken to complete a task. Efficiency = Work ÷ Time.

Leaving Before Completion

When a person leaves 'x' days before completion, calculate the work done by the remaining person(s) for the full duration to find the leaver's contribution.

LCM of Fractions

To find the LCM of fractions, use the formula: LCM of Numerators ÷ HCF of Denominators.

Q45. Answer: (d) Adipose

- A Adipose tissue is formed beneath the skin and between internal organs.
- Adipose tissue is a type of loose connective tissue that stores fat to provide insulation to the body and protect major organs.
- It is the cells of the adipose tissue, called adipocytes which store fat in the form of triglycerides.

Epithelial Tissue	**• The tissue found at the outer layer of skin is epithelial tissue. - Epithelial tissue covers the external surface as well as the internal lining of the organs.**
Nervous Tissue	• Cells of this tissue are called neurons. - The brain, Spinal Cord and nerves are made up of this tissue.
Muscular Tissue	• Muscular tissue consists of elongated cells, also called muscle fibres. - This tissue is responsible for movement in our body.

Q46. Answer: (a) 2652181

The pattern followed here is as follows,

The letters are assigned with their positional values.

Hence, “2652181” is the correct answer.

Q47. Answer: (b) Salman Khan

- Salman Khan hosted the Hindi version of “Bigg Boss-11”.
- Salman Khan hosted the show for the eighth time in a row.
- This season is televised on Colors TV.

Q48. Answer: (d) Electronegativity

- Electronegativity is the property of attracting electrons by the halogen atoms in a molecule.
- Electronegativity is a measure of the tendency of an atom to attract a bonding pair of electrons.
- Fluorine (F) with atomic number 9 is the most electronegative element.

Electron affinity	**It is defined as a change in the energy of a neutral atom when an electron is added to it.**
Electrochemistry	It defined as the study of a chemical reaction when electricity is passed through them.
Electropositivity	It is defined as a tendency of an atom to donate an electron.

Q49. Answer: (b) Mumbai

- Board of Control for Cricket in India (BCCI):
- It is the national governing body for cricket in India.
- It is not a government body.
- The board was formed in December 1928.
- Its headquarter is in Mumbai.
- The current President of BCCI is Mitun Manhas
- BCCI does not depend on the Government of India for its finances.
- BCCI formed in December 1928 as a society, registered under the Tamil Nadu Societies Registration Act.
- The BCCI is India's richest sporting body and the richest cricket board in the world.

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Q50. Answer: (a) Kr

• Krypton (Kr) is placed in period 4 in the Atomic Table.

• Inert gases belong to Group 18 of the Periodic Table.

• The Inert gases are Helium (He), Neon (Ne), Argon (Ar), Krypton (Kr), Xenon (Xe), Radon (Rn) and Ununoctium (Uuo) / Oganesson (Og).

Q51. Answer: (b) 4995195

The pattern followed here is as follows,

The letters are assigned with the unit digit of their positional values.

Hence, “4995195” is the correct answer.

Q52. Answer: (a) 4

Shortcut Trick

Average Speed of the whole journey = 84 ÷ 8 = 10.5 km/hr.

Apply Alligation between foot speed (8) and cycle speed (13) with mean speed (10.5).

Ratio of Time = (13 − 10.5) : (10.5 − 8) = 2.5 : 2.5 = 1 : 1.

Total time 8 hours divided in 1 : 1 ratio → 4 hours each.

Therefore The correct answer is 4 hours.

Alternate Method

Given: Foot speed = 8 km/hr, Cycle speed = 13 km/hr, Total Distance = 84 km, Total Time = 8 hours.

Formula Used: Distance = Speed × Time

=> Let the time spent on the cycle be 't' hours.

=> Then, the time spent on foot is (8 − t) hours.

=> Total Distance = (Speed_(foot) × Time_(foot)) + (Speed_(cycle) × Time_(cycle))

=> 84 = 8 × (8 − t) + 13 × t

=> 84 = 64 − 8t + 13t

=> 84 − 64 = 5t

=> 20 = 5t

=> t = 4 hours.

Therefore The correct answer is 4 hours.

Additional Information

Alligation in Speed & Distance

When alligation is applied to speeds, the resulting ratio is always the ratio of time taken for each part of the journey.

Average Speed Formula

Average Speed = Total Distance ÷ Total Time. This value serves as the mean in mixture/alligation problems involving speed.

Relative Speed

In opposite directions, add speeds (S1 + S2); in the same direction, subtract speeds (|S1 − S2|).

Q53. Answer: (b) Aunt

We can draw family tree diagram from the given information, as follows,

Clearly, Amit and Venu are cousins. Therefore, Amit’s mother will be “aunt” of Venu.

Hence, “Aunt” is the correct answer.

Q54. Answer: (d) Linnaeus

• Carolus Linnaeus formulated the scientific system for naming the species and hence was called the Father of Taxonomy.

• He published this theory in his book called “Systema Naturae”.

• The basis of this classification is to operate the organisms based on their characteristics to separate the larger groups to smaller units i.e. species.

• The hierarchy of animal classification is Phylum (called Division in plants), Class, Order, Family, Genus, Species.

• Charles Darwin is known as the Father of Evolution.

Q55. Answer: (c) 2024

Number of odd days from 5th January 2018 till 5th January 2019 = 1

Number of odd days from 5th January 2019 till 5th January 2020= 1

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Number of odd days from 5th January 2020 till 5th January 2021= 2
Number of odd days from 5th January 2021 till 5th January 2022= 1
Number of odd days from 5th January 2022 till 5th January 2023= 1
Number of odd days from 5th January 2023 till 5th January 2024= 1
Total odd days = 1 + 1 + 2 + 1 + 1 + 1 = 7 = 0 odd days
5th January 2024 is Friday.
Hence, “2024” is the correct answer.

Q56. Answer: (b) Rs. 15.28 lakh crore

The correct answer is Rs. 15.28 lakh crore.
Key Points
• As per RBI Annual Report 2016-17, An estimated of demonetised Rs. 15.28 lakh crore banknotes are received.
• On November 8, 2016 PM Modi announced demonetisation.
• Due to this the 500- and 1000-rupees banknotes ceased to be legal tender in India from Midnight of November 8.
• Demonetization was done to stop corruption and choke illegal transactions, stop terror funding etc.

Q57. Answer: (c) Manushi Chillar

• Manushi Chillar was crowned as the Miss World 2017 title.
• She was the sixth Indian to win the Miss World title with first being Reita Faria in 1966.
• Vanessa Ponce of Mexico won the Miss World 2018 title.

Q58. Answer: (c) 14

Shortcut Trick
Arrange data in ascending order: 3, 3, 4, 4, 4, 5, 6, 7, 8, 11.
Mode (most frequent value) = 4.
Median (average of 5^(th) and 6^(th) terms) = (4 + 5) ÷ 2 = 4.5.
Mean (Sum 55 ÷ Total 10) = 5.5.
Sum = 4 + 4.5 + 5.5 = 14.
Therefore The correct answer is 14.
Alternate Method
Given: Data set = 6, 3, 8, 4, 3, 11, 7, 4, 5, 4.
Formula Used:
Mean = (Σx) ÷ n
Median = [(n/2)^(th) term + (n/2 + 1)^(th) term] ÷ 2 (for even n)
Mode = Value with the highest frequency.
=> Arrange data in ascending order: 3, 3, 4, 4, 4, 5, 6, 7, 8, 11.
=> Number of observations (n) = 10.
=> Mode = 4 (appears 3 times).
=> Median = (5^(th) term + 6^(th) term) ÷ 2 = (4 + 5) ÷ 2 = 4.5.
=> Mean = (3+3+4+4+4+5+6+7+8+11) ÷ 10 = 55 ÷ 10 = 5.5.
=> Sum = Mode + Median + Mean = 4 + 4.5 + 5.5 = 14.
&there4$ The correct answer is 14.
Additional Information
Empirical Relationship
For a moderately skewed distribution, the relationship is: Mode = 3 × Median − 2 × Mean.
Mean, Median, and Mode
Mean is the arithmetic average, Median is the positional middle value, and Mode is the most frequent observation.
Symmetric Distribution
In a perfectly symmetric distribution (like the Normal Distribution), Mean = Median = Mode.
3

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Q59. Answer: (c) 88

Shortcut Trick

Age difference between Arya and Vishal is always 20 years.

12 years hence, Age ratio (Arya : Vishal) = 1.25 : 1 = 5 : 4.

Ratio difference = 5 − 4 = 1 unit → 20 years.

Arya's age 12 years hence = 5 units = 5 × 20 = 100 years.

Arya's present age = 100 − 12 = 88 years.

Therefore The correct answer is 88 years.

Alternate Method

Given: Difference in ages = 20 years; Ratio after 12 years = 1.25.

Let Vishal's present age be V and Arya's present age be A.

=> A − V = 20

=> V = A − 20

According to the condition 12 years hence:

=> (A + 12) = 1.25 × (V + 12)

=> (A + 12) = 1.25 × (A − 20 + 12)

=> A + 12 = 1.25 × (A − 8)

=> A + 12 = 1.25A − 10

=> 0.25A = 22

=> A = 22 ÷ 0.25 = 88

Therefore The correct answer is 88 years.

Additional Information

Constant Age Difference

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

Ratio Method in Ages

If the ratio of ages at two different times is known, use the constant difference to find the value of 1 unit of the ratio.

Q60. Answer: (a) Both the conclusions follow

From the statement give we can find that, Nita is mesmerized by looking at Limay’s new watch, from the words “Oh, that’s so awesome”. So, we can conclude that “Limay’s watch is attractive”.

And, Nita Asked Limay that, “Where did you buy it from?”. So, we can conclude that, “Nita wants to know where to buy a similar watch from”.

Hence, “both the conclusions follow:”.

Q61. Answer: (c) 1538

• In the year 1538 Sher Khan (Sher Shah) attacked Bengal and defeated Ghiyashuddin Shah.

• Sher Shah is the founder of the Sur Empire and his original name was Farid.

• He founded the Sur Empire in the year 1540 by defeating Humayun in the Battle of Chausa.

• He ruled from 1540-1545 and after his death Sur Dynasty existed for another 10 years and then India was finally reconquered by Humayun in the year 1555.

• The Tomb of Sher Shah Suri is in the town of Sasaram in Bihar state.

Q62. Answer: (b) Rs. 11,550

Shortcut Trick

Let the Cost Price (CP) be 100%.

First Selling Price (SP1) = 100% − 34% = 66%.

Given, 66% = Rs. 7,260.

Target Selling Price (SP2) = 100% + 5% = 105%.

Required SP = (7,260 ÷ 66) × 105 = 110 × 105 = Rs. 11,550.

Therefore The correct answer is Rs. 11,550.

Alternate Method

Given → SP1 = Rs. 7,260 | Loss = 34% | Desired Profit = 5%

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

=> First, calculate CP: CP = 7,260 × 100 ÷ (100 − 34) = 7,260 × 100 ÷ 66.

=> CP = 110 × 100 = Rs. 11,000.

=> Now, calculate required SP for 5% profit: SP = 11,000 × (100 + 5) ÷ 100.

=> SP = 11,000 × 105 ÷ 100 = 110 × 105.

=> SP = Rs. 11,550.

Therefore The correct answer is Rs. 11,550.

Additional Information

Cost Price and Selling Price

The price at which an article is purchased is called its Cost Price (CP), and the price at which it is sold is called its Selling Price (SP).

Profit and Loss Percent

Profit and Loss percentages are always calculated on the Cost Price unless otherwise specified in the problem.

Q63. Answer: (b) Statements 1 and 2 together are sufficient

We can check the statement one by one.

Statement 1 : Next to L are P and M

Here, information about O and N is not given. Thus, statement 1 alone is not sufficient.

Statement 2 : O is standing to the right of P

Here, information about L, M and N is not given. Thus, statement 2 alone is not sufficient.

Statement 3 : O is standing to the left of N

Here, information about L, M and P is not given. Thus, statement 3 alone is not sufficient.

On combining statement 1 and 2

Note: Here by combining the statements as given we cannot deduce the required answer. But by considering options given we are assuming ‘right’ as ‘immediate right’ and can deduce the answer.

Hence, “Statements 1 and 2 together are sufficient”.

Q64. Answer: (a) 125114

The pattern followed here is as follows,

The letters are assigned with their positional values.

Hence, “125114” is the correct answer.

Q65. Answer: (b) 4√1024

Shortcut Trick

Identify 1024 as a power of 2: 1024 = 2^(10).

For a root $\sqrt[n]{x}$ to be rational, the exponent of the base must be divisible by the root index n.

Check divisibility: 10/10 = 1 (Integer), 10/2 = 5 (Integer), 10/5 = 2 (Integer).

For ^4√1024, the exponent ratio is 10/4 = 2.5 (Not an integer).

Since the power is not an integer, ^4√1024 is an irrational number.

Therefore The correct answer is ^4√1024.

Alternate Method

Given: A set of numbers involving roots of 1024.

Formula Used: $\sqrt[n]{(a^m)} = a^{(m/n)}$. A number is irrational if it cannot be expressed as p/q.

Step-by-step Calculations:

=> Prime Factorization: 1024 = 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 = 2^(10)

=> Option 1: ^(10)√1024 = (2^(10))^(1/10) = 2^1 = 2 (This is a rational number)

=> Option 2: ^4√1024 = (2^(10))^(1/4) = 2^(10/4) = 2^(5/2) = 2^2 × 2^(1/2) = 4√2

=> Since √2 is irrational, the product 4√2 is also irrational.

=> Option 3: √1024 = (2^(10))^(1/2) = 2^5 = 32 (This is a rational number)

=> Option 4: ^5√1024 = (2^(10))^(1/5) = 2^2 = 4 (This is a rational number)

Therefore The correct answer is ^4√1024.

Additional Information

Rational vs Irrational Numbers

A Rational number can be written as p/q where p, q are integers and q ≠ 0. An Irrational number cannot be expressed as a fraction and has non-terminating, non-repeating decimal expansion.

Properties of Surds

If 'a' is a positive rational number and 'n' is a positive integer such that $\sqrt[n]{a}$ is not a rational number, then $\sqrt[n]{a}$ is called a surd of order n.

Perfect Powers of 2

Memorizing powers of 2 ($2^1=2$, 2^5=32, 2^(10)=1024) helps in quickly identifying perfect roots in exams.

Q66. Answer: (a) C432

The pattern followed here is as follows,

Hence, “C432” is the correct answer.

Q67. Answer: (a) Manipur

The correct answer is Manipur.

Key Points

• Irom Sharmila is known as the 'Iron Lady' of Manipur.

• She is a civil rights and political activist, and poet from Manipur.

• Irom Chanu Sharmila was an Intern at the Human Rights Alert, A Human Rights Group In Imphal.

• She helped document cases of abuse through interviews of Women who had Survived Gang Rapes, as well as of the parents and children of Slain Civilians.

• She fought for what she believed in, and her fight and forms of resistance changed after the hunger strike ended.

• Her fight began with resistance against AFSPA, but now she also fights patriarchy, structural sexism, and other forms of oppression.

• She’s fighting against systems that tried to control her and dictate her life.

• But the act of choosing what she wanted, was the first step towards liberation.

• She was famous for her hunger strike against the Armed forces Special Powers Act which she started in the year 2000 and ended her fast in 2016.

Q68. Answer: (b) Ciliary body

• The ciliary body helps the eye to adjust the focal length of the lens.

• The ciliary body is a circular structure that produces the fluid in the eye called aqueous humour.

• It also contains the ciliary muscle, which changes the shape of the lens when the eyes focus on a near object and this process is called accommodation.

Lens	**It facilitates the Image formation.**
Retina	It receives light from lens and covert light energy into Neural Signals
Eyeball	It is structure that houses all the structure that are responsible for vision in humans.

Q69. Answer: (a) [figure]

We know that “bell” are made of “brass” but we cannot find any relation between “water” and “brass or bell”. Thus, the following venn diagram represent relationship between given information.

Hence, “option figure 1” is the correct answer.

Q70. Answer: (d) K. Chandra Shekhar Rao

• K. Chandra Shekar Rao, the Chief Minister of Telangana was honoured with the global Agricultural Leadership Award 2017.

• This award is given by the Indian Council of Food and Agriculture (IFCA).

• He belongs to Telangana Rashtra Samiti (TRS) party and its election symbol is CAR.

Q71. Answer: (a) Associated Chambers of Commerce and Industry

• Associated Chambers of Commerce and Industry is the full form of ASSOCHAM.

• ASSOCHAM is headquartered in New Delhi.

• It was founded in 1920 and It is one of the apex trade associations of India.

• The organisation represents the interests of trade and commerce in India and acts as an interface between industry, government and other relevant stakeholders on policy issues and initiatives.

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Q72. Answer: (c) Anupam Kher

• Anupam Kher was the Bollywood actor that received Kala Ratan Award in March 2017.

• He resigned as the chairman of the film and television institute of India (FTII) in 2018.

• Anupam Kher was awarded the Padma Shri award in 2004 and the Padma Bhushan award in 2016

Q73. Answer: (d) Testes

• The Mature Sperm is produced in Testes.

• Along with sperm, the male sex hormone Testosterone is produced in testes.

• Testosterone is responsible for puberty in males, mass muscle growth etc.

• Testes are also called Gonads.

Scrotum	**• The scrotum helps in maintaining the low temperature of the testes up to 2–2.5 °C lower than the normal internal body temperature which is necessary for spermatogenesis (Sperm Production).**
Vas Deferens	• It is a muscular tube that transports sperm from the testes to the penis.
Prostate Gland	• It secretes fluids into the urethra during sperm ejaculation.

Q74. Answer: (d) Lower animals and plants

The correct answer is Lower animals and plants.

Key Points

• Asexual reproduction is a type of reproduction that does not involve the fusion of gametes (sexual cells) and results in offspring that are genetically identical to the parent organism.

• It is commonly observed in lower animals and plants, as they often have simple structures and mechanisms for reproduction.

• In lower animals such as hydra, sponges, and planarians, asexual reproduction occurs through methods like budding, fragmentation, and regeneration.

• In plants, asexual reproduction is widely seen in forms such as vegetative propagation (e.g., in potatoes, onions, and strawberries), spore formation (e.g., in mosses and ferns), and budding (e.g., in yeast).

• It allows for rapid population growth, particularly in favorable environmental conditions, as it does not require complex reproductive organs or processes.

• This form of reproduction is advantageous for organisms in stable environments where adaptation to change is not immediately necessary.

Additional Information

• Plants

• Plants primarily reproduce through both sexual and asexual methods, depending on the species and environmental conditions.

• Examples of asexual reproduction in plants include vegetative propagation (e.g., cuttings of rose plants) and spore formation (e.g., in mosses and ferns).

• Sexual reproduction in plants involves the formation of seeds through pollination and fertilization.

• Higher animals

• Higher animals, such as mammals, birds, and reptiles, reproduce sexually, involving the fusion of male and female gametes.

• Asexual reproduction is not observed in higher animals due to their complex biological systems and the need for genetic diversity.

• Lower animals

• Lower animals like hydra, amoeba, and starfish exhibit asexual reproduction techniques like binary fission, budding, and fragmentation.

• These methods are simple and require less energy compared to sexual reproduction.

Q75. Answer: (d) 45 km/hr

Shortcut Trick

Total Distance = 175 km, Total Time = 3.5 hours.

Distance covered = 58 × 2.5 = 145 km.

Remaining Distance = 175 − 145 = 30 km.

Remaining Time = 3.5 − 2.5 − (20/60) = 1 − 1/3 = 2/3 hours.

Required Speed = 30 ÷ (2/3) = 30 × 1.5 = 45 km/hr.

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Therefore The correct answer is 45 km/hr.
Alternate Method
Given:
Total Distance = 175 km
Total Time allotted = 3.5 hours
Calculations:
=> Distance covered in first stretch = Speed × Time = 58 × 2.5 = 145 km
=> Remaining Distance = 175 − 145 = 30 km
=> Time spent traveling and resting = 2.5 hours + 20 minutes
=> 20 minutes in hours = 20 ÷ 60 = 1/3 hours
=> Total Time used = 2.5 + 1/3 = 5/2 + 1/3 = (15 + 2) ÷ 6 = 17/6 hours
=> Time left for the last stretch = 3.5 − 17/6 = 7/2 − 17/6 = (21 − 17) ÷ 6 = 4/6 = 2/3 hours
=> Required Speed = Remaining Distance ÷ Time left
=> Required Speed = 30 ÷ (2/3) = 30 × (3/2) = 45 km/hr
Therefore The correct answer is 45 km/hr.
Additional Information
Basic Speed Formula
Distance = Speed × Time. To find Speed, use Distance ÷ Time. To find Time, use Distance ÷ Speed.
Unit Conversion
To convert minutes to hours, divide the value by 60. To convert km/hr to m/s, multiply by 5/18.
Average Speed
Average Speed = Total Distance ÷ Total Time taken (including rest time if any).

Q76. Answer: (b) N Biren Singh

• N Biren Singh was sworn in as the Chief Minister of Manipur in the year 2017.
• He is a member of the Bhartiya Janata Party (BJP).
• He won the 2017 Manipur Legislative Assembly Election from Heingang Assembly Constituency.

Q77. Answer: (a) 7.6 ms^(-1)

Shortcut Trick
Average Speed = Total Distance ÷ Total Time
Total Distance = 23 + 15 = 38 m
Total Time = 3 + 2 = 5 s
Average Speed = 38 ÷ 5 = 7.6 ms^(−1)
Therefore The correct answer is 7.6 ms^(−1).
Alternate Method
Given:
Distance 1 (d1) = 23 m, Time 1 (t1) = 3 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 = 23 + 15 = 38 m
=> Total Time = t1 + t2 = 3 + 2 = 5 s
=> Average Speed = 38 / 5
=> Average Speed = 7.6 ms^(−1)
Therefore The correct answer is 7.6 ms^(−1).
Additional Information
Average Speed for Equal Distances
If an object covers two equal distances at speeds u and v, then Average Speed = 2uv / (u + v).
Uniform Motion
When an object covers equal distances in equal intervals of time, it is said to be in uniform motion; otherwise, it is non-uniform

motion.

Conversion Factor

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

Q78. Answer: (a) -6

=> (-12)[11 + {7 × (-3)}] ÷ [4 {13 - (-3) × (-6)}],

=> (-12)[11 + {-21}] ÷ [4 {13 - 18}],

=> (-12)[-10] ÷ [4 × (-5)],

=> 120 ÷ (-20),

=> -6

Q79. Answer: (d) Energy

Concept:

When a force is applied on an object which cause displacement along the direction of force then the work is said be done by that force.

The work done by a force is defined as: The product of component of the applied force on the block in the direction of the displacement and the magnitude of this displacement is called work done.

i.e., W = vec F.dvec x = Fdxcos θ

or in terms of magnitude, it can be given as

W = F × s

Also, if work is done against the gravitational force the force acting can be given as mass times gravitational force whereas instead of distance, we can express it as height

i.e., W = (mg) × h = mgh

this expression is similar to potential energy for a system

Here both force and displacement will be along the same direction since force is causing this displacement thus Work done is a scalar quantity.

Here,

Force applied on object = F

Displacement of object = dx

Distance travelled by an object = s

The angle between Force and displacement = θ

Explanation:

From the above explanation, we can see that potential energy is the potential to do work and both work and potential energy has the same unit and dimension.

Also, the total amount of work done by the system will directly depend on the amount of potential energy

An object having the capability to do work is said to possess potential energy

Extra point:

The following table represents the quantity and its formula

Quantity	Formula	Definition
Inertia	•	a tendency to do nothing or to remain unchanged.
Force	F = mass x acceleration	A push or pull applied on an object of some mass which causes it to accelerate at the rate a
Energy	P.E = mgh, K.E = $mv^2/2$	Energy is a conserved quantity which has a different form, but it is classified based on potential and kinetic energy
Pressure	P = F/A	It is defined as the force applied per unit area

Q80. Answer: (b) 23

We can count triangles as given below,

Hence, there are “23” triangles in the given figure.

Q81. Answer: (a) Copper

- Copper is displaced when zinc is added to the solution of copper sulphate.
- Zinc is more reactive than copper hence copper is displaced by Zinc.
- This reaction is given by Zn + CuSO4 → ZnSO4 + Cu
- This reaction is an example of a displacement reaction.
- A chemical reaction in which a less reactive element is displaced from its compound by a more reactive element is known as a displacement reaction.

Q82. Answer: (b) Nanometres

- Atomic Radius is measured in Nanometres (10^(-9)m).
- Atomic Radius is defined as the shortest distance from Nucleus to its Outermost Orbit.
- It can also be measured in Angstroms (A^0).
- The Atomic radius decreases from left to right and increases from top to bottom in a period in a periodic Table.
- Atomic radii can be measured by X-ray or any other spectroscopic methods.

Q83. Answer: (a) Calcium oxide

- Calcium oxide (CaO) compound is used as a drying agent.
- Drying agent is used to remove water form an organic compound.
- Calcium oxide is used to dry ammonia gas.
- When Limestone (CaCO3) is heated, it gives Calcium oxide.

CaCO3→ CaO + Co2

- It also known as quick lime.
- It used for manufacturing of cement, paper, Caustic Soda etc.

Compound	Chemical Formula
Calcium Carbide	CaC2
Calcium Carbonate	CaCO3
Gypsum	CaSO4.2H2O

Q84. Answer: (d) C

The pattern followed here is as follows,

Similarly,

Hence, “option figure C” is the correct answer.

Q85. Answer: (b) Only I is implicit.

The assumption I is talking about the fact that “there are friendly bacteria in the gut”. Therefore, assumption I implicit. But we cannot assume that “gut health is foremost for overall health” because only gut health is not responsible for overall health and their no information provided in the statement about “gut health”.

Hence, “Only assumption I is implicit”.

Q86. Answer: (a) 1568 J

- Mass of the body (m) = 20 kg.
- Height above the ground = 8 m
- The gravity of the earth is taken as 9.8 m/s².
- Potential energy is given by P.E = m g h
- Now by substituting the above values, we get

= (20) (8) (9.8)

= 1568 J

- The potential energy is given by 1568 Joules.

Q87. Answer: (d) 3.6 × 10^6

- 1 Kilo Watt Hour = 3.6 x 10^6 Joules.
- 1 Joule is equal to 1 watt-second.
- Hence 1 kWh is equal to 1 x 1000 x 60 x 60 => 3600000 J

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• It can also be written as 3.6 x 10^6 Joules.
• Hence 1kWH is equal to 3.6 x 10^6 Joules.

Q88. Answer: (a) B

In the question figure, three holes are punched in a pentagon-shaped plate.
The option figure consisting of three holes in a pentagon plate with an orientation resembling the question figure is option figure B.
Hence, option figure B is the correct answer.

Q89. Answer: (b) There is no difference in the average price.

Shortcut Trick
Total price for Year 1 = 40 + 40 + 40 = 120.
Total price for Year 2 = 35 + 50 + 35 = 120.
Since the total sum and number of months (3) are identical for both years, the averages must be the same.
Difference in average = 40 − 40 = 0.
Therefore The correct answer is There is no difference in the average price.
Alternate Method
Given:
Prices in Year 1: Jan = 40, Feb = 40, Mar = 40
Prices in Year 2: Jan = 35, Feb = 50, Mar = 35
Formula Used:
Average = (Sum of all observations) ÷ (Total number of observations)
Calculations:
=> Total price in Year 1 = 40 + 40 + 40 = 120
=> Average price in Year 1 = 120 ÷ 3 = 40 Rs./kg
=> Total price in Year 2 = 35 + 50 + 35 = 120
=> Average price in Year 2 = 120 ÷ 3 = 40 Rs./kg
=> Difference = Average (Year 1) − Average (Year 2)
=> Difference = 40 − 40 = 0 Rs./kg
Therefore The correct answer is There is no difference in the average price.
Additional Information
Arithmetic Mean
The arithmetic mean is the sum of all numerical values in a data set divided by the count of those values. Formula: A = Σx ÷ n.
Average Difference
The difference of averages is equal to the average of the differences: Avg(A) − Avg(B) = Avg(A − B).
Weighted Average
If the quantities (weights) of items change, use the formula: (w1x1 + w2x2) ÷ (w1 + w2).

Q90. Answer: (d) B

the lateral mirror image of 'TEETH' as shown in the following figure,
Hence, "option figure B" is the correct answer.

Q91. Answer: (a) 44

We can count triangles as given below,
Hence, there are "44" triangles in the given figure.

Q92. Answer: (c) B

On folding the given transparent sheet, the following figure will be seen,
Hence, "option figure B" is the correct answer.

Q93. Answer: (a) 2

We know that 2016 is a leap year,
Therefore, number of days in a leap year = 366 days
Number of days in 52 weeks => 52 × 7 = 364 days
Remaining days → P

days = 366 – 364

= 2 days

Therefore, P days = 2 days.

Hence, “2” is the correct answer.

Q94. Answer: (b) 84/219

Using reduced form,

=> 32/88 = (4 × 8) / (11 × 8) = 4/11

=> 84/219 has no reduced form

=> 64/176 = (4 × 16) / (4 × 11) = 4/11

=> 20/55 = (4 × 5) / (11 × 5) = 4/11

Therefore 84/219 is not equal to 4/11

Q95. Answer: (c) D

The pattern followed here is as follows,

Similarly,

Hence, “option figure D” is the correct answer.

Q96. Answer: (a) 6

Shortcut Trick

LCM of 2, 4, and 6 = 12 hours (Interval for ringing together).

Total time = 3 days × 24 hours = 72 hours.

Number of times = Total time ÷ Interval = 72 ÷ 12 = 6 times.

Therefore The correct answer is 6.

Alternate Method

Given:

Alarm 1 sounds every 2 hours.

Alarm 2 sounds every 4 hours.

Alarm 3 sounds every 6 hours.

Total duration = 3 days.

Calculations:

=> LCM (2, 4, 6):

=> $2 = 2^1$

=> $4 = 2^2$

=> $6 = 2^1 \times 3^1$

=> LCM = $2^2 \times 3^1 = 4 \times 3 = 12$ hours.

=> Total hours in 3 days = 3 × 24 = 72 hours.

=> Number of times they ring together = 72 ÷ 12 = 6.

Therefore The correct answer is 6.

Additional Information

LCM in Time Problems

For events occurring at different intervals, the Least Common Multiple (LCM) determines the first time they coincide.

Including the Starting Ring

If the question asks how many times they ring together including the start, add 1 to the result: (Total Time ÷ LCM) + 1.

Unit Conversion

Ensure all time units (seconds, minutes, hours, days) are converted to a single common unit before calculating the LCM or division.

Q97. Answer: (c) North - West

From the given information we can draw a diagram as given below,

Clearly, Meet is facing in the North-West direction.

Hence, “North – West” is the correct answer.

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Q98. Answer: (c) Law and Telecommunications

• As of August 2018, Law and Telecommunications is the portfolio held by the Union Minister Ravi Shankar Prasad.

• But as of May 2019, The Union Minister Ravi Shankar Prasad held the post of Minister of Electronics and Information Technology, Ministry of Law and Justice.

• As of May 2019, Ministry of Telecommunications is led by Minister of State (Independent Charge) Manoj Sinha.

Q99. Answer: (b) C

In the question figure, a star is attached to a rectangle which has a triangle inscribed in it.

The option figure which consists of the same figure and orientation is option figure C.

Hence, option figure C is the correct answer.

Q100. Answer: (b) 4.5

Using BODMAS rule,

=> (-18) [36 ÷ {7 - (-2)}] ÷ [(-4){19 - (-3) × (-5)}]

=> (-18) [36 ÷ 9] ÷ [(-4){19 - 15}]

=> (-18) × 4 ÷ [(-4) × 4]

=> (-72) ÷ (-16)

=> 4.5

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