RRC Group D Previous Year Paper 46 (Held On: 7 Dec 2018 Shift 2)

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

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CBT

Q1. Select the option that is related to the third term in the same way as the second term is related to the first.

Error : Big mistake : : deny : ?

(a) Deep
(b) Den
(c) Dig
(d) Prohibition

Q2. The least common multiple of 21 and 560 is:

(a) 560
(b) 1680
(c) 1120
(d) 840

Q3. If X is the husband of Aamir's mother's sister, then how is X related to Aamir?

(a) Father
(b) Brother
(c) Uncle
(d) Nephew

Q4. Identify the odd:

(a) dyne cm^(-2)
(b) Pa
(c) N m^(-2)
(d) N

Q5. If the alphabets in the word "ASTEROID" are arranged in alphabetical order and the numerical values of each letter in alphabetical order are assigned 1, 2, 3 then the total value of the position of the consonants from the left side is:

(a) 23
(b) 25
(c) 22
(d) 24

Q6. In each of the questions below, a statement is given, followed by two arguments I and II. You have to decide which argument is 'stronger'.

Statement: Should TV plays be banned?

Argument:

I. Yes, they show a very negative view of life situations that are influencing some sects of society to imitate the same behaviour.

II. No, this is good interesting entertainment for older people.

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

Q7. Which country has won the 2018 FIFA Fair Play Trophy?
(a) France
(b) Argentina
(c) Spain
(d) Brazil

Q8. What amount of water can reach a height of 10 m by a pump of 1 kW in a minute? (Take g = 10 m/s^2)
(a) 1000 kg
(b) 100 kg
(c) 500 kg
(d) 600 kg

Q9. Who has won the Man Booker International Award for his novel "A Horse Walks Into a Bar'?
(a) Ismail Kadar
(b) David Grossman
(c) Philip Roth
(d) Jessica Cohen

Q10. How many factors of the number 4840 are there?
(a) 25
(b) 26
(c) 24
(d) 27

Q11. What will be the next term in the following series?
4D3C, 7G6F, 10J9I, _____ ?
(a) 13K12L
(b) 13L12M
(c) 13M12L
(d) 12L13N

Q12. The mean of the three numbers is 38 and the range of data is 31. The middle number is 20 less than the sum of the other two numbers. What is the largest number among these three numbers?
(a) 47
(b) 49
(c) 51
(d) 45

Q13. The fertile Gangetic plain is made up of rich _____ soil.
(a) Arid
(b) Black
(c) Alluvial
(d) Red

Q14. True is related to False, as Straight is related to:
(a) Lend
(b) Tend
(c) Curve
(d) Mend

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Q15. What is the trailing velocity?

(a) Exactly the same velocity
(b) Walking the object at a rapid pace
(c) The electrons in the conductor move at a constant average speed
(d) Uneven velocity of electrons

Q16. _____ is a public sector industry.

(a) Amul
(b) SAIL
(c) Reliance Petroleum
(d) TISCO

Q17. If a : b = 4 : 5 and a : c = 3 : 4, then find b : c.

(a) 15 : 16
(b) 3 : 5
(c) 5 : 4
(d) 13 : 14

Q18. A particle is actuated by a force of constant magnitude which is always perpendicular to the velocity of the particle, the velocity of the particle is on a flat surface. It follows that

(a) Its acceleration is constant.
(b) Its kinetic energy is constant.
(c) Its distance is constant
(d) Its velocity is constant.

Q19. Pradhan Mantri Ujjwala Yojana was launched:

(a) July 2017
(b) January 2018
(c) May 2014
(d) May 2016

Q20. The value of Avogadro constant is _____.

(a) 6.023×10^{23}
(b) 6.022×10^{21}
(c) 6.022×10^{22}
(d) 6.022 × 10^(24)

Q21. Read the given statement and conclusion carefully and choose which conclusion logically follows.

Statement:

Homegrown fruits and vegetables are better for health than consuming imported fruits and vegetables, which are maintained to show freshness using artificial conditions.

Conclusions:

I. Imported vegetables are maintained under artificial conditions.

II. Homegrown fruits and vegetables are usually fresh.

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

Q22. The LCM and HCF of two numbers are 120 and 3 respectively. One of these numbers is 24. What is the second number?

(a) 30
(b) 15
(c) 20

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(d) 60

Q23. Consider the given statement and decide which of the given assumptions is implicit in the given statement.

Statement:

Read the instructions before you start playing the game.

Assumptions:

I. The game is being organized.

II. No blind person is playing the game.

III. Players are literate.

(a) None are implicit.

(b) Only I and III are implicit.

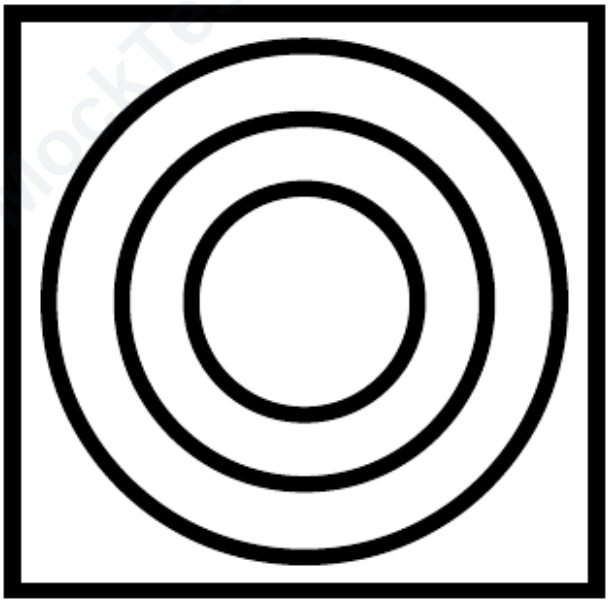
(c) Only I is implicit.

(d) All are implicit.

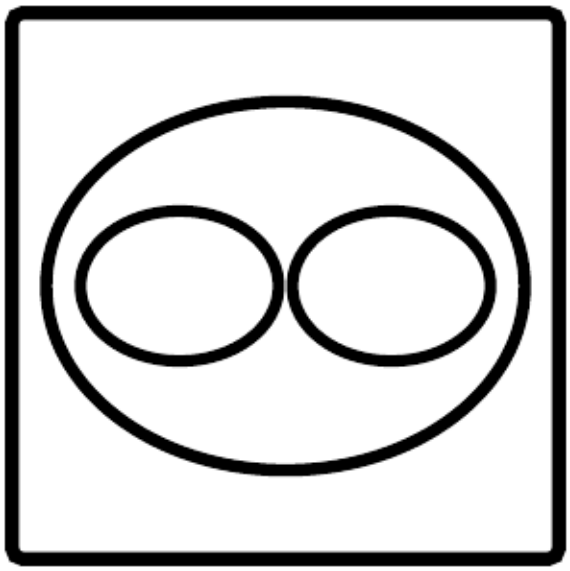
Q24. Choose the Venn diagram that shows the best of the three classes below:

State, District, City

a)

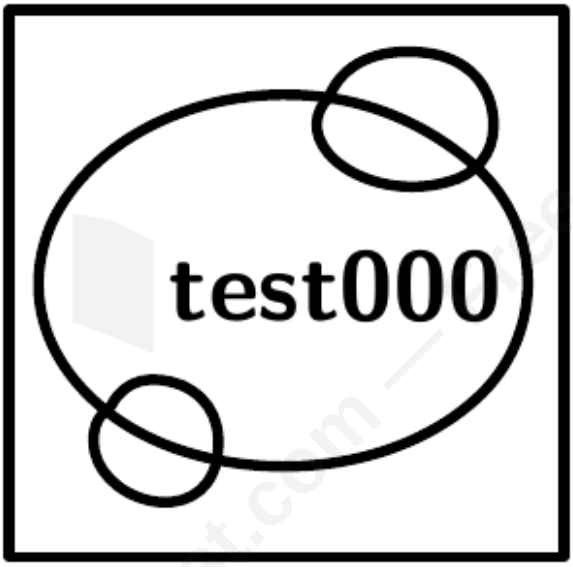


b)

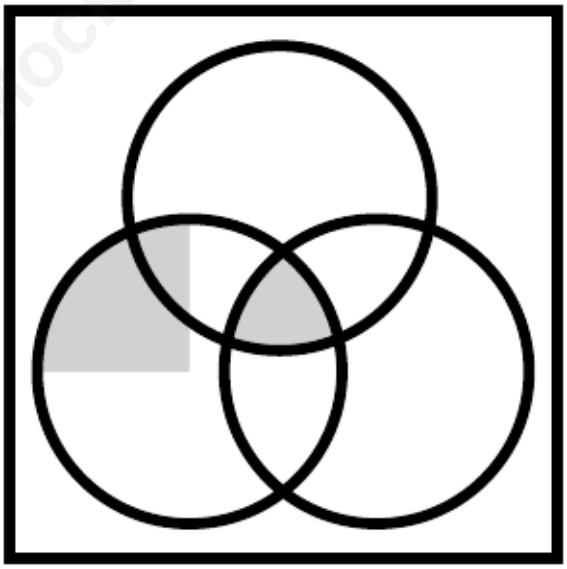


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c)



d)



(a) d
(b) c
(c) b
(d) a

Q25. A person of 80 kg mass runs with a force of 240 N. Its acceleration should be _____.

(a) 3 ms^(-2)
(b) 8 ms^(-2)
(c) 24 ms^(-2)
(d) 4 ms^(-2)

Q26. What is the total number of frequencies observed in an observation of a data called?

(a) Mean
(b) Median
(c) Range
(d) Frequency

Q27. Which city has been chosen to host the 2022 Commonwealth Games?

(a) Leeds
(b) Portsmith
(c) Liverpool
(d) Birmingham

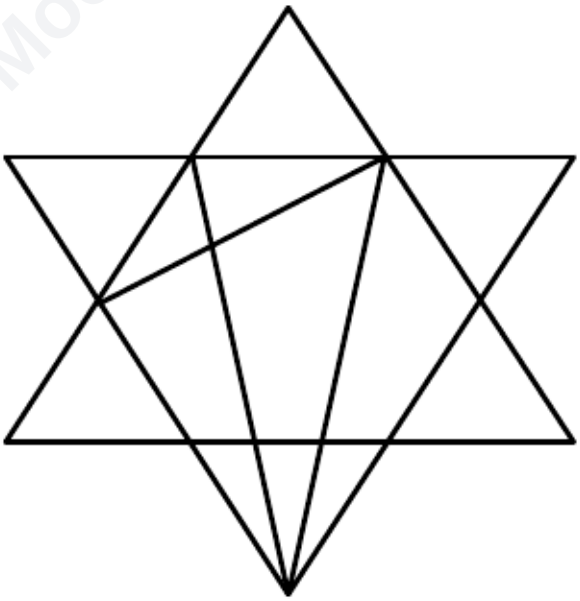
Q28. A, B, C and D are points on the circle. AC and BD intersect each other inside the circle at point E. The AB and CD lines are drawn. angle BAE = 37° and angle ACD = 83°, what is the measure of angle BEC?

(a) 120°
(b) 140°
(c) 130°
(d) 110°

Q29. Pipes A and B can fill a tank in 15 and 12 minutes respectively. Pipe C can empty the same tank at the rate of 2 liters per minute when the tank is full. If all three pipes are operating at the same time, The tank gets emptied one hour. Tank capacity is

(a) 14 liters
(b) 12 liters
(c) 18 liters
(d) 16 liters

Q30. How many triangles are present in the picture below?



(a) 19
(b) 23
(c) 21
(d) 29

Q31. (3.7 - 2.931 + 0.12) × 0.37 = ?
find the vale of '?'

(a) 0.37893
(b) 0.35893
(c) 0.33893
(d) 0.32893

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Q32. Which one of the following fundamental rights is not enshrined in the Constitution of India?

(a) Right to Property
(b) Rights against exploitation
(c) Right to Freedom
(d) Right to Equality

Q33. Which of the following metals exist in their original state?

(a) Copper
(b) Platinum
(c) Iron
(d) Potassium

Q34. The convex lens has a focal length of _____.

(a) Infinite
(b) Zero
(c) Positive
(d) Negative

Q35. Read the following information carefully and answer the questions given below it.

Sudeep is applying for residential accommodation at IOCL Panipat Company. To get residential accommodation by IOCL company, the employee has to fulfil the following criteria:

(I) He must have worked in the company for at least 10 years and in the ABC department for at least 4 years.

(II) He should have a maximum of five members in his family.

(III) Before retirement age is 58 years, there is a minimum of 5 years' term left.

(IV) He should not be the owner or co-owner of a house (if one of the spouses is the owner).

For cases in which an employee:

• Fulfills all the conditions except (I) above and has joined the company as a manager, he shall be referred to the Director.

• Fulfills all the conditions except (III) above and is working as a senior manager in the company, he will be referred to the Managing Director.

• Moved from another city. Condition (I) can be removed.

Based on the above conditions, decide whether Sudeep will be provided accommodation or the matter will be referred to a higher authority. All cases are presented on 31 July 2016.

Sudeep has been transferred from another office and on February 6, 2016, he was 53 years old. He has been working in the company for the last 20 years. Out of which he has worked for 6 years in ABC department. He has 4 members in the family and neither he nor his wife owned any house.

(a) His case will be referred to the Director.
(b) Sudeep will be provided company accommodation.
(c) His case will be referred to the Managing Director.
(d) Sudeep will not be provided company accommodation.

Q36. The outermost shell of a _____ element has two electrons.

(a) Carbon
(b) Boron
(c) Magnesium
(d) Chlorine

Q37. Consider the following question and decide which statement is sufficient to answer the question.

Following

Find the value of $p^2 - q^2$.

Statement:

1) If $p + q = 12$

2) If $pq = 4$

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(a) Only 1 is sufficient.
(b) Neither 1 nor 2 is sufficient.
(c) Only 2 is sufficient.
(d) Both 1 and 2 are sufficient.

Q38. Bats detect the obstacles along the way by getting the reflected _____.

(a) Subsonic waves
(b) Radio waves
(c) Ultrasonic waves
(d) Electric magnetic waves

Q39. If $a-1/a=7$, then $a^3 - 1/(a^3)= ?$

(a) 322
(b) 364
(c) 357
(d) 343

Q40. The question given below is followed by two statements 1 and 2. You have to decide whether this statement is definitely sufficient to answer the question. Choose the appropriate answer from the options given below.

Question:

1. $(a + b)^2 > (a - b)^2$

2. $a = b$

Question:

Determine if the product ab is positive.

(a) Only statement 1 is sufficient, while statement 2 alone is not enough.
(b) Both statements together are not sufficient.
(c) Both statements together are sufficient.
(d) Only statement 2 is sufficient, while statement 1 alone is not enough.

Q41. What will be the square root of 12996?

(a) 106
(b) 126
(c) 124
(d) 114

Q42. A bullet of 10 g mass comes out with an initial velocity of 1000 m/s and strikes the earth at a velocity of 500 m/s at the same level. What will be the work done (in water) by facing resistance to air?

(a) 500
(b) 5000
(c) 375
(d) 3750

Q43. What will come in the place of the question mark '?' in the following question?

$76 \div 19 \times 2 - 6 =$ _____ ?

(a) -4
(b) 2
(c) 2.375
(d) -1

Q44. Pradeep and Ashoka were running in exactly the opposite direction. If Pradeep was running in the north-west direction, in which direction was Ashoka running?

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

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(d) South - West

Q45. Read the statement below and decide which of the conclusions logically follows it?

Statement:

Nowadays the prices of goods are increasing.

Conclusions:

I. All things are becoming rare.

II. People cannot eat things.

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

Q46. Which of the following is not a homologous series?

(a) CH4
(b) C2H6
(c) C4H9
(d) C3H8

Q47. If '×' is supposed as '-' and '÷' is supposed as '+', find the value of ((55 × 50) ÷ 25) ÷ 125.

(a) 155
(b) 145
(c) 150
(d) 125

Q48. Who is the current head of State Bank of India?

(a) Nita Ambani
(b) Dinesh Kumar Khara
(c) Barkha Singh
(d) Arundhati Bhattacharya

Q49. _____ tissue transports food to plants.

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

Q50. A and B are friends and A is 2 years older than B. A's father D is twice as old as A and B's age is twice as old as his sister C's age. The difference between D and C's age is 40 years. Find the age of A.

(a) 25 years
(b) 15 years
(c) 40 years
(d) 26 years

Q51. The SI unit of momentum is _____.

(a) kg ms^(-2)
(b) kg ms¹
(c) kg ms²
(d) kg ms^(-1)

Q52. Four friends Bipin, Anwar, John and Dhoni are playing cards. Anwar and Bipin are partners. Dhoni is facing north. If Anwar is facing west, then who is facing south?

(a) Dhoni
(b) John
(c) Bipin

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(d) Anwar

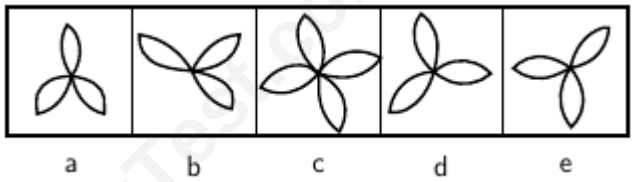
Q53. Who is the current Chief Minister of Odisha?

(a) Mamata Banerjee
(b) Naveen Patnaik
(c) Siddaramaiah
(d) Chandrababu Naidu

Q54. The first Indian Governor General of independent India was named _____.

(a) C. Rajagopalachari
(b) Annie Besant
(c) M.N. Prasad
(d) C.V. Raman

Q55. Ileana is smart enough to choose odds, who does she choose from below?



(a) c
(b) d
(c) a
(d) e

Q56. Which of the following was not awarded the Crystal Award at the World Economic Forum in Davos in January 2018?

(a) Elton John
(b) Kiran Rao
(c) Shahrukh Khan
(d) Cate Blanchett

Q57. Who said, "God save us from people who mean well."

(a) Kiran Desai
(b) R. K. Narayan
(c) Khushwant Singh
(d) Vikram Seth

Q58. Any sum invested for 3.5 years at 12% annual interest becomes Rs. 994 at maturity. What was the principal amount invested?

(a) Rs. 700
(b) Rs. 750
(c) Rs. 725
(d) Rs. 720

Q59. What is the SI unit of resistance?

(a) Ohm (Ω)
(b) Ohm meter (Ω. m)
(c) Ampere
(d) Coulomb

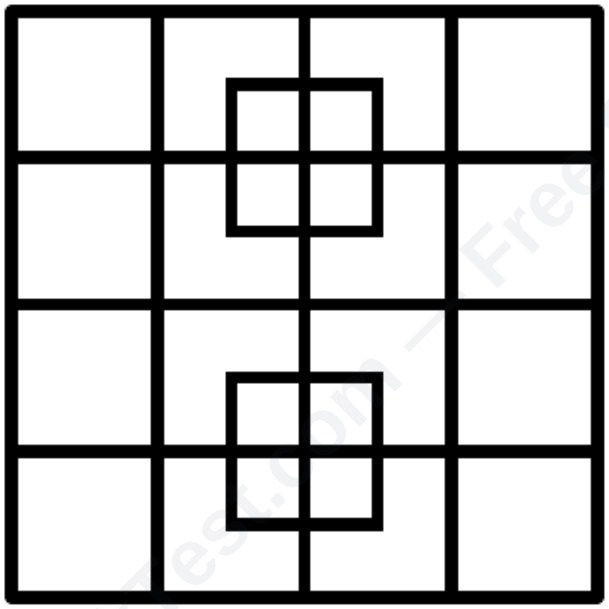
Q60. Who played the lead role in the film "Newton", which was released in the year 2017?

(a) Nawazuddin Siddiqui
(b) Akshay Kumar
(c) Irfan Khan

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(d) Raj Kumar Rao

Q61. Calculate the number of squares in the given figure:



(a) 42
(b) 44
(c) 46
(d) 40

Q62. Which one of the given statements is sufficient/necessary to answer the question?

Question:

Is this a box?

Statement:

1. It opens and closes with flaps.
2. It can be used to store various items.

(a) Only statement 1 is sufficient, while statement 2 is not enough.
(b) Either 1 or 2 is enough.
(c) Statements 1 and 2 both are sufficient.
(d) Only statement 2 is sufficient, while statement 1 is not sufficient.

Q63. Read the statement given below and consider the given facts to be true even if they appear to be different from the commonly known facts. From the two conclusions given next, decide which of them logically follows the conclusion from them?

Statement

All jaguars are cheetah.

All cheetahs are leopards.

All leopards are panthers (black leopards).

All panthers are cats.

Conclusions:

1. Some cats are cheetahs.
2. Some panthers are cheetah.

(a) Only conclusion (2) follows.
(b) Either conclusion (1) or (2) follows.
(c) Only conclusion (1) follows.
(d) Both conclusions (1) and (2) follow.

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Q64. Nonlinear muscles are _____.

(a) Non-cellular
(b) Bi-cellular
(c) Uni-cellular
(d) Multi-cellular

Q65. Manika moves around her rectangular field at a slow pace. She starts walking towards the west, then turns 45° to her right and walks 500m. Which direction is she facing now?

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

Q66. Select the correct alternative that represents the answers for statements A and B respectively.: A. What is the fixed number of water molecules present in a formula unit of salt?

B. What is the number of water molecules in $CuSO_4\ 5H_2O$?

(a) Neutralization water, four
(b) Crystallization water, five
(c) Neutralization water, five
(d) Crystallization water, two

Q67. Three of the four options below are related in a particular way. Select an option that is different or mismatched from others.

(a) Cow
(b) King
(c) Spider
(d) Web

Q68. The 158.5 m long train crosses the 761.5 m long bridge in 46 seconds. What is the speed of this train?

(a) 80 km/h
(b) 75 km/h
(c) 72 km/h
(d) 78 km/h

Q69. Consider the following question and decide which statement is sufficient to answer the question.

Question:

Identify the code for SUN from the given statements.

Statement:

I: GUN is written as HUN and TUN are written as UUN.

II: SUN rises from the east.

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

Q70. India and Pakistan have extended the agreement of _____ for 3 years, ie by 2021, which is the second only rail service between the two countries.

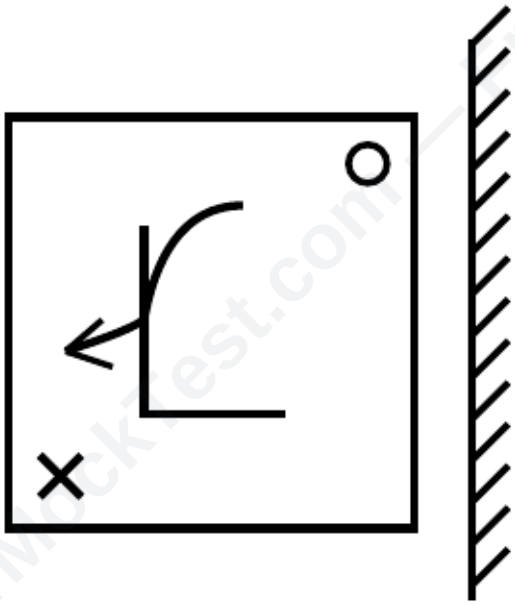
(a) Border Express
(b) Samjhauta Express
(c) Thar Link Express
(d) Attari Express

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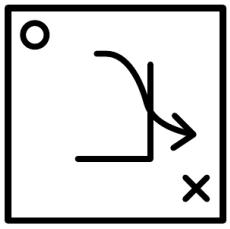
Q71. A tank can be filled by tap A in 2 hours and tap B in 5 hours. Tap C can empty the filled tank in 8 hours. If all the taps are opened simultaneously, how long will it take to fill the tank completely?

(a) 12 hours
(b) 10/3 hours
(c) 8 hours
(d) 40/23 hours

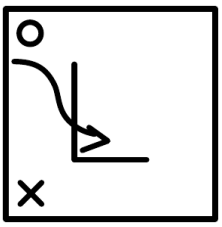
Q72. If a mirror is placed to the right of the figure, indicate the correct mirror image of the given figure.



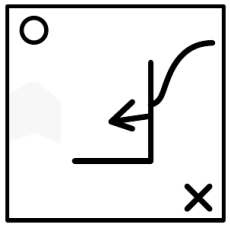
(a)



(b)

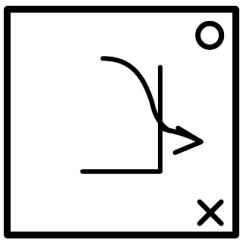


(c)



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(d)



Q73. In the 19th century, Western music became popular in India and as a result the following instruments were adopted:

(a) Guitar, Tabla
(b) Trampoline, Tanpura
(c) Violin, Piano
(d) Sitar, Piano

Q74. Two friends park their vehicle outside the garden entrance. The parking lot is 500 meters from the garden entrance and is located 90° to the left of the garden entrance. If the entrance of the garden is towards the east then in which direction is the parking lot?

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

Q75. If the molecular formulas of ethane, hydrogen chloride, and glucose are C2 H6, HCI, and C6 H12 O6 respectively, what will be their respective empirical formulas?

(a) CH3, HCI and CH2O
(b) C2H6, HCI and C6 H12 O6
(c) 2CH3, HCI and 6 CH2O
(d) CH, HCI and CHO

Q76. What are the next three numbers in this series?

61, 61, 37, 67, 67, 52, 71, 71, ____, _, ___

(a) 64, 73, 73
(b) 67, 75, 75
(c) 67, 73, 73
(d) 65, 75, 75

Q77. The Chief Election Commissioner is appointed by

(a) Chief Minister
(b) Prime minister
(c) Vice President
(d) President

Q78. 71g of CI2 contains atoms:

(a) 1.205×10^{21}
(b) 1.205 × 1024
(c) 1.205 × 1023
(d) 1.205 × 1022

Q79. y years ago June was 2/7 of Janaki's age. After y years from today, June's age will be 2/3 of Janaki's age. What is the ratio of the present ages of June and Janaki?

(a) 3 : 4
(b) 9 : 16
(c) 6 : 11
(d) 2 : 7

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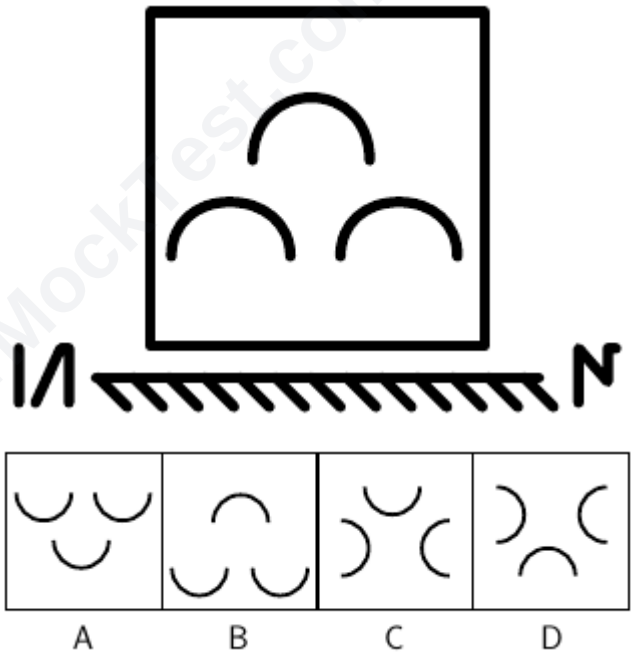
Q80. 36 kg of gunpowder contains 27 kg of salt, 5.4 kg of charcoal and some amount of sulfur. Find the percentage of sulfur.

(a) 15%
(b) 10%
(c) 8%
(d) 100%

Q81. Humayun's Tomb, built in 1570, is a fine specimen of great ____ architecture.

(a) British
(b) Chola
(c) Mughal
(d) Magadh

Q82. Select the mirror image for the following figure.



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

Q83. Phylum _____ occurs exclusively in marine animals.

(a) Platyhelminthes
(b) Echinodermata
(c) Coelenterate
(d) Nematode

Q84. If 1234x is divisible by 11, what will be the value of x?

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

Q85. _____ is the first in South India and the eighth court in the country, in which e-court payment facility has been introduced.

(a) Karnataka High Court
(b) Madras High Court
(c) Kerala High Court

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(d) Mumbai High Court

Q86. What is the unit of ionization energy?

(a) Joule
(b) N/m²
(c) KJ mol^(-1)
(d) KJ m^(-1)

Q87. Which of the following metals is used to electrode iron material?

(a) Calcium
(b) Zinc
(c) Silver
(d) Aluminum

Q88. On investing an amount of 7.5% simple interest per annum, it becomes Rs. 819 after completion of 4 years. What was the amount invested?

(a) Rs. 630
(b) Rs. 660
(c) Rs. 620
(d) Rs. 640

Q89. The tissue that makes a plant hard and strong is called:

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

Q90. Which of the following words is related to football?

(a) Dribble
(b) Night watchman
(c) Doosra
(d) Googly

Q91. What type of vegetative spread is seen in chrysanthemum (Guldaudi)?

(a) Runner
(b) Stallon
(c) Offset
(d) Blotch

Q92. A computer game has builders and destroyers. They are 32. Some of them try to build a wall around a palace while the rest try to demolish it. Each builder can build a wall alone in 36 hours while any destroyer can demolish it in 30 hours. If all 32 are activated when there is no wall and the wall is built in 2.5 hours, how many of them are destroyers?

(a) 12
(b) 6
(c) 8
(d) 10

Q93. In which state are the Khetri mines located?

(a) Orisha
(b) Rajasthan
(c) Bihar
(d) Uttar Pradesh

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Q94. The length and width of a rectangular piece of ground are 80 m and 36 m, respectively. A pit was dug 40 m long, 18 m wide and 12 m deep in one corner of this ground. The soil from the pit was spread evenly over the remaining ground. How much did it increase the height of the land?

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

Q95. If 8219x is divisible by 11, what will be the value of x?

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

Q96. 60 men can do a work in 17 days. 5 workers left work after 6 days. Since then How many days will it take to complete the remaining work?

(a) 15
(b) 16
(c) 13
(d) 12

Q97. Wooden sleepers (timber) are used under the rail. What does it produce?

(a) Large area, which reduces pressure.
(b) Small area, which increases the pressure.
(c) Large area, which increases the pressure.
(d) Wooden sleepers are easy to find.

Q98. Read the following information carefully and answer the question given below:

Veena and Bindu play Carrom and Throwball.

Kavya and Pavitra play tennis and chess.

Bindu and Kavya play chess and throwball.

Veena and Pavitra play carrom and tennis.

Who among them plays chess, throwball and tennis?

(a) Kavya
(b) Bindu
(c) Veena
(d) Pavitra

Q99. You are given a question and two statements. Find out which statement is necessary / sufficient to answer the question.

Question:

What is the total sales made by Company Y in the financial year 2017

Statement:

1. The company sold 2000 products of Y in the year 2017, each worth Rs. 1000.

2. The company did not release any product other than Y in the year 2017.

(a) Each statement alone is sufficient.
(b) 1 alone is sufficient while 2 alone is not sufficient.
(c) 2 alone is sufficient while 1 alone is not sufficient.
(d) Both 1 and 2 together are sufficient.

Q100. The four abbreviations arranged in ascending order are w, x, y and z. The smallest three numbers average 23, while the largest three numbers average 29. What is the range of data?

(a) 15
(b) 24

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(c) 18
(d) 21

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) Prohibition

Given,

Error : Big mistake : : deny : ?

Here we see error means mistake or a big mistake, similarly, deny means prohibition or disallow.

Therefore The term related to the third term is prohibition.

Hence, the correct answer is Prohibition.

Q2. Answer: (b) 1680

Shortcut Trick

Identify the highest common factor (HCF) to simplify the LCM calculation.

21 = 7 × 3 and 560 = 7 × 80.

LCM = Common factor × Remaining factors

LCM = 7 × 3 × 80 = 21 × 80 = 1680.

Therefore The correct answer is 1680.

Alternate Method

Given: Numbers are 21 and 560.

Formula Used: LCM = Product of the highest powers of all prime factors involved.

=> Prime factorization of 21 = 3 × 7

=> Prime factorization of 560 = 2 × 2 × 2 × 2 × 5 × 7 = 2^4 × 5 × 7

=> LCM = 2^4 × 3 × 5 × 7

=> LCM = 16 × 3 × 5 × 7

=> LCM = 48 × 35 = 1680

Therefore The correct answer is 1680.

Additional Information

Relation between LCM and HCF

The product of two numbers is always equal to the product of their LCM and HCF (Product = LCM × HCF).

LCM of Fractions

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

Co-prime Numbers

For any two co-prime numbers, the LCM is simply the product of the two numbers because their HCF is 1.

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Q3. Answer: (c) Uncle

Given,

X is the husband of Aamir's mother's sister.

The family tree is as follow,

Here we see X is Uncle to Aamir.

Hence, the correct answer is Uncle.

Q4. Answer: (d) N

The correct answer is N.

Key Points

• N (Newton) is the SI unit of force.

• All other options are a unit of pressure.

• Dyne cm-2 (dyne per centimeter squared) is a unit of pressure in the CGS system.

• Pa (Pascal) is the SI unit of pressure.

• N m-2 (Newton per meter squared) is a unit of pressure that is equivalent to Pascal.

Q5. Answer: (a) 23

The positions of the letters according to the English alphabet series:

Given word,

"ASTEROID"

In alphabetical order,

ADEIORST

Therefore The total value of consonants,

Consonants are D, R, S and T

The total value of the position of the consonants from the left side is :

8 +7 + 6 + 2 = 23

Hence, the correct answer is 23.

Q6. Answer: (d) Only argument II is strong.

Given,

Statement: Should TV plays be banned?

Argument:

I. Yes, they show a very negative view of life situations that are influencing some sects of society to imitate the same behaviour.

→ This argument does not follow the statement as TV plays do not show a very negative view of life situations that are influencing some sects of society to imitate the same behaviour.

II. No, this is good interesting entertainment for older people.

→ This argument supports the statement as TV plays entertains the older people.

Hence, the correct answer is Only argument II is strong.

Q7. Answer: (c) Spain

The correct answer is Spain.

Key Points

• Spain has won the 2018 FIFA Fair Play Trophy.

• Spain won the Fair Play Trophy which goes to the team with the tournament's best disciplinary record.

• The winner is selected by the FIFA Technical Study Group.

• Luka Modric, Kylian Mbappe, Harry Kane, and Thibaut Courtois all received awards for their respective achievements at the 2018 World Cup during the presentation ceremony following the final at the Luzhniki Stadium in Moscow, Russia.

• The FIFA Fair Play Award is a FIFA recognition of exemplary behavior that promotes the spirit of fair play and compassion in association with football around the world.

• First awarded in 1987, it has been presented to individuals (including posthumously), teams, fans, spectators, football associations/federations, and even entire footballing communities.

Additional Information

• The fair play award is an annual football award and it is awarded to the team which has the best record of playing as per the rules and playing fair even when they are competing hard.

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• Leeds United and their manager, Marcelo Bielsa, have won the 2019 Fifa Fair Play Award at the governing body's annual award ceremony in Milan.

• The Championship side won the award after Bielsa ordered his team to let Aston Villa score an equalizer at Elland Road in April.

• Mattia Agnese a 17-year-old Italian defender who has won the 2020 FIFA Fair Play Award after saving the life of one of his opponents last January.

• Agnese (17) is playing for Ospedaletti, a non-professional Italian club based in the Region of Liguria.

Q8. Answer: (d) 600 kg

The correct answer is 600kg.

Key Points

• Power of pump=1kW=1000W

• Time(t)=60s

• Height(h)=10 m

• g=10ms^(−2)

• We know, Power=work done per unit time

• Work done=mgh

• =m×10×10 =100m

• Power= 100m/t

• 1000= 100m/60

• m=600 kg

• Hence,pump can raise 600 kg water per minute up to 10 m height.

Q9. Answer: (b) David Grossman

The correct answer is David Grossman.

Key Points

• David Grossman has won the Man Booker International Award for his novel 'A Horse Walks Into a Bar'.

• David Grossman has become the first Israeli author to win the Man Booker International Prize.

• Grossman is a bestselling Israeli writer of fiction, non-fiction, and children’s literature, whose works have been translated into 36 languages.

• A Horse Walks into a Bar is a novel published in Hebrew in 2014 by Ha'kibbutz Ha'meuchad as Sus echad nichnas Lebar.

• The book was translated into English by Jessica Cohen, and published in the UK by Jonathan Cape in November 2016 and in the US by Alfred A. Knopf in February 2017.

• The title is derived from a common bar joke.

• Hence, the correct option is 2.

Additional Information

• Ismail Kadare is an Albanian novelist, poet, essayist, and playwright.

• He has been a leading literary figure in Albania since the 1960s.

• He focused on poetry until the publication of his first novel "The General of the Dead Army" which made him a leading literary figure in Albania and famous internationally.

• Philip Milton Roth (March 19, 1933 – May 22, 2018) was an American novelist and short-story writer.

• Roth's fiction, regularly set in his birthplace of Newark, New Jersey, is known for its intensely autobiographical character for philosophically and formally blurring the distinction between reality and fiction.

• Jessica Cohen is a British-Israeli-American literary translator.

• Her translation of David Grossman's 2014 novel A Horse Walks Into a Bar was awarded the 2017 Man Booker International Prize.

Q10. Answer: (c) 24

Shortcut Trick

Prime factorize 4840 → $2^3 \times 5^1 \times 11^2$.

Number of factors = (p1+1) × (p2+1) × (p3+1)...

Number of factors = (3+1) × (1+1) × (2+1) = 4 × 2 × 3 = 24.

Therefore The correct answer is 24.

Alternate Method

Given: Number = 4840

Formula Used: If N = a^p × b^q × c^r, then total factors = (p+1)(q+1)(r+1)
=> 4840 = 2 × 2420
=> 4840 = 2 × 2 × 1210
=> 4840 = 2 × 2 × 2 × 605
=> 4840 = 2^3 × 5 × 121
=> 4840 = 2^3 × 5^1 × 11^2
=> Total factors = (3 + 1) × (1 + 1) × (2 + 1)
=> Total factors = 4 × 2 × 3 = 24
Therefore The correct answer is 24.
Additional Information
Sum of Factors
The sum of all factors is given by [(a^(p+1)−1)/(a−1)] × [(b^(q+1)−1)/(b−1)] × [(c^(r+1)−1)/(c−1)].
Number of Even/Odd Factors
For even factors, take (p) × (q+1) × (r+1). For odd factors, ignore the power of 2 and take (q+1) × (r+1).
Perfect Square Factors
To find perfect square factors, use only even exponents of prime factors in combinations.

Q11. Answer: (c) 13M12L

We know,
Given,
4D3C, 7G6F, 10J9I, _____ ?
The pattern followed here is,
The number represents the place value of the alphabets
Hence, the correct answer is 13M12L.

Q12. Answer: (b) 49

Shortcut Trick
Let the three numbers in ascending order be x, y, and z.
Sum of numbers = 38 × 3 = 114.
Given: y = (x + z) − 20 => x + z = y + 20.
Substitute in sum: (y + 20) + y = 114 => 2y = 94 => y = 47.
Now, x + z = 67 and z − x = 31 (Range). Adding both gives 2z = 98 => z = 49.
Therefore The correct answer is 49.
Alternate Method
Given:
Mean of three numbers = 38
Range of data = 31
Middle number = Sum of other two − 20
Formula Used:
Mean = Sum of observations ÷ Number of observations
Range = Largest value − Smallest value
Calculations:
Let the three numbers in ascending order be x, y, and z.
=> Mean = (x + y + z) ÷ 3 = 38
=> x + y + z = 114 --- (Equation 1)
The range of the data is 31:
=> z − x = 31 --- (Equation 2)
The middle number (y) is 20 less than the sum of the other two numbers (x + z):
=> y = (x + z) − 20
=> x + z = y + 20 --- (Equation 3)
Substitute Equation 3 into Equation 1:
=> (y + 20) + y = 114

=> 2y + 20 = 114

=> 2y = 94

=> y = 47

Substitute y = 47 into Equation 1:

=> x + 47 + z = 114

=> x + z = 67 --- (Equation 4)

Now, solve Equation 2 and Equation 4 simultaneously:

=> z − x = 31

=> z + x = 67

Adding both equations:

=> 2z = 98

=> z = 49

Subtracting Equation 2 from Equation 4:

=> 2x = 36

=> x = 18

Thus, the three numbers are 18, 47, and 49.

The largest number is 49.

Verification of Options:

• Option 1 (47): If the largest number is 47, then the smallest is 47 − 31 = 16. The middle number would be 114 − 47 − 16 = 51, which is greater than the largest number (contradiction).

• Option 2 (49): If the largest number is 49, then the smallest is 49 − 31 = 18. The middle number is 114 − 49 − 18 = 47. This satisfies all conditions perfectly.

• Option 3 (51): If the largest number is 51, then the smallest is 51 − 31 = 20. The middle number would be 114 − 51 − 20 = 43. But 43 is not equal to (20 + 51) − 20 = 51 (contradiction).

• Option 4 (45): If the largest number is 45, then the smallest is 45 − 31 = 14. The middle number would be 114 − 45 − 14 = 55, which is greater than the largest number (contradiction).

Therefore The correct answer is 49.

Additional Information

Mean (Average)

The sum of all values divided by the total number of values. Formula: Mean = (Σx) ÷ n.

Range

The difference between the highest (largest) and lowest (smallest) values in a data set. Formula: Range = Maximum − Minimum.

Median of Three Numbers

When three numbers are arranged in ascending order, the middle number is the median.

Q13. Answer: (c) Alluvial

The correct answer is Alluvial.

Key Points

• The fertile Gangetic plain is made up of rich Alluvial soil.

• Alluvial soils are soils deposited by surface water.

• You will find them along rivers, in floodplains and deltas, stream terraces, and areas called alluvial fans.

• This last category results from larger floods, causing the soil to spread out in the shape of a triangle fan.

• Most alluvial soils are derived from the sediment being deposited by the river Ganga in the Indo–Gangetic plain.

• Alluvial soil can be classified into two groups on the basis of its age :

1. khaddar

2. Bhangar

Additional Information

• Arid soil has a very low concentration of organic matter, reflecting the paucity of vegetative production on these dry soils.

• In India, the arid soil is mainly found in parts of Western Rajasthan, Haryana, and Punjab and extends up to the Rann of Kutch in Gujarat.

• It is also called Desert soil in some places.

• Red soil is a type of soil that develops in a warm, temperate, moist climate under deciduous.

• It has thin organic and organic-mineral layers overlying a yellowish-brown leached layer resting on an illuvium red layer.

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• Red soils are generally derived from crystalline rock.

• Black soils are mineral soils that have a black surface horizon, enriched with organic carbon that is at least 25 cm deep.

• These soils are black in color due to the presence of iron, aluminum compounds, and humus.

• The black soil is majorly found in the parts of Gujarat, Maharashtra, Western parts of Madhya Pradesh, North- Western Andhra Pradesh, Karnataka.

Q14. Answer: (c) Curve

Given,

True is related to False.

We know the opposite of true is false.

Similarly,

The opposite of straight is the curve.

Hence, the correct answer is Curve.

Q15. Answer: (c) The electrons in the conductor move at a constant average speed

The correct answer is The electrons in the conductor move at a constant average speed.

Key Points

• In trailing velocity the electrons in the conductor move at a constant average speed.

• Drift velocity defined as:

• The average velocity attained by charged particles, (eg. electrons) in a material due to an electric field.

• The SI unit of drift velocity is m/s.

• Subatomic particles like electrons move in random directions all the time.

• When electrons are subjected to an electric field they do move randomly, but they slowly drift in one direction.

• The drift velocity of an electron for a unit electric field is known as the mobility of the electron.

Additional Information

• Velocity Defined :

• The meaning of velocity of an object can be defined as the rate of change of the object's position with respect to a frame of reference and time.

• It might sound complicated but velocity is basically speeding in a specific direction.

• Constant Velocity :

• The motion with constant velocity is the simplest form of motion. We witness constant motion whenever an object slides over a horizontal, low friction surface.

Q16. Answer: (b) SAIL

The correct answer is SAIL.

Key Points

• SAIL is a public sector industry.

• Steel Authority of India Limited (SAIL) is an Indian state-owned steel making company based in New Delhi, India.

• SAIL traces its origin to the Hindustan Steel Limited (HSL) which was set up on 19 January 1954.

• It is a public sector undertaking, owned and operated by the Government of India.

• SAIL operates and owns 5 integrated steel plants at Bhilai, Rourkela, Durgapur, Bokaro, and Burnpur(Asansol) and 3 special steel plants at Salem, Durgapur, and Bhadravathi.

• It also owns a Ferro Alloy plant at Chandrapur.

Additional Information

• Amul is an Indian dairy cooperative society, based at Anand in the Indian state of Gujarat formed in 1946.

• Amul brand is today managed by the Gujarat Co-operative Milk Marketing Federation Ltd (GCMMF) which is jointly owned by about 3,000,000 milk producers in the state.

• AMUL stands for Anand Milk Union Limited.

• TISCO is known as Tata Steel, which has grown to the world's 7th largest Steel Company.

• In terms of domestic production, Tata Steel is the largest company in India.

• The main plant of Tata Steel is located in Jamshedpur and registered office in Mumbai.

• The name of the town where TISCO was founded by Jamshedji was given by Lord Chelmsford in 1919.

• Reliance Petroleum is an Indian petroleum company that specializes in oil and energy owned by Seema Bindal of Reliance Industries Limited.

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• It is based in Ahmedabad, Gujarat, India, and has interests in the downstream oil business.

Q17. Answer: (a) 15 : 16

Shortcut Trick

Equate the common term a by multiplying the ratios.

a : b = 4 : 5 (×3) → a : b = 12 : 15

a : c = 3 : 4 (×4) → a : c = 12 : 16

Since a is now 12 in both, b : c = 15 : 16.

Therefore The correct answer is 15 : 16.

Alternate Method

Given:

Ratio a : b = 4 : 5

Ratio a : c = 3 : 4

Calculations:

=> To find b : c, we can write it as (b / a) × (a / c).

=> From a : b = 4 : 5, we get b / a = 5 / 4.

=> From a : c = 3 : 4, we get a / c = 3 / 4.

=> b / c = (b / a) × (a / c) = (5 / 4) × (3 / 4)

=> b / c = (5 × 3) / (4 × 4) = 15 / 16

=> b : c = 15 : 16

Therefore The correct answer is 15 : 16.

Additional Information

Compounded Ratio

The compounded ratio of two ratios (a : b) and (c : d) is (ac : bd). In this problem, we used the product of ratios to eliminate the common term.

Inverse Ratio

The inverse ratio of a : b is b : a. For example, if a : b = 4 : 5, then b : a = 5 : 4.

Equating the Common Term

When combining multiple ratios, always find the LCM of the common term's values to create a single continuous ratio (a : b : c).

Q18. Answer: (b) Its kinetic energy is constant.

The correct answer is Its kinetic energy is constant.

• As mentioned in the given condition, the particle is acted upon by a force of constant magnitude which is always perpendicular to the velocity of the particle, so work done by the force in the direction of the velocity is zero.

• Therefore, the magnitude of velocity would not change due to this force.

• KE = $1/2mv^2$

• As we know mass and magnitude of velocity will always be constant in this given situation so the kinetic energy will also be constant.

Q19. Answer: (d) May 2016

The correct answer is May 2016.

Key Points

• Pradhan Mantri Ujjwala Yojana was launched in May 2016.

• Pradhan Mantri Ujjwala Yojana was launched by Prime Minister of India Narendra Modi on 1 May 2016.

• it is implemented by the Ministry of Petroleum and Natural Gas through its Oil Marketing Companies.

• The government aims to provide LPG connections to BPL households in the country.

• The scheme is aimed at replacing the unclean cooking fuels mostly used in rural India with clean and more efficient LPG.

Additional Information

• Pradhan Mantri Jan Dhan Yojana:

• Pradhan Mantri Jan Dhan Yojana is a financial inclusion program of the Government of India open to Indian citizens.

• This yojana aims to expand affordable access to financial services such as bank accounts, remittances, credit, insurance, and pensions.

• Pradhan Mantri Awas Yojana:

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• Pradhan Mantri Awas Yojana is an initiative by the Government of India in which affordable housing will be provided to the urban poor with a target of building 20 million affordable houses by 31 March 2022.

• Pradhan Mantri Suraksha Bima Yojana:

• Pradhan Mantri Suraksha Bima Yojana is a government-backed accident insurance scheme in India.

• It was originally mentioned in the 2015 Budget speech by Finance Minister Late Arun Jaitley in February 2015.

• It was formally launched by Prime Minister Narendra Modi on 8 May in Kolkata.

Q20. Answer: (a) 6.023×10^{23}

The correct answer is 6.023×10^{23}.

Key Points

• Avogadro's Number:

• The number of units in one mole of any substance is called Avogadro's number or Avogadro's constant.

• It is equal to $6.022140857 \times 10^{23}$.

• The units may be electrons, ions, atoms, or molecules, depending on the character of the reaction and the nature of the substance.

Q21. Answer: (c) Both conclusions follow.

Given,

Statement:

Homegrown fruits and vegetables are better for health than consuming imported fruits and vegetables, which are maintained to show freshness using artificial conditions.

Conclusions:

I. Imported vegetables are maintained under artificial conditions.

→ True the Imported vegetables are maintained under artificial conditions to show freshness.

II. Homegrown fruits and vegetables are usually fresh.

→ True as they are homegrown they are not maintained under any artificial condition.

Hence, the correct answer is Both conclusions follow.

Additional Information

• If there are two or more sentences that are used to frame a statement, then, the sentences must be interrelated, and mutual contradiction should be there.

• Do not look for truthful notions. The information provided in the statement is the only requirement for a student to answer the question. No assumptions must be made.

• Read the statement carefully and look for keywords that are common between the statement and the conclusions

• If there is more than one conclusion that is applicable to the statement, students must ensure that the conclusions they opt for have some relation with each other.

Q22. Answer: (b) 15

Shortcut Trick

Product of Numbers = LCM × HCF

24 × Second Number = 120 × 3

Second Number = (120 × 3) ÷ 24 = 5 × 3 = 15

Therefore The correct answer is 15.

Alternate Method

Given:

LCM = 120

HCF = 3

First Number (n1) = 24

Formula Used:

n1 × n2 = LCM × HCF

Calculations:

=> 24 × n2 = 120 × 3

=> 24 × n2 = 360

=> n2 = 360 ÷ 24

=> n2 = 15

Therefore The correct answer is 15.

Additional Information

Fundamental Property

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

Co-prime Numbers

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

HCF Rule

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

Q23. Answer: (d) All are implicit.

Given,

Statement:

Read the instructions before you start playing the game.

Assumptions:

1. The game is being organized. → Implicit as the game is about to start.

2. No blind person is playing the game. → Implicit as the statement asks to 'read' the instructions. This requires the players to be having proper eyesight. Thus, the authorities might have assumed that people who are playing might be not blind.

3. Players are literate. → Implicit as the statement asks to 'read' the instructions. This requires the players to be capable of reading. Thus, the authorities might have assumed that people who are playing might be literate.

Hence, the correct answer is "All are implicit."

Q24. Answer: (d) a

Given,

State, District, City

The best possible Venn diagram is,

Hence, the correct answer is figure a.

Q25. Answer: (a) 3 ms^(-2)

The correct answer is 3 ms-2.

Key Points

• Force = mass * acceleration

• Acceleration = force/mass

• Acceleration = 240/80

• Acceleration =3 ms^(-2)

• Hence, acceleration should be 3 ms^(-2)

Additional Information

• Newton’s 2nd law states that the acceleration of an object as produced by a net force is directly proportional to the magnitude of the net force, in the same direction as the net force, and inversely proportional to the mass of the object.

• Force = mass *acceleration.

Q26. Answer: (d) Frequency

Shortcut Trick

The number of times a particular value or event occurs in a given data set is defined as its frequency.

Hence, the total count of observations or occurrences is represented by frequency.

Therefore The correct answer is Frequency.

Alternate Method

Given: An observation of data and we need to identify what the total number of occurrences/frequencies is called.

Let's analyze each option to find the correct definition:

=> Mean: The average of all observations, calculated as the sum of observations divided by the total number of observations.

=> Median: The middle value of a sorted data set that divides it into two equal halves.

=> Range: The difference between the maximum and minimum values in a data set.

=> Frequency: The total number of times a particular data point or observation occurs in the dataset.

=> Therefore, the total number of occurrences observed in a data set is called its frequency.

Therefore The correct answer is Frequency.

Additional Information

Cumulative Frequency

The running total of frequencies of all classes up to the current class in a frequency distribution.

Relative Frequency

The fraction or proportion of times a value occurs in the data set, calculated as: Relative Frequency = Class Frequency ÷ Total Number of Observations.

Measures of Central Tendency

Statistical measures like Mean, Median, and Mode that represent the center or typical value of a data distribution.

Q27. Answer: (d) Birmingham

The correct answer is Birmingham.

Key Points

• Birmingham City has been chosen to host the 2022 Commonwealth Games.

• The 2022 Commonwealth Games, officially known as the XXII Commonwealth Games and commonly known as Birmingham 2022.

• It is an international multi-sport event for members of the Commonwealth that is scheduled to be held in Birmingham, England.

• This is to be the third time England has hosted the Games after London in 1934 and Manchester in 2002.

• The Games are expected to take place between 28 July and 8 August 2022.

• The city was announced as the host by the Commonwealth Games Federation (GCF) at a press conference at the Arena Academy in Birmingham on 21 December 2017.

Additional Information

• Her Majesty Queen Elizabeth II is Head of the Commonwealth.

• The headquarters of GCF is located in London, England.

• 2026 Commonwealth Games :

• The 2026 Commonwealth Games, officially known as the XXIII Commonwealth Games.

• It is a multi-sport event for members of the Commonwealth to be organized in a city designated by the Commonwealth Games Federation.

• The host city was initially intended to be selected at the 2019 GCF General Assembly in Kigali, Rwanda.

• 2018 Commonwealth Games :

• The 2018 Commonwealth Games, officially known as the XXI Commonwealth Games and commonly known as Gold Coast 2018.

• It was held on the Gold Coast, Queensland, Australia, between 4 and 15 April 2018.

• It was India's 18th appearance at the Commonwealth Games. With 26 Gold medals and a total of 66 medals India finished 3rd in the tournament.

• The first time a major multi-sport event achieved gender equality by having an equal number of events for male and female athletes.

Q28. Answer: (a) 120°

Shortcut Trick

The angle formed by the intersection of two chords inside a circle is equal to the sum of the angles subtended by the intercepted arcs at the circumference.

In ΔABE, angle BEC is the exterior angle at vertex E.

angle BEC = angle BAE + angle ABE

Since angle ABE and angle ACD are angles in the same segment (subtended by arc AD), angle ABE = angle ACD = 83°.

angle BEC = 37° + 83° = 120°.

Therefore The correct answer is 120°.

Alternate Method

Given: angle BAE = 37°, angle ACD = 83°.

Formula Used: Angles subtended by the same arc at the circumference are equal; Sum of angles in a triangle = 180°.

=> Points A, B, C, and D lie on the circumference of the circle.

=> angle ABD and angle ACD are subtended by the same arc AD.

=> Therefore angle ABD = angle ACD = 83°.

=> In ΔABE, the sum of interior angles is 180°.

=> angle BAE + angle ABE + angle AEB = 180°

=> 37° + 83° + angle AEB = 180°

=> 120° + angle AEB = 180°

=> angle AEB = 180° − 120° = 60°.

=> Since AC is a straight line, angle AEB and angle BEC form a linear pair.

=> angle AEB + angle BEC = 180°

=> 60° + angle BEC = 180°

=> angle BEC = 180° − 60° = 120°.

Therefore The correct answer is 120°.

Additional Information

Angles in the Same Segment

Angles subtended by the same arc at any point on the remaining part of the circle are equal.

Exterior Angle Theorem

The exterior angle of a triangle is equal to the sum of the two opposite interior angles.

Angle between Intersecting Chords

The measure of an angle formed by two chords intersecting inside a circle is half the sum of the measures of the intercepted arcs.

Q29. Answer: (b) 12 liters

Shortcut Trick

Net rate of filling (A + B) − Emptying (C) − Overall Emptying => (1/15 + 1/12) − 1/C − 1/60 => −1/60 (since it empties in 60 mins).

Rate of Pipe C − 1/15 + 1/12 + 1/60 − (4 + 5 + 1)/60 − 10/60 − 1/6 minutes.

Time taken by Pipe C alone to empty − 6 minutes.

Tank Capacity − Rate × Time − 2 liters/min × 6 minutes − 12 liters.

Therefore The correct answer is 12 liters.

Alternate Method

Given: Filling time Pipe A − 15 mins, Pipe B − 12 mins. Net emptying time (A + B − C) − 60 mins. Emptying rate of Pipe C − 2 liters/min.

Formula Used: Work − Rate × Time; Efficiency (filling) is positive, Efficiency (emptying) is negative.

Person	Time (min)	Total Work (units)	Efficiency
Pipe A	15	60	+4
Pipe B	12	+5	
A + B − C	−60	−1	

=> Combined Efficiency of (A + B − C) − −1

=> Efficiency of A + Efficiency of B − Efficiency of C − −1

=> 4 + 5 − Efficiency of C − −1

=> 9 − Efficiency of C − −1

=> Efficiency of Pipe C − 9 + 1 − 10 units/min

=> Time taken by Pipe C alone to empty the tank − Total Work ÷ Efficiency − 60 ÷ 10 − 6 minutes

=> Tank Capacity − Rate of Pipe C × Time taken by Pipe C

=> 2 liters/min × 6 minutes − 12 liters

Therefore The correct answer is 12 liters.

Additional Information

Pipes & Cisterns Sign Convention

Inlet pipes that fill the tank are assigned positive efficiency, while outlet/leakage pipes that empty the tank are assigned negative efficiency.

Net Work Done

If a tank is emptied in 't' hours, the net work is considered as −1 or the net efficiency is negative. Capacity − Emptying Rate × Time to empty the full tank.

Q30. Answer: (d) 29

The pattern followed here is:For 1st figure:

Thus total number of triangles = 29

Hence, the correct answer is "29".

Q31. Answer: (d) 0.32893

Concep used:

We have to follow the BODMAS rule

Calculation:

(3.7 - 2.931 + 0.12) × 0.37 = ?

=> (3.82 – 2.931) × 0.37 = ?

=> 0.889 × 0.37 = ?

=> ? = 0.32893

Therefore The vale of '?' is 0.32893

Q32. Answer: (a) Right to Property

The correct answer is the Right to Property.

Key Points

• The right to Property fundamental rights is not enshrined in the Constitution of India.

• The right to property is not a Fundamental Right but is a constitutional right.

• By the 44th Amendment to the Constitution, the right to property was removed as a fundamental right, and instead, a new provision was added to the Constitution.

• Article 300-A making it a constitutional right.

• This right was eliminated to make sure that every person can get deprived of the property and also decreasing the boundaries of rich and poor categories for owning land.

Additional Information

• Fundamental Right Defined:-

• Fundamental rights are those rights that are essential for the intellectual, moral, and spiritual development of citizens of India.

• As these rights are fundamental or essential for the existence and all-around development of individuals, they are called 'Fundamental Rights'.

• There are six fundamental rights recognized by the Indian constitution:

• Right to equality (Articles. 14-18)

• Right to Freedom (Articles. 19-22)

• Right Against Exploitation (Articles. 23-24)

• Right to Freedom of Religion (Articles. 25-28)

• Cultural and Educational Rights (Articles. 29-30)

• Right to Constitution

• The right to freedom includes freedom of speech and expression, assembly, association or union or cooperatives, movement, residence, and the right to practice any profession or occupation.

• The right to equality includes equality before the law, the prohibition of discrimination on grounds of religion, race, caste, sexual orientation, gender or gender identity and/or place of birth, equality of opportunity in matters of employment, the abolition of untouchability, and the abolition of titles.

• The right against exploitation prohibits all forms of forced labor, child labor, and trafficking of human beings.

• Children under the age of 14 are not allowed to work.

Q33. Answer: (b) Platinum

The correct answer is Platinum.

Key Points

• Platinum metals exist in their original state.

• Platinum is a chemical element with the symbol Pt and atomic number 78.

• It is a dense, malleable, ductile, highly unreactive, precious, silverish-white transition metal.

• Its name is derived from the Spanish term platino, meaning "little silver"

• Platinum is a member of the platinum group of elements and group 10 of the periodic table of elements.

• Platinum is one of the least reactive metals.

• The white silver metal known as platinum is the heaviest of the precious metals, weighing almost twice as much as karat gold.

Additional Information

• Copper is a chemical element with the symbol Cu and atomic number 29.

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• It is a soft, malleable, and ductile metal with very high thermal and electrical conductivity.
• A freshly exposed surface of pure copper has a pinkish-orange color.
• Copper is used as a conductor of heat and electricity.
• Iron is a brittle, hard substance, classified as a metal in Group 8 on the Periodic Table of the Elements.
• The most abundant of all metals, its pure form rapidly corrodes from exposure to moist air and high temperatures.
• It is the fourth most widely distributed element on the earth's crust but is found as iron ore rather than as a useable metal.
• Iron ore comes in a variety of forms and looks like a rock.
• It is a mixture of iron, oxygen, and other elements, mixed in with sands and clays.
• Potassium is a chemical element with the symbol K and atomic number 19.
• Potassium is a silvery-white metal that is soft enough to be cut with a knife with little force.
• Potassium metal reacts rapidly with atmospheric oxygen to form flaky white potassium peroxide in only seconds of exposure.

Q34. Answer: (c) Positive

The correct answer is Positive.

Key Points

• The convex lens has a focal length of Positive.
• The focal length of an optical system is a measure of how strongly the system converges or diverges light.
• it is the inverse of the system's optical power.
• A positive focal length indicates that a system converges light, while a negative focal length indicates that the system diverges light.
• The focal length of a double convex lens is given by the formula (1/v) + (1/u) = (1/f).
• where u is the distance between the object and the lens, v is the distance between the image and the lens.

Additional Information

• The convex lens is a lens that converges rays of light that convey parallel to its principal axis, which is relatively thick across the middle and thin at the lower and upper edges.
• The edges are curved outward rather than inward.
• Convex lenses are used in eyeglasses for correcting farsightedness, where the distance between the eye's lens and retina is too short, as a result of which the focal point lies behind the retina.
• Eyeglasses with convex lenses increase refraction, and accordingly reduce the focal length.
• Macro Lenses - This type of camera lens is used to create very close-up, macro photographs.
• Telephoto Lenses - Telephoto lenses are a type of zoom lens with multiple focal points.
• A concave lens is a lens that possesses at least one surface that curves inwards.
• Concave lenses are used in telescope and binoculars to magnify objects.
• It is a diverging lens, meaning that it spreads out light rays that have been refracted through it.
• A concave lens is thinner at its center than at its edges and is used to correct short-sightedness.
• Biconcave - A lens in which both sides are concave is biconcave. Biconcave lenses are diverging lenses.
• Plano-concave - A lens in which one side is concave and the other is Plano. Plano-concave lenses are diverging lenses.

Q35. Answer: (b) Sudeep will be provided company accommodation.

Given,

Criteria for accommodation:

(I) He must have worked in the company for at least 10 years and in the ABC department for at least 4 years.

(II) He should have a maximum of five members in his family.

(III) Before retirement age is 58 years, there is a minimum of 5 years' term left.

(IV) He should not be the owner or co-owner of a house (if one of the spouses is the owner).

For cases in which an employee:

• Fulfills all the conditions except (I) above and has joined the company as a manager, he shall be referred to the Director.
• Fulfills all the conditions except (III) above and is working as a senior manager in the company, he will be referred to the Managing Director.
• Moved from another city. Condition (I) can be removed.

Based on the above conditions, decide whether Sudeep will be provided accommodation or the matter will be referred to a higher authority. All cases are presented on 31 July 2016.

We see Sudeep fulfills all the criteria.

Therefore Sudeep will be provided with company accommodation.

Hence, the correct answer is Sudeep will be provided company accommodation.

Q36. Answer: (c) Magnesium

The correct answer is Magnesium.

Key Points

• The outermost shell of a Magnesium element has two electrons.

• 12 is the atomic mass for magnesium.

• it is in group 2 of the periodic table, which it loses,

• so it can attain stability by losing the electron and its outermost shell will be complete by achieving (2,8) configuration

• it has a charge of +2, as it still has 12 protons (positive charges) and now has only 10 electrons (negative charges).

• Magnesium is used in products that benefit from being lightweight, such as car seats, luggage, laptops, cameras, and power tools.

• It is also added to molten iron and steel to remove sulfur.

• Outermost Shell :

• This outermost shell is known as the valence shell, and the electrons found in it are called valence electrons.

• In general, atoms are most stable, least reactive, when their outermost electron shell is full.

Additional Information

• Carbon is a chemical element with the symbol C and atomic number 6.

• It is nonmetallic and tetravalent-making four electrons available to form covalent chemical bonds.

• It belongs to group 14 of the periodic table.

• Carbon typically shares electrons to achieve a complete valence shell, forming bonds with multiple other atoms.

• Boron is a chemical element with the symbol B and atomic number 5.

• The boron atom has only six electrons in its outer shell, leading to an electron deficiency.

• This molecule has 12 valence shell electrons, 3 each from the B atoms, and 1 each from the six H atoms.

• Electrons per shell: 2,3

• Atomic Mass: 10.811 g/mol

• Chlorine atom consists of 17 protons (positively charged sub-atomic particles) in the atom's nucleus (central region), balanced by seventeen electrons (negatively charged sub-atomic particles) distributed around the nucleus.

Q37. Answer: (d) Both 1 and 2 are sufficient.

Shortcut Trick

To find the value of $p^2 - q^2$, we use the identity $(p + q)(p - q)$.

We know that $(p - q)^2 = (p + q)^2 - 4pq$.

Therefore, to calculate the final expression, we must know both $(p + q)$ and pq.

Statement 1 provides $p + q$ and Statement 2 provides pq.

By combining both, we can find the numerical value of $p^2 - q^2$.

Therefore The correct answer is Both 1 and 2 are sufficient.

Alternate Method

Given: Find $p^2 - q^2$ using statements 1 and 2.

Formula Used: $p^2 - q^2 = (p + q)(p - q)$ and $(p - q) = \sqrt{((p + q)^2 - 4pq)}$

Calculations:

=> From Statement 1: $p + q = 12$

=> From Statement 2: $pq = 4$

=> Substituting these into the identity for $(p - q)$:

=> $(p - q)^2 = 12^2 - 4 \times 4$

=> $(p - q)^2 = 144 - 16 = 128$

=> $p - q = \sqrt{128} = 8\sqrt{2}$

=> Now, $p^2 - q^2 = (p + q) \times (p - q) = 12 \times 8\sqrt{2} = 96\sqrt{2}$

=> Since we used both statements to find the value, both are required.

Therefore The correct answer is Both 1 and 2 are sufficient.

Additional Information

Algebraic Identities

Useful relations include $(a + b)^2 = a^2 + b^2 + 2ab$ and $(a - b)^2 = a^2 + b^2 - 2ab$. Subtracting these gives $(a + b)^2 - (a - b)^2 = 4ab$.

Data Sufficiency Logic

If an expression involves n variables, you generally need n independent equations to find unique values for those variables.

Difference of Squares

The expression $x^2 - y^2$ is always factorable as $(x - y)(x + y)$, which is a fundamental property in simplification and factoring.

Q38. Answer: (c) Ultrasonic waves

The correct answer is Ultrasonic waves.

Key Points

• Bats detect the obstacles along the way by getting the reflected Ultrasonic waves.

• They are one of the few mammals that can use sound to navigate--a trick called echolocation.

• Bats produce echolocation sounds, which are usually ultrasonic, ranging in frequency from 20 kilohertz (kHz) to 200 kHz.

• Bats emit high-frequency sound waves while navigating, and process the echo that comes back from obstacles.

• Bats are not blind, but at night their ears are more important than their eyes.

• The returning echoes give the bats information about anything that is ahead of them, including the size and shape of an insect and which way it is going.

• Hence, the correct option is 3.

Additional Information

• Ultrasonic Wave :

• Ultrasound is sound waves with frequencies higher than the upper audible limit of human hearing.

• Ultrasound is not different from "normal" sound in its physical properties, except that humans cannot hear it.

• This limit varies from person to person and is approximately 20 kilohertz in healthy young adults.

• Ian Donald and engineer Tom Brown with the invention of ultrasonic wave.

• Radio Wave :

• Radio waves are a type of electromagnetic radiation best-known for their use in communication technologies, such as television, mobile phones, and radios.

• These devices receive radio waves and convert them to mechanical vibrations in the speaker to create sound waves.

• Radio waves have frequencies as high as 300 gigahertz to as low as 30 hertz.

• Subsonic Wave ;

• A subsonic wave is a wave that is traveling slower than the speed of sound and a supersonic wave travels faster.

• By definition, a sound wave travels at the speed of sound which varies depending on the medium through which it's traveling.

• Electromagnetic Waves :

• EM waves are waves that are created as a result of vibrations between an electric field and a magnetic field.

• In other words, EM waves are composed of oscillating magnetic and electric fields.

Q39. Answer: (b) 364

Shortcut Trick

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

Given that $k = 7$.

Value = $7^3 + 3 \times 7$

Value = $343 + 21 = 364$.

Therefore The correct answer is 364.

Alternate Method

Given:

$a - 1/a = 7$

Formula Used:

Using the algebraic identity: $(x - y)^3 = x^3 - y^3 - 3xy(x - y)$

Calculations:

=> Cubing both sides of the given equation:

=> $(a - 1/a)^3 = 7^3$

=> $a^3 - (1/a)^3 - 3 \times a \times (1/a) \times (a - 1/a) = 343$

=> $a^3 - 1/a^3 - 3 \times 1 \times (7) = 343$

=> $a^3 - 1/a^3 - 21 = 343$

=> $a^3 - 1/a^3 = 343 + 21$

=> $a^3 - 1/a^3 = 364$

Therefore The correct answer is 364.

Additional Information

Sum of Cubes Identity

If $a + 1/a = k$, then the value of $a^3 + 1/a^3$ is given by $k^3 - 3k$.

Square Identity (Subtraction)

If $a - 1/a = k$, then the value of $a^2 + 1/a^2$ is $k^2 + 2$.

Square Identity (Addition)

If $a + 1/a = k$, then the value of $a^2 + 1/a^2$ is $k^2 - 2$.

Q40. Answer: (a) Only statement 1 is sufficient, while statement 2 alone is not enough.

Shortcut Trick

Expand Statement 1: (a + b)2 > (a − b)2 => a2 + b2 + 2ab > a2 + b2 − 2ab.

Subtract a2 + b2 from both sides: 2ab > −2ab => 4ab > 0 => ab > 0.

This confirms ab is positive, making Statement 1 sufficient.

Statement 2: a = b => ab = a2. If a = 0, ab = 0 (not positive); if a = 1, ab = 1 (positive). Insufficient.

Therefore The correct answer is Only statement 1 is sufficient, while statement 2 alone is not enough.

Alternate Method

Given:

Question: Is the product ab > 0?

Statement 1: (a + b)2 > (a − b)2

Statement 2: a = b

Analysis of Statement 1:

=> (a + b)2 > (a − b)2

=> a2 + 2ab + b2 > a2 − 2ab + b2

=> 2ab > −2ab

=> 4ab > 0

=> ab > 0 (Always positive)

Thus, Statement 1 alone is sufficient to answer if ab is positive.

Analysis of Statement 2:

=> a = b

=> Case A: If a = 2, b = 2, then ab = 4 (Positive)

=> Case B: If a = 0, b = 0, then ab = 0 (Not positive)

Since we get two different answers (Yes and No), Statement 2 alone is not sufficient.

Therefore The correct answer is Only statement 1 is sufficient, while statement 2 alone is not enough.

Additional Information

Algebraic Identities

The difference between squares of sum and difference is (a + b)2 − (a − b)2 = 4ab.

Product Sign Rules

A product ab is positive if both a and b have the same sign (both positive or both negative) and are non-zero.

Data Sufficiency Logic

A statement is sufficient only if it leads to a unique 'Yes' or 'No' answer for the given question under all possible values.

Q41. Answer: (d) 114

Shortcut Trick

Step 1: Split 12996 into two parts: 129 and 96. Since the last digit is 6, the unit digit of the square root must be 4 or 6.

Step 2: Find the largest square less than 129. Since $11^2 = 121$ and $12^2 = 144$, the tens/hundreds part is 11.

Step 3: Multiply 11 by the next number: 11 × 12 = 132. Since 129 < 132, choose the smaller unit digit (4).

Step 4: Combining the parts gives 114.

Therefore The correct answer is 114.

Alternate Method

Given: Number = 12996

Method: Prime Factorisation Method

=> 12996 = 2 × 6498

=> 12996 = 2 × 2 × 3249

=> 12996 = 2 × 2 × 3 × 1083

=> 12996 = 2 × 2 × 3 × 3 × 361

=> 12996 = 2 × 2 × 3 × 3 × 19 × 19

=> √12996 = √($2^2 \times 3^2 \times 19^2$)

=> √12996 = 2 × 3 × 19

=> √12996 = 6 × 19 = 114

Therefore The correct answer is 114.

Additional Information

Unit Digit Property

If a perfect square ends in 6, its square root must end in either 4 or 6 because $4^2 = 16$ and $6^2 = 36$.

Long Division Method

Group digits in pairs from right to left (96, 29, 1) and find the quotient step by step to solve for non-perfect squares or large numbers.

Range Estimation

$100^2 = 10000$ and $120^2 = 14400$. Since 12996 lies between these, the root must be between 100 and 120.

Q42. Answer: (d) 3750

The correct answer is 3750.

Key Points

• By work-energy theorem

• Work was done in overcoming the air resistance=Loss in energy

• Initial KE=0.5×m×v1^(2)

• =0.5×0.01×10^6

• =5000J

• Final KE=0.5×m×v2^(2)

• =0.5×0.01×25×10^4

• =1250J

• Work was done in overcoming the air resistance=5000−1250=3750J

• Hence the correct answer is option 4

Q43. Answer: (b) 2

Given:

76 ÷ 19 × 2 – 6

Concept used:

Follow the BODMAS rule to solve this question, as per the order given below

calculation:

76 ÷ 19 × 2 – 6

=> 4 × 2 – 6

=> 8 – 6

=> 2

Therefore The value of 76 ÷ 19 × 2 – 6 is 2

Q44. Answer: (c) South - East

Given,

Pradeep and Ashoka were running in exactly the opposite direction. Pradeep was running in the north-west direction.

Therefore

Here we see Ashoka is running in the South-East direction.

Hence, the correct answer is South - East.

Q45. Answer: (b) Neither (I) nor (II) follows.

Given,

Statement:

Nowadays the prices of goods are increasing.

Conclusions:

I. All things are becoming rare. → This statement does not follow as all things are not becoming rare.

II. People cannot eat things. → This statement also does not follow as the statement is regarding increasing prices of goods and it has nothing to do what people can eat and not.

Hence, the correct answer is Neither (I) nor (II) follows.

Q46. Answer: (c) C4H9

The correct answer is C4H9.

Key Points

• Homologous series:

• Homologous series is a series of compounds with similar chemical properties and some functional groups differing from the successive member by CH2.

• Carbon chains of varying length have been observed in organic compounds having the same general formula.

• Alkanes with general formula C_nH_(2n+2), alkenes with general formula C_nH_(2n) and alkynes with general formula C_nH_(2n-2) form the most basic homologous series in organic chemistry.

Important Points

• In a homologous series, the increment in the carbon chain of the adjacent members is −CH2.

• Hence C4H9 is not the Homologous series.

Q47. Answer: (a) 155

Given,

'×' is supposed as '-' and

'÷' is supposed as '+'

((55 × 50) ÷ 25) ÷ 125.

Therefore → ((55 - 50) + 25) + 125

→ (5 + 25) + 125

→ 30 + 125

→ 155

Hence, the correct answer is 155.

Q48. Answer: (b) Dinesh Kumar Khara

The correct answer is Dinesh Kumar Khara.

Key Points

• Dinesh Kumar Khara is the current head of State Bank of India.

• State Bank of India :

• It is an Indian multinational, public sector banking and financial services statutory body headquartered in Mumbai, Maharashtra.

• SBI is the 43rd largest bank in the world and ranked 221st in the Fortune Global 500 list of the world's biggest corporations of 2020.

Additional Information

• Dinesh Kumar Khara :

• He has replaced SBI chairman Rajnish Kumar, whose three-year term comes to an end today.

• Mr Khara joined SBI as Probationary Officer in 1984.

• He has over 36 years of rich experience in all facets of Banking.

• The Government appointed Dinesh Kumar Khara as chairman of the bank for three years effective from October 7, 2020.

• Khara was appointed as managing director of SBI in August 2016 for a three-year term..

• Khare was instrumental in merging five associate banks and Bharatiya Mahila Bank with SBI effective April 2017.

• Nita Mukesh Ambani :

• She is an Indian philanthropist.

• She is the chairperson and founder of the Reliance Foundation, Dhirubhai Ambani International School and a non-executive director of Reliance Industries.
• She is married to Reliance Industries chairman and managing director Mukesh Ambani.
• Barkha Singh :
• She is an Indian model.
• She began her career as a child artist at the age of 10.
• Arundhati Bhattacharya :
• She is a retired Indian banker and former Chairperson of the State Bank of India.
• She is the first woman to be the Chairperson of the State Bank of India.
• In 2016 she was listed as the 25th most powerful woman in the world by Forbes.

Q49. Answer: (c) Phloem

The correct answer is Phloem.

Key Points

• Phloem tissue transports food to plants.
• In plants, the synthesized food molecules by the leaves are transported to the different storage organs- roots, stem, fruits with the help of vascular tissue called phloem.
• Phloem is the living tissue in vascular plants that transports the soluble organic compounds made during photosynthesis and known as photosynthates, in particular the sugar sucrose, to parts of the plant where needed.
• This transport process is called translocation.
• The phloem carries food downward from the leaves to the roots.
• Xylem cells constitute the major part of a mature woody stem or root.
• Hence, the correct option is 3.

Additional Information

• Xylem :
• Xylem, plant vascular tissue that conveys water and dissolved minerals from the roots to the rest of the plant and also provides physical support.
• Xylem tissue consists of a variety of specialized, water-conducting cells known as tracheary elements.
• Xylem can be found in vascular bundles, present in non-woody plants and non-woody parts of woody plants.
• Parenchyma :
• The functional tissue of an organ as distinguished from the connective and supporting tissue.
• Parenchyma tissue is composed of thin-walled cells and makes up the photosynthetic tissue in leaves, the pulp of fruits, and the endosperm of many seeds.
• Collenchyma :
• Collenchyma, in plants, supports the tissue of living elongated cells with irregular cell walls.
• Collenchyma cells have thick deposits of cellulose in their cell walls and appear polygonal in cross-section.
• The strength of the tissue results from these thickened cell walls and the longitudinal interlocking of the cells.

Q50. Answer: (d) 26 years

Shortcut Trick

Let B's age be x years. Then A = x + 2, D = 2(x + 2), and C = x/2.

According to the question: D − C = 40

=> 2(x + 2) − x/2 = 40 => 2x + 4 − x/2 = 40 => 3x/2 = 36 => x = 24.

A's age = x + 2 = 24 + 2 = 26 years.

Therefore The correct answer is 26 years.

Alternate Method

Given: A = B + 2, D = 2A, B = 2C, D − C = 40.

=> Let C = y. Then B = 2y.

=> A = B + 2 = 2y + 2.

=> D = 2A = 2(2y + 2) = 4y + 4.

=> D − C = 40

=> (4y + 4) − y = 40

=> 3y + 4 = 40

=> 3y = 36 => y = 12.

=> A = 2y + 2 = 2(12) + 2 = 26 years.

Therefore The correct answer is 26 years.

Additional Information

Linear Equations in Ages

Age problems are solved by translating verbal statements into linear equations. If 'n' years ago age was X, current age is X + n.

Variable Substitution

To solve for multiple people, express all ages in terms of a single variable (usually the youngest person or the person asked in the question).

Ratio of Ages

If the ratio of ages of A and B is a:b, their ages are taken as ax and bx. The difference between their ages remains constant over time.

Q51. Answer: (d) kg ms^(-1)

The correct answer is kg ms-1.

Key Points

• The SI unit for momentum is kg ms^(-1).

• Newton's second law of motion in terms of momentum states that the net external force equals the change in momentum of a system divided by the time over which it changes.

• Momentum can be defined as "mass in motion."

• All objects have mass; so if an object is moving, then it has momentum - it has its mass in motion.

• The amount of momentum that an object has is dependent upon two variables: how much stuff is moving and how fast the stuff is moving

•. Momentum depends upon the variables mass and velocity.

• In terms of an equation, the momentum of an object is equal to the mass of the object times the velocity of the object.

• Momentum = mass * velocity

• Hence, the correct option is 4.

Additional Information

• Impulse

• These concepts are merely an outgrowth of Newton's second law as discussed in an earlier unit.

• Newton's second law (Fnet = m * a) stated that the acceleration of an object is directly proportional to the net force acting upon the object and inversely proportional to the mass of the object.

• Impulse = Change in momentum

Q52. Answer: (b) John

Given,

Four friends Bipin, Anwar, John and Dhoni are playing cards. Anwar and Bipin are partners.

Dhoni is facing north.

Therefore

Anwar is facing West.

Therefore

Here we see John is facing the South direction.

Hence, the correct answer is John.

Q53. Answer: (b) Naveen Patnaik

The correct answer is Naveen Patnaik.

Key Points

• Naveen Patnaik is the current Chief Minister of Odisha.

• Naveen Patnaik (born 16 October 1946) is an Indian politician serving as the current and 14th Chief Minister of Odisha.

• He is also the president of the Biju Janata Dal, a writer.

• He has authored three books.

• He is the longest-serving chief minister of Odisha and as of 2019, one of the longest-serving chief ministers of any Indian state.

• He holding the post for almost two decades, and only the third Indian chief Minister after Pawan Chamling and Jyoti Basu to win five consecutive terms as Chief Minister of an Indian state.

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• Hence, the correct option is 2.

Additional Information

• Mamata Banerjee :

• Mamata Banerjee is an Indian politician who is serving as the 8th and current Chief Minister of West Bengal since 2011.

• She the first woman who holds the office since 2011.

• She founded the All India Trinamool Congress party in 1998 after separating from the Indian National Congress and became its chairwoman.

• Siddaramaiah :

• He is an Indian politician.

• He is currently serving as the Leader of Opposition in the Karnataka Legislative Assembly since 9 December 2019.

• Siddaramaiah is a politician and representative of the Indian National Congress party in the state of Karnataka.

• He is known for his socialist, secular and anti-caste outlook.

• Chandrababu Naidu :

• Nara Chandrababu Naidu is an Indian politician and current leader of opposition in the Andhra Pradesh Legislative Assembly.

• He is a former Chief Minister of Andhra Pradesh, serving from 2014 to 2019.

• He was the first Chief Minister of the state after it was divided

Q54. Answer: (a) C. Rajagopalachari

The correct answer is C. Rajagopalachari.

Key Points

• The first Indian Governor-General of independent India was named C. Rajagopalachari.

• Chakravarti Rajagopalachari, popularly known as Rajaji, was independent India's first Indian Governor-General.

• He was also the last one.

• Chakravarti Rajagopalachari, informally called Rajaji or C.R., was an Indian politician, independence activist, lawyer, writer, historian, and statesman.

• Rajagopalachari was the last Governor-General of India, as India soon became a Republic in 1950.

• Hence, the correct option is 1.

Additional Information

• Annie Besant :

• Annie Besant was a British socialist, theosophist, women's rights activist, writer, orator, educationist, and philanthropist.

• Regarded as a champion of human freedom.

• she was an ardent supporter of both Irish and Indian self-rule.

• She was a prolific author with over three hundred books and pamphlets to her credit.

• C. V. Raman :

• Chandrasekhara Venkata Raman was an Indian physicist known mainly for his work in the field of light scattering.

• With his student K. S. Krishnan, he discovered that when light traverses a transparent material, some of the deflected light changes wavelength and amplitude.

• The Nobel Prize in Physics 1930 was awarded to Sir Chandrasekhara Venkata Raman "for his work on the scattering of light and for the discovery of the effect named after him."

Q55. Answer: (a) c

Given:

Here we see that all the shapes have only three petals except figure c, figure c has four petals.

Therefore c is an inconsistent figure.

Hence, the correct answer is "Option 1".

Q56. Answer: (b) Kiran Rao

The correct answer is Kiran Rao.

Key Points

• Kiran Rao was not awarded the Crystal Award at the World Economic Forum in Davos in January 2018.

• Kiran Rao is an Indian film producer, screenwriter, and director.

• She is married to Bollywood actor Aamir Khan.

• She is the cousin of actress Aditi Rao Hydari.

• In 2016, Rao co-founded Paani Foundation, a non-profit organization working towards the mission of fighting drought in Maharashtra.

• The Crystal Awards celebrate the achievements of leading artists and cultural figures whose leadership inspires inclusive and sustainable change.

• Hence, the correct option is 2.

Additional Information

• Shah Rukh Khan :

• Bollywood Actor Shah Rukh Khan has won the 2018 Crystal Award from India.

• The superstar was honored with this award for his leadership in championing children's and women's rights in India.

• Shah Rukh Khan received the 24th Crystal Award 2019 for "his leadership in championing children's and women's rights in India," the World Economic Forum (WEF).

• Deepika Padukone :

• Bollywood actor Deepika Padukone has been awarded the Crystal Award 2020 at the annual meeting of the World Economic Forum.

• The actor has been awarded for her leadership in raising mental health awareness and her foundation Live Love Laugh.

• Elton John :

• Sir Elton Hercules John CH CBE (born Reginald Kenneth Dwight; 25 March 1947) is an English singer, songwriter, pianist, and composer.

• Collaborating with lyricist Bernie Taupin since 1967 on more than 30 albums,

• John has sold over 300 million records, making him one of the best-selling music artists of all time.

• Cate Blanchett :

• Catherine Elise Blanchett AC is an Australian actor, producer, and theatre director.

• Regarded as one of the greatest actresses of her generation.

• she is noted for her versatile roles in blockbusters, independent films, and in her stage work in various theatre productions

Q57. Answer: (d) Vikram Seth

The correct answer is Vikram Seth.

Key Points

• "God save us from people who mean well is said, Vikram Seth.

• Vikram Seth (born 20 June 1952) is an Indian novelist and poet.

• He has written several novels and poetry books.

• He has received several awards such as Padma Shri, Sahitya Academy Award, Pravasi Bharatiya Samman, WH Smith Literary Award, and Crossword Book Award.

• Seth's most lauded works are the travel book From Heaven Lake (1983), the verse novel The Golden Gate (1986), and the epic novel A Suitable Boy (1993).

• Hence, the correct option is 4.

Additional Information

• Kiran Desai :

• Kiran Desai is an Indian author.

• Her novel The Inheritance of Loss won the 2006 Man Booker Prize and the National Book Critics Circle Fiction Award.

• In January 2015, The Economic Times listed her as one of 20 "most influential" global Indian women.

• Krishnaswami Iyer Narayanaswami :

• Rasipuram Krishnaswami Iyer Narayanaswami, commonly known as R. K. Narayan.

• He was an Indian writer known for his work set in the fictional South Indian town of Malgudi.

• He was a leading author of early Indian literature in English along with Mulk Raj Anand and Raja Rao.

• Khushwant Singh :

• Khushwant Singh was an Indian author, lawyer, diplomat, journalist, and politician.

• His experience in the 1947 Partition of India inspired him to write Train to Pakistan in 1956, which became his most well-known novel.

Q58. Answer: (a) Rs. 700

Shortcut Trick

Effective Interest Rate = 12% × 3.5 = 42%

Total Maturity Amount (%) = 100% (Principal) + 42% (Interest) = 142%

Given: 142% = Rs. 994

Principal Amount (100%) = (994 ÷ 142) × 100 = 7 × 100 = Rs. 700

Therefore The correct answer is Rs. 700.

Alternate Method

Given:

Maturity Amount (A) = Rs. 994

Rate of interest (R) = 12% per annum

Time period (T) = 3.5 years

Formula Used:

Amount = Principal + Simple Interest

A = P + (P × R × T) ÷ 100

Calculations:

=> 994 = P + (P × 12 × 3.5) ÷ 100

=> 994 = P + (P × 42) ÷ 100

=> 994 = P + 0.42P

=> 994 = 1.42P

=> P = 994 ÷ 1.42

=> P = 99400 ÷ 142

=> P = 700

Therefore The correct answer is Rs. 700.

Additional Information

Simple Interest (SI)

It is calculated only on the initial Principal amount throughout the entire period: SI = (P × R × T) ÷ 100.

Principal Amount

The sum of money originally invested or borrowed is called the Principal. It can be found as P = (100 × SI) ÷ (R × T).

Maturity Amount

The total sum of Principal and Interest received at the end of the tenure: A = P(1 + RT/100).

Q59. Answer: (a) Ohm (Ω)

The correct answer is Ohm (Ω).

Key Points

• Resistance is a measure of the opposition to current flow in an electrical circuit.

• Resistance is measured in ohms, symbolized by the Greek letter omega (Ω).

• Ohms are named after Georg Simon Ohm (1784-1854), a German physicist who studied the relationship between voltage, current, and resistance.

• Hence, the correct option is 1.

Additional Information

• Ampere is the SI unit of current.

• Ohm-meter is the SI unit of electrical resistivity which is the measure of an object's ability to oppose the flow of current.

Q60. Answer: (d) Raj Kumar Rao

The correct answer is Raj Kumar Rao.

Key Points

• Raj Kumar Rao played the lead role in the film "Newton", which was released in the year 2017.

• Newton is a 2017 Indian black comedy-drama film co-written and directed by Amit V. Masurkar.

• The film stars Rajkummar Rao, Pankaj Tripathi, Anjali Patil and Raghubir Yadav.

• Newton had its world premiere in the Forum section of the 67th Berlin International Film Festival.

• Raj Kumar Yadav, known professionally as Rajkummar Rao, is an Indian actor known for his work in Hindi films.

• Rao won the Asia Pacific Screen Award for Best Actor and the writers won the award for Best Screenplay.

• He is the recipient of several awards, including a National Film Award, three Filmfare Awards, and an Asia Pacific Screen Award.

• Hence, the correct option is 4.

Additional Information

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• Nawazuddin Siddiqui :
• Nawazuddin Siddiqui is an Indian actor known for his work in Hindi cinema.
• He is an alumnus of the National School of Drama.
• Siddiqui's feature film debut was alongside director Prashant Bhargava in Patang.
• his performance was appreciated by cinema critic Roger Ebert.
• Akshay Kumar :
• Rajiv Hari Om Bhatia, known professionally as Akshay Kumar.
• He is an India-born naturalized Canadian actor, producer, martial artist, and television personality who works in Bollywood.
• Irfan Khan :
• Sahabzade Irfan Ali Khan, known professionally as Irrfan Khan or simply Irrfan.
• He was an Indian actor who worked in Hindi cinema as well as British and American films.

Q61. Answer: (d) 40

Given,
The number of squares is,
Small squares = 24
Squares consisting of four small squares = 11
Squares consisting of nine small squares = 4
Large square = 1
Therefore Total number of squares = 24 + 11 + 4 + 1 = 40
Hence, the correct answer is 40.

Q62. Answer: (c) Statements 1 and 2 both are sufficient.

Given,
Question:
Is this a box?
Statement:
1. It opens and closes with flaps. → Yes, the box opens and closes with flaps.
2. It can be used to store various items. → Yes, the box can be used to store various items.
Here we see both the statements are sufficient/necessary to answer the question.
Hence, the correct answer is Statements 1 and 2 both are sufficient.

Q63. Answer: (d) Both conclusions (1) and (2) follow.

Given,
Statement
All jaguars are cheetah.
All cheetahs are leopards.
All leopards are panthers (black leopards).
All panthers are cats.
Conclusions:
1. Some cats are cheetahs.
2. Some panthers are cheetah.
The least possible Venn diagram for the given statements is as follows,
Conclusions:
1. Some cats are cheetahs. → True (From Venn diagram we see some cats are cheetahs)
2. Some panthers are cheetah. → True (From Venn diagram we see some panthers are cheetahs)
Hence, the correct answer is Both conclusions (1) and (2) follow.

Q64. Answer: (c) Uni-cellular

The correct answer is Uni-cellular.
Key Points
• Nonlinear muscles are Uni-cellular.
• A unicellular organism, also known as a single-celled organism, is an organism that consists of a single cell, unlike a multicellular

organism that consists of multiple cells.
• Unicellular organisms fall into two general categories:
• prokaryotic organisms
• eukaryotic organisms.
• Unicellular organisms include bacteria, protists, and yeast.
• For example, a paramecium is a slipper-shaped, unicellular organism found in pond water.
• It takes in food from the water and digests it in organelles known as food vacuoles.
• Hence, the correct option is 3.
Additional Information
• Multi-cellular :
• Multicellular organisms are organisms that consist of more than one cell, in contrast to unicellular organisms.
• Animals, plants, and fungi are multicellular organisms and often, there is a specialization of different cells for various functions.
• Multicellular organisms arise in various ways, for example by cell division or by aggregation of many single cells.
• Non-cellular :
• Non-cellular life refers to organisms, such as viruses, that exist without any cells.
• The cell theory, which is one of the fundamental tenets of biology, states that all living things are composed of cells and that cells are the basic units of life.
• Viruses, virions, and viroids are all examples of non-cellular life.
• Viruses are parasites that infect plants, animals, fungi, and bacteria.
• They consist of genetic material and a protective protein coat.
• Viruses are dormant without a host.

Q65. Answer: (d) North-West

Given,
Manika moves around her rectangular field at a slow pace.
She starts walking towards the west,
then turns 45° to her right and walks 500m.
Here we see Manika is facing North-West direction.
Hence, the correct answer is North-West.

Q66. Answer: (b) Crystallization water, five

The correct answer is Crystallization water, five.
Key Points
• The water of crystallization or crystallization water is the number of water molecules that combine chemically in a definite molecular proportion, with the concerned salt in the crystalline state.
• In the above formula, $CuSO_4 \cdot 5H_2O$, it is clear that we have 5 H_2O (water) molecules attached to a molecule of $CuSO_4$.
Additional Information
• The water of crystallization is removed by heating and with this, the crystalline properties are also lost.
• Examples are $CaSO_4.2H_2O$, $Na_2CO_3.10H_2O$, $CoCl_2.6H_2O$, etc.

Q67. Answer: (d) Web

Given,
Cow, King, Spider, Web.
Here we see all are living things except Web.
Therefore The Web is mismatched from the others.
Hence, the correct answer is Web.

Q68. Answer: (c) 72 km/h

Shortcut Trick
Total distance = 158.5 + 761.5 = 920 m
Speed (m/s) = 920 ÷ 46 = 20 m/s
Speed (km/h) = 20 × (18/5) = 72 km/h
Therefore The correct answer is 72 km/h.

Alternate Method

Given:

Length of Train (L1) = 158.5 m

Length of Bridge (L2) = 761.5 m

Time taken (t) = 46 seconds

Formula Used:

Speed = Total Distance ÷ Total Time

Total Distance = Length of Train + Length of Bridge

Conversion: 1 m/s = 18/5 km/h

Calculations:

=> Total Distance = 158.5 + 761.5 = 920 m

=> Speed in m/s = 920 ÷ 46

=> Speed in m/s = 20 m/s

=> Speed in km/h = 20 × (18/5)

=> Speed in km/h = 4 × 18 = 72 km/h

Therefore The correct answer is 72 km/h.

Additional Information

Unit Conversion

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

Train Crossing a Point Object

When a train crosses a pole or a standing man, the distance covered is equal to the length of the train itself.

Relative Speed

If two objects move in the same direction, relative speed = S1 − S2. If they move in opposite directions, relative speed = S1 + S2.

Q69. Answer: (c) Only statement I is sufficient.

Given,

Question:

Identify the code for SUN from the given statements.

Statement:

I: GUN is written as HUN and TUN are written as UUN.

II: SUN rises from the east.

From statement I, we get,

GUN → HUN, TUN → UUN

The pattern followed here is,

Here we see we get the code from Statement I.

And statement II is irrelevant as it does not give the answer.

Therefore The only statement I is sufficient.

Hence, the correct answer is the Only statement I is sufficient.

Q70. Answer: (c) Thar Link Express

The correct answer is Thar Link Express.

Key Points

• India and Pakistan have extended the agreement of Thar Link Express for 3 years, ie by 2021, which is the second only rail service between the two countries.

• Thar Link Express :

• India and Pakistan have extended the agreement of Thar Link Express, the second solitary rail service between both countries for three more years till 2021.

• The Thar Express links Jodhpur (India) and Karachi (Pakistan) via Munabao (Rajasthan)-Khokhrapar (Sindh province) border crossing and carries only passengers.

• Currently, two train runs between India and Pakistan.

• One is Samjhauta Express, which starts from Delhi, India, and ends in Lahore, Pakistan and 2nd are Thar Link Express.

• Hence, the correct option is 3.

Additional Information

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• Samjhauta Express :

• The Samjhauta Express is a bi-weekly train — Thursday and Monday — that runs between Delhi and Attari in India and Lahore in Pakistan.

• The word Samjhauta means "agreement", "accord" and "compromise" in both Hindi and Urdu.

• Until the reopening of the Thar Express, this was the only rail connection between the two countries.

• The train was started on 22 July 1976 following the Shimla Agreement and ran between Amritsar and Lahore, a distance of about 52 km.

• On 8 August 2019, the service was suspended by Pakistan following the revocation of Article 370 in Jammu And Kashmir.

• Pakistani authorities briefly suspended the train service on February 28, 2019, following tensions in the aftermath of the Pulwama terror attack in which 40 CRPF soldiers were killed.

Q71. Answer: (d) 40/23 hours

Shortcut Trick

Combined efficiency logic: Net work = 1/2 + 1/5 − 1/8

LCM of 2, 5, and 8 is 40 units.

Net efficiency = 20 + 8 − 5 = 23 units/hr.

Time taken = Total work ÷ Net efficiency = 40/23 hr.

Therefore The correct answer is 40/23 hr.

Alternate Method

Given: Filling time Tap A = 2 hr, Tap B = 5 hr; Emptying time Tap C = 8 hr.

Person	Days	Total Work	Efficiency
Tap A	2	40	20
Tap B	5	8	
Tap C	8	−5	

=> Total capacity of tank (LCM of 2, 5, 8) = 40 units.

=> Efficiency of Tap A = 40 ÷ 2 = +20 units/hr.

=> Efficiency of Tap B = 40 ÷ 5 = +8 units/hr.

=> Efficiency of Tap C (Outlet) = 40 ÷ 8 = −5 units/hr.

=> Combined efficiency of (A + B + C) = 20 + 8 − 5 = 23 units/hr.

=> Time to fill the tank = Total Capacity ÷ Combined Efficiency = 40/23 hr.

Therefore The correct answer is 40/23 hr.

Additional Information

Inlet and Outlet Pipes

An Inlet pipe fills the tank (positive work) while an Outlet pipe empties it (negative work).

Work Rate Formula

If a pipe fills a tank in 'x' hours, part filled in 1 hour = 1/x. If 'y' is emptying time, net work in 1 hour = 1/x − 1/y.

Pipes & Cisterns Logic

The concepts are identical to Time & Work, where efficiency is replaced by the rate of flow of water.

Q72. Answer: (a) [figure]

Given,

In the mirror image the top and bottom part of the figure remains the same and left and right part of the figure interchanges.

Therefore

Therefore The mirror image is

Hence, the figure in option 1 is the correct answer.

Q73. Answer: (c) Violin, Piano

The correct answer is Violin, Piano.

Key Points

• In the 19th century, Western music became popular in India and as a result, the Violin, Piano instruments were adopted.

• The piano is an acoustic, stringed musical instrument invented in Italy by Bartolomeo Cristofori around the year 1700.

• It is played using a keyboard, which is a row of keys (small levers) that the performer presses down or strikes with the fingers

and thumbs of both hands to cause the hammers to strike the strings.

• Pianos can be broken down into three types of categories:

• Grand pianos, Upright pianos, and digital pianos.

• The violin, sometimes known as a fiddle, is a wooden chordophone in the violin family.

• Most violins have a hollow wooden body.

• It is the smallest and thus highest-pitched instrument in the family in regular use.

• A distinctive feature of a violin body is its hourglass-like shape and the arching of its top and back.

• The hourglass shape comprises two upper bouts, two lower bouts, and two concave C-bouts at the waist, providing clearance for the bow.

• Hence, the correct option is 3.

Additional Information

• Guitar :

• The guitar is a fretted musical instrument that usually has six strings.

• It is typically played with both hands by strumming or plucking the strings with either a guitar pick or the fingers/fingernails of one hand, while simultaneously fretting with the fingers of the other hand.

• There are three main types of modern acoustic guitar:

• the classical guitar, the steel-string acoustic guitar, the archtop guitar.

• George Beauchamp invented Guitar.

• Tanpura :

• The tanpura is a long-necked plucked string instrument, originating from India, found in various forms in Indian music.

• It does not play melody but rather supports and sustains the melody of another instrument or singer by providing a continuous harmonic bourdon or drone.

• Sitar :

• The sitar is a plucked stringed instrument, originating from the Indian subcontinent, used in Hindustani classical music.

• The instrument was invented in medieval India and flourished in the 16th and 17th centuries and arrived at its present form in 18th-century India.

Q74. Answer: (a) North

Given,

Two friends park their vehicle outside the garden entrance. The parking lot is 500 meters from the garden entrance and is located 90° to the left of the garden entrance.

The entrance of the garden is towards the east.

Therefore

Here we see the parking lot is towards the North.

Hence, the correct answer is North.

Q75. Answer: (a) CH3, HCl and CH2O

The correct answer is CH3 HCl, and CH2O.

Key Points

• If the molecular formulas of ethane, hydrogen chloride, and glucose are C2H6, HCl, and C6H12O6 respectively, then empirical formulas are CH3, HCl and CH2O respectively

• Hence, the correct option is 1.

Additional Information

• Empirical versus Molecular Formulas

• The formulas we have calculated in the preceding section express the simplest atomic ratio between the elements in the compound.

• Such formulas are called empirical formulas.

• An empirical formula does not necessarily represent the actual numbers of atoms present in a molecule of a compound; it represents only the ratio between those numbers.

• The actual numbers of atoms of each element that occur in the smallest freely existing unit or molecule of the compound are expressed by the molecular formula of the compound.

• The molecular formula of a compound may be the empirical formula, or it may be a multiple of the empirical formula.

• For example, the molecular formula of butane, C4H8, shows that each freely existing molecule of butene contains four atoms of carbon and eight atoms of hydrogen.

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• Its empirical formula is CH_(2.) One molecule of ethylene (molecular formula C2H4) contains two atoms of carbon and four atoms of hydrogen.

• Its empirical formula is CH2.

• Both have the same empirical formula, yet they are different compounds with different molecular formulas.

• Butene is C4H8, or four times the empirical formula; ethylene is C2H4 or twice the empirical formula.

Q76. Answer: (c) 67, 73, 73

Shortcut Trick

The series follows a triplet pattern where the first two numbers are identical and the third follows a separate sequence.

First two numbers of each triplet: 61, 61 → 67, 67 → 71, 71 → 73, 73 (Pattern: +6, +4, +2).

Third number of each triplet: 37 → 52 → 67 (Pattern: +15).

The missing sequence follows the end of the third triplet and the start of the fourth: 67, 73, 73.

Therefore The correct answer is 67, 73, 73.

Alternate Method

Given Series: 61, 61, 37, 67, 67, 52, 71, 71, _, _, _

61, 61, 37

Triplet 1

→

67, 67, 52

Triplet 2

→

71, 71, [67]

Triplet 3

→

73, 73, 82

Step 1: Identify the repeating pair pattern: 61, 67, 71... The differences are +6 and +4. Following the decreasing difference (+6, +4, +2), the next pair starts with 71 + 2 = 73.

Step 2: Identify the third element pattern: 37, 52... The difference is 52 − 37 = 15. The next third element is 52 + 15 = 67.

Step 3: Arrange the missing numbers: The next number is the 3rd element of the 3rd triplet (67), followed by the pair of the 4th triplet (73, 73).

=> Missing values = 67, 73, 73.

Therefore The correct answer is 67, 73, 73.

Additional Information

Mixed/Combination Series

A series where two or more different patterns are interleaved. Here, a repeating pair pattern and a linear arithmetic pattern are combined into triplets.

Decreasing Difference Pattern

In some series, the addition factor itself decreases by a constant value (e.g., +6, +4, +2) which is common in arithmetic progressions of the second order.

Q77. Answer: (d) President

The correct answer is President.

Key Points

• The Chief Election Commissioner is appointed by President.

• The Chief Election Commissioner heads the Election Commission of India.

• A body constitutionally empowered to conduct free and fair elections to the national and state legislatures and of President and Vice-President.

• Sushil Chandra Chief Election Commissioner of India and Chairman.

• A-WEB addressing participants of the International Virtual Election Visitors Programme 2020 for Bihar Legislative Assembly Elections.

• Draupadi Murmu is the current president of India.

• Hence, the correct option is 4.

Additional Information

• Chief Minister :

• A chief minister heads a state government's council of ministers and can be deputed in that role by a deputy chief minister.

• In the Republic of India, a chief minister is the elected head of government of each state out of 28 states and sometimes a union territory.

• The governor appoints and swears in the chief minister, whose council of Ministers are collectively responsible to the assembly.

• The chief minister is elected through a majority in the state legislative assembly.

• This is procedurally established by the vote of confidence in the legislative assembly, as suggested by the governor of the state who is the appointing authority.

• Prime Minister :

• Narendra Damodardas Modi is an Indian politician serving as the 14th and current Prime Minister of India since 2014.

• He was the Chief Minister of Gujarat from 2001 to 2014 and is the Member of Parliament for Varanasi.

• The Prime minister can be a member of any of the two houses of the Parliament of India :

• the Lok Sabha

• the Rajya Sabha

• The prime minister selects and can dismiss members of the cabinet; allocates posts to members within the government.

• The prime minister is the senior-most member of the cabinet in the executive of government in a parliamentary system.

• Vice President :

• Jagdeep Dhankar is the current Vice President of India.

• He served as the Governor of West Bengal and was also a member of Bharatiya Janata Party.

• He served as the Minister of State for Parliamentary Affairs in the Chandrashekhar Mantralaya.

• He won the 2022 election with 74.37% of the votes and recorded the highest election-win margin since the 1992 election.

• Earlier, the 13th Vice President of India was Venkaiah Naidu.

Q78. Answer: (b) 1.205 × 1024

The correct answer is 1.205 × 1024.

Key Points

• Weight of Cl2 =71 g.

• Molecular weight of Cl2 =71 g/mol

• The number of moles of Cl2= 71 g/71g/gatom=1 moles.

• Avogadro's number is 6.023×10^{23} molecules/mol.

• The number of atoms of Cl2 =2 atoms/molecule ×1 mol. $\times6.023\times10^{23}$ molecules/mol =1.205×10^(24) atoms.

• Hence, the correct option is 2.

Q79. Answer: (c) 6 : 11

Shortcut Trick

Ratio of June and Janaki ages y years ago = 2 : 7 (Difference = 5)

Ratio of June and Janaki ages after y years = 2 : 3 = 10 : 15 (Difference = 5)

Change in ratio units = 10 − 2 = 8 units, which corresponds to 2y years.

Hence, y years = 4 units. Present age ratio = (2 + 4) : (7 + 4) = 6 : 11.

Therefore The correct answer is 6 : 11.

Alternate Method

Given:

Let the ages of June and Janaki y years ago be 2k and 7k respectively.

=> Present age of June = 2k + y

=> Present age of Janaki = 7k + y

=> Age after y years of June = 2k + 2y

=> Age after y years of Janaki = 7k + 2y

According to the question:

=> (2k + 2y) / (7k + 2y) = 2 / 3

=> 3(2k + 2y) = 2(7k + 2y)

=> 6k + 6y = 14k + 4y

=> 2y = 8k => y = 4k

Present Age Ratio:

=> (2k + 4k) : (7k + 4k)

=> 6k : 11k = 6 : 11

Therefore The correct answer is 6 : 11.

Additional Information

Ratio Difference Method

When the age difference between two people is constant, the difference between their ratio parts must be made equal to simplify calculations.

Linear Equations in Ages

Age problems often involve shifting the time reference: (Present + n) for future and (Present − n) for the past.

Q80. Answer: (b) 10%

Shortcut Trick

Total Gunpowder = 36 kg

Total known components (Salt + Charcoal) = 27 + 5.4 = 32.4 kg

Remaining Sulfur = 36 − 32.4 = 3.6 kg

Percentage of Sulfur = (3.6 ÷ 36) × 100 = 10%

Therefore The correct answer is 10%.

Alternate Method

Given:

Total Weight of Gunpowder = 36 kg

Weight of Salt = 27 kg

Weight of Charcoal = 5.4 kg

Formula Used:

Weight of Sulfur = Total Weight − (Weight of Salt + Weight of Charcoal)

Percentage of Sulfur = (Weight of Sulfur ÷ Total Weight) × 100

Calculations:

=> Sum of known ingredients = 27 kg + 5.4 kg = 32.4 kg

=> Weight of Sulfur = 36 kg − 32.4 kg = 3.6 kg

=> Percentage of Sulfur = (3.6 / 36) × 100

=> Percentage of Sulfur = 0.1 × 100

=> Percentage of Sulfur = 10%

Therefore The correct answer is 10%.

Additional Information

Percentage Change

Percentage change is calculated as (Change ÷ Original Value) × 100. In mixture problems, the sum of all individual component percentages always equals 100%.

Ratio to Percentage

To convert a component part to percentage, find the ratio of the component weight to the total weight and multiply by 100.

Q81. Answer: (c) Mughal

The correct answer is Mughal.

Key Points

• Humayun's Tomb, built-in 1570, is a fine specimen of great Mughal architecture.

• Humayun's tomb in the capital Delhi is a fine specimen of the great Mughal architecture.

• Built-in 1570, the tomb is of particular cultural significance as it was the first garden-tomb on the Indian subcontinent.

• Humayun's tomb is the tomb of the Mughal Emperor in Delhi, India.

• The tomb was commissioned by Humayun's first wife and chief consort, Empress Bega Begum.

• In 1558 designed by Mirak Mirza Ghiyas and his son, Sayyid Muhammad.

• Hence, the correct option is 3.

Additional Information

• British :

• British architects in India in the later 19th century, especially in public and government buildings in the British Raj.

• The All India War Memorial Arch, also known as the India Gate is one of the monuments built by the British.

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• The monument was designed by the famous British architect Edward Lutyens and was completed in 1931.

• This impressive structure is also a work of art by the British architect Edward Lutyens.

• The 1490s, while other historians date the empire from the early 1600s.

• The end of the empire came in the years after World War 2, with most of Britain's colonies ruling themselves independently by the late 1960s.

• Chola :

• The Cholas ruled for more than 1,500 years, making them one of the longest-ruling families in human history, if not the longest.

• The Chola Empire was based in the Kaveri River Valley, which runs southeast through Karnataka, Tamil Nadu, and the southern Deccan Plateau to the Bay of Bengal.

• The Chola dynasty was a Tamil thalassocracy empire of southern India, one of the longest-ruling dynasties in the world's history.

• Magadha :

• The Hindu Mahabharata calls Brihadratha the first ruler of Magadha.

• King Bimbisara of the Haryanka dynasty led an active and expansive policy, conquering the Kingdom of Anga in what is now West Bengal.

• King Bimbisara was killed by his son, Prince Ajatashatru.

• Magadha was an ancient Indian kingdom in southern Bihar, and was counted as one of the sixteen Mahajanapadas, 'Great Kingdoms' of ancient India.

• Magadha played an important role in the development of Jainism and Buddhism, and two of India's greatest empires, the Maurya Empire and the Gupta Empire, originated in Magadha.

Q82. Answer: (c) A

Given,

When the mirror is placed horizontally the left and right part of the figure remains unchanged and the top and bottom part of the image interchanges.

Therefore

Therefore The mirror image is

Hence, the correct answer is A.

Q83. Answer: (b) Echinodermata

The correct answer is Echinodermata.

Key Points

• Phylum Echinodermata occurs exclusively in marine animals.

• An echinoderm is any member of the phylum Echinodermata of marine animals.

• Sea stars, sea cucumbers, sea urchins, sand dollars, and brittle stars are all examples of echinoderms

• They have a star-like appearance and are spherical or elongated.

• The skeleton is made up of calcium carbonate.

• The organisms are spiny-skinned.

• Echinoderms also have a very simple digestive system, circulatory system, and nervous system.

• Hence, the correct option is 2.

Additional Information

• Platyhelminthes :

• Platyhelminthes are triploblastic, bilaterally symmetrical, dorsoventrally flattened, acoelomate flatworms with organ grade of construction without a definite anus, circulatory, skeletal or respiratory system.

• Animals in the phylum Platyhelminthes are called flatworms because they are flattened from head to tail.

• Platyhelminthes have three embryonic tissue layers:

• ectoderm

• mesoderm

• endoderm

• Platyhelminthes are free-living and can be found in ponds, lakes, streams, ditches, and temporary puddles.

• Coelenterate :

• Coelenterata is a term encompassing the animal phyla Cnidaria and Ctenophora.

• The body form is radially symmetrical, diploblastic, and does not have a coelom.

• In the coelenterates, many kinds of reproduction exist.

• Like all metazoa, they can reproduce sexually.

• The fertilized eggs may produce larvae differing anatomically and ecologically from the adult sexually reproducing stage.

• Nematode :

• Nematodes are very small, slender worms typically about 5 to 100 µm thick, and 0.1 to 2.5 mm long.

• They are a diverse animal phylum inhabiting a broad range of environments.

• Many species of nematodes are 'free-living, living in soil, sea, and freshwater.

• These feed on bacteria, fungi, protozoans, and even other nematodes, and play a very important role in nutrient cycling and release of nutrients for plant growth.

Q84. Answer: (d) 2

Shortcut Trick

For 1234x to be divisible by 11, the difference between the sum of digits at odd places and even places must be 0 or a multiple of 11.

Sum of odd-position digits from right: x + 3 + 1 = x + 4

Sum of even-position digits from right: 4 + 2 = 6

Set them equal: x + 4 = 6 => x = 2

Therefore The correct answer is 2.

Alternate Method

Given: The 5-digit number is 1234x, which is completely divisible by 11.

Formula Used: Divisibility rule of 11 states that (Sum of digits at odd places) − (Sum of digits at even places) = 0 or a multiple of 11.

=> Let the digits of 1234x from left to right be d5 = 1, d4 = 2, d3 = 3, d2 = 4, and d1 = x.

=> Sum of digits at odd places (1st, 3rd, 5th from right) = x + 3 + 1 = x + 4

=> Sum of digits at even places (2nd, 4th from right) = 4 + 2 = 6

=> Difference = (x + 4) − 6 = x − 2

=> For divisibility by 11, x − 2 = 0

=> x = 2

Therefore The correct answer is 2.

Additional Information

Divisibility Rule of 11

A number is divisible by 11 if the difference between the sum of the digits at odd places and the sum of the digits at even places is either 0 or divisible by 11.

Divisibility Rule of 9

A number is divisible by 9 if the sum of all its individual digits is completely divisible by 9.

Divisibility Rule of 8

A number is divisible by 8 if the number formed by its last three digits is completely divisible by 8.

Q85. Answer: (b) Madras High Court

The correct answer is Madras High Court.

Key Points

• Madras High Court is the first in South India and the eighth court in the country, in which an e-court payment facility has been introduced.

• The Madras High Court is the second oldest High Court of India after the Calcutta High Court in Kolkata.

• It is located in Chennai, Tamil Nadu.

• Thiruvarur Muthuswamy Iyer KCI was an Indian lawyer who, in 1877, became the first native Indian to be appointed as judge of the Madras High Court.

• He also acted as the Chief Justice of the Madras High Court in 1893.

• He is also one of the first Indians to have a statue.

• Hence, the correct option is 2.

Additional Information

• Electronic court :

• The e-Court Fee system is an internet-based application that gives you the convenience of paying court fees without hassles involved in obtaining physical Judicial Stamps.

• The system is secure and reliable.

• An electronic court is a location in which matters of law are adjudicated upon, in the presence of qualified Judge or Judges, which has a well-developed technical infrastructure.

• Mumbai High Court :

• The Bombay High Court is one of the oldest High Courts of India.

• It is located in Mumbai, Maharashtra.

• Its jurisdiction covers the states of Maharashtra and Goa and the Union Territory of Dadra and Nagar Haveli and Daman and Diu.

• Kerala High Court :

• The High Court of Kerala is the highest court in the Indian state of Kerala and in the Union Territory of Lakshadweep.

• It is located in Kochi.

• Karnataka High Court :

• The High Court of Karnataka is the High Court of the Indian state of Karnataka and thus its highest judicial authority.

• The court's principal bench is located in Bangalore, the capital city of Karnataka, with additional benches in Hubli-Dharwad and Gulbarga.

Q86. Answer: (c) KJ mol^(-1)

The correct answer is KJ mol-1.

Key Points

• Ionization energy is the energy required to remove an electron from one mole of gaseous atoms.

• Units = Energy/Mol

• = KJ/mol

• =KJ mol−1

• Hence, the correct option is 3.

Additional Information

• Ionization energy is the quantity of energy that an isolated, gaseous atom in the ground electronic state must absorb to discharge an electron, resulting in a cation.

• H(g)→H+(g)+e^−

• This energy is usually expressed in kJ/mol, or the amount of energy it takes for all the atoms in a mole to lose one electron each.

• The most notable factors affecting the ionization energy include:

• Electron configuration: this accounts for most element's IE, as all of their chemical and physical characteristics can be ascertained just by determining their respective electron configuration.

• Nuclear charge: if the nuclear charge (atomic number) is greater, the electrons are held more tightly by the nucleus and hence the ionization energy will be greater.

• A number of electron shells: if the size of the atom is greater due to the presence of more shells, the electrons are held less tightly by the nucleus and the ionization energy will be lesser.

• Effective nuclear charge (Zeff): if the magnitude of electron shielding and penetration is greater, the electrons are held less tightly by the nucleus, the Zeff of the electron, and the ionization energy is lesser.

• Type of orbital ionized: an atom having a more stable electronic configuration has less tendency to lose electrons and consequently has higher ionization energy.

• Electron occupancy: if the highest occupied orbital is doubly occupied, then it is easier to remove an electron.

Q87. Answer: (c) Silver

The correct answer is Silver.

Key Points

• Silver metals are used as electrode iron material.

• Silver is a chemical element with the symbol Ag and atomic number 47.

• A soft, white, lustrous transition metal.

• It exhibits the highest electrical conductivity, thermal conductivity, and reflectivity of any metal.

• Silver is mined in many countries, but most come from the USA, Canada, Mexico, Peru, and Bolivia.

• Silver is commonly extracted from ore by smelting or chemical leaching.

• Hence, the correct option is 3.

Confusion Points

• Zinc is used for the galvanization of iron but to use iron as an electrode, a coating of silver is used.

Additional Information

• Zinc :

• Zinc is a chemical element with the symbol Zn and atomic number 30.

• Zinc is a slightly brittle metal at room temperature and has a blue-silvery appearance when oxidation is removed.

• It is the first element in group 12 of the periodic table.

• Zinc is a bluish-white, lustrous metal.

• Calcium :

• Calcium is a chemical element with the symbol Ca and atomic number 20.

• As an alkaline earth metal, calcium is a reactive metal that forms a dark oxide-nitride layer when exposed to air.

• Its physical and chemical properties are most similar to its heavier homologs strontium and barium.

• Aluminium:

• Aluminium is a chemical element with the symbol Al and atomic number 13.

• Aluminium has a density lower than those of other common metals, at approximately one-third that of steel.

• Aluminium has a great affinity towards oxygen, thanks to which it forms a protective layer of oxide on the surface.

Q88. Answer: (a) Rs. 630

Shortcut Trick

Total Simple Interest percentage for 4 years = 7.5% × 4 = 30%.

Total Amount percentage = 100% (Principal) + 30% (Interest) = 130%.

Given that 130% corresponds to Rs. 819.

Principal (100%) = (819 ÷ 130) × 100 = 6.3 × 100 = Rs. 630.

Therefore The correct answer is Rs. 630.

Alternate Method

Given:

Total Amount (A) = Rs. 819

Rate of Interest (R) = 7.5% p.a.

Time Period (T) = 4 years

Formula Used:

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

Amount (A) = Principal (P) + Simple Interest (SI) = P + (P × R × T) ÷ 100

Calculations:

=> 819 = P + (P × 7.5 × 4) ÷ 100

=> 819 = P + (P × 30) ÷ 100

=> 819 = P + 0.3P

=> 819 = 1.3P

=> P = 819 ÷ 1.3

=> P = 8190 ÷ 13

=> P = 630

Therefore The correct answer is Rs. 630.

Additional Information

Simple Interest Formula

The interest calculated only on the initial principal is SI = (P × R × T) ÷ 100, where P is principal, R is rate, and T is time.

Compound Interest Comparison

For the first year, SI and CI are equal if the interest is compounded annually. CI = P(1 + R/100)^T − P.

Effective Rate of Interest

In Simple Interest, the effective rate for the entire period is simply R × T. In Compound Interest, it is [(1 + R/100)^T − 1] × 100.

Q89. Answer: (a) Sclerenchyma

The correct answer is Sclerenchyma.

Key Points

• Sclerenchyma is the tissue that makes the plant hard and strong.

• Sclerenchyma tissue, when mature is composed of dead cells that have heavily thickened walls containing lignin and a high cellulose content (60%–80%).

• It serves the function of providing structural support in plants.

• Sclerenchyma cells possess two types of cell walls:

• primary walls

• secondary walls.

• Hence, the correct option is 1.

Additional Information

• Aerenchyma :

• Aerenchyma is a spongy tissue that forms spaces or air channels in the leaves, stems, and roots of some plants, which allows the exchange of gases between the shoot and the root.

• Aerenchyma is the parenchyma cells present in floating water plants that have air vacuoles that give them buoyancy and help them float.

• Chlorenchyma:

• chlorenchyma Parenchyma tissue that contains chloroplasts and is photosynthetic.

• Chlorenchyma makes up the mesophyll tissue of plant leaves and is also found in the stems of certain plant species.

• A chlorenchyma has chlorophyll-containing plastids called chloroplasts. A chloroplast is a plastid that contains high amounts of green pigment.

• Parenchyma:

• Parenchyma tissue is composed of thin-walled cells and makes up the photosynthetic tissue in leaves, the pulp of fruits, and the endosperm of many seeds.

• Collenchyma cells mainly form supporting tissue and have irregular cell walls.

• They are found mainly in the cortex of stems and in leaves.

Q90. Answer: (a) Dribble

The correct answer is Dribble.

Key Points

• Dribble words are related to football.

• Dribbling is manoeuvring a ball by one player while moving in a given direction, avoiding defenders' attempts to intercept the ball.

• A successful dribble will bring the ball past defenders legally and create opportunities to score.

• The dribbling is related to:

• The "solo" in Gaelic football, kicking the ball to oneself while running.

• The "hop" in Gaelic football, bouncing the ball on the ground and back to oneself while running.

• Hence, the correct option is 1.

Additional Information

• Nightwatchman:

• In the sport of cricket, a nightwatchman is a lower-order batsman who comes in to bat higher up the order than usual near the end of the day's play.

Doosra:

• It is a very difficult skill to master so you'll need plenty of practice if you want to learn how to do it.

• However, its validity has been called into question because of the number of off-spinners who have been reported to the International Cricket Council for suspect actions bowling the doosra.

• Googly :

• A “googly”(coined by cricketer B.J.T. Bosanquet on the 1903–04 MCC tour) is a ball bowled with fingerspin that breaks unexpectedly in the opposite direction from that anticipated by the batsman given the motion of the bowler.

Q91. Answer: (d) Blotch

The correct answer is Blotch.

Key Points

• Blotch type of vegetative spread is seen in chrysanthemum (Guldaudi).

• Chrysanthemum has been commercially propagated by rooting of cuttings, whereas the quality will decline over multiple collections from a single plant.

• They are native to East Asia and northeastern Europe.

• Most species originate from East Asia and the centre of diversity is in China.

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• Chrysanthemum is propagated vegetatively either through root suckers or terminal cuttings.

Additional Information

• Vegetative propagation is commonly used to multiply elite individuals in a number of horticultural and silvicultural plants and particularly frequently in chrysanthemum (Chrysanthemum grandiflorum).

• Chrysanthemum is one of the major world ornamental species, and cuttings are normally taken from a stock plant, but their vigour of cuttings tends to decline when the cuttings were harvested repeatedly from the same stock plants.

• It is laborious to reestablish the stock plants to meet the need for cuttings.

• The development of techniques to extend the period for cuttings collection would therefore be of significant economic interest.

Q92. Answer: (c) 8

Shortcut Trick

Total Capacity (LCM of 36, 30) = 180 units.

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

Required Efficiency for total work in 2.5 hours = 180 ÷ 2.5 = 72.

Using Alligation: If all 32 were Builders, efficiency = 32 × 5 = 160. If all 32 were Destroyers, efficiency = 32 × (−6) = −192.

Ratio of Builders to Destroyers = |72 − (−192)| : |160 − 72| = 264 : 88 = 3 : 1.

Number of Destroyers = (1 ÷ 4) × 32 = 8.

Therefore The correct answer is 8 destroyers.

Alternate Method

Given: Total persons = 32, Builder time = 36 hrs, Destroyer time = 30 hrs, Completion time = 2.5 hrs.

Formula Used: Total Work = Time × Net Efficiency

=> Let Total Work = LCM(36, 30) = 180 units.

=> Efficiency of 1 Builder = 180 ÷ 36 = +5 units/hr.

=> Efficiency of 1 Destroyer = 180 ÷ 30 = −6 units/hr.

=> Let the number of destroyers be 'd'. Then number of builders = (32 − d).

=> Net Efficiency = 5(32 − d) − 6d = 160 − 5d − 6d = 160 − 11d.

=> Work done in 2.5 hours = (160 − 11d) × 2.5 = 180.

=> 160 − 11d = 180 ÷ 2.5 = 72.

=> 11d = 160 − 72 = 88.

=> d = 8.

Therefore The correct answer is 8 destroyers.

Additional Information

Pipes and Cisterns Analogy

Builders act like inlet pipes (positive efficiency) and destroyers act like outlet pipes (negative efficiency).

Net Work Calculation

Total Work = (Sum of Builder Efficiencies − Sum of Destroyer Efficiencies) × Total Time.

Alligation Method in Time & Work

Useful when two groups with different efficiencies contribute to a single target rate; it directly provides the ratio of members in each group.

Q93. Answer: (b) Rajasthan

The correct answer is Rajasthan.

Key Points

• The Khetri mines are located in Rajasthan.

• Khetri mines in Rajput are famous for copper mines.

• Khetri Nagar, which is located 10 km far from Khetri, is known as the 'Tamba Project'.

• Khetri Nagar was built by Hindustan Copper Limited which is a public sector under the "Government of India" and under his jurisdiction.

• Khetri Nagar is a town in the Jhunjhunu district of Rajasthan in India.

• Khetri Nagar is also very well known with the name of 'Copper'.

Additional Information

• There are four main mining methods: underground, open surface (pit), placer, and in-situ mining.

• Underground mines are more expensive and are often used to reach deeper deposits.

• Surface mines are typically used for more shallow and less valuable deposits.

• Placer mining is used to sift out valuable metals from sediments in river channels, beach sands, or other environments.

• In-situ mining, which is primarily used in mining uranium, involves dissolving the mineral resource in place then processing it at the surface without moving rock from the ground.

Q94. Answer: (c) 4 m

Shortcut Trick

Volume of soil = Area of remaining ground × Rise in height

40 × 18 × 12 = [(80 × 36) − (40 × 18)] × h

8640 = [2880 − 720] × h

8640 = 2160 × h => h = 8640 ÷ 2160 = 4 m

Therefore The correct answer is 4 m.

Alternate Method

Given:

Ground dimensions: Length = 80 m, Width = 36 m

Pit dimensions: Length = 40 m, Width = 18 m, Depth = 12 m

Calculations:

=> Total area of ground = 80 × 36 = 2880 m^2

=> Area of the pit = 40 × 18 = 720 m^2

=> Remaining area = 2880 − 720 = 2160 m^2

=> Volume of soil excavated from the pit = 40 × 18 × 12 = 8640 m^3

=> Rise in height (h) = Volume ÷ Remaining Area

=> h = 8640 ÷ 2160

=> h = 4 m

Therefore The correct answer is 4 m.

Additional Information

Volume of Cuboid

The volume of a rectangular cuboid is calculated as Length × Width × Height.

Area Conservation

When soil is spread on the remaining ground, the area of the pit must be subtracted from the total surface area.

Volume Displacement

Volume of earth taken out = Volume of earth spread on the level ground.

Q95. Answer: (b) 2

Shortcut Trick

For divisibility by 11, the difference between the sum of digits at odd places and the sum of digits at even places must be 0 or a multiple of 11.

Sum of digits at odd places (8, 1, x) = 8 + 1 + x = 9 + x

Sum of digits at even places (2, 9) = 2 + 9 = 11

Difference = (9 + x) − 11 = x − 2

For divisibility, x − 2 = 0 => x = 2.

Therefore The correct answer is 2.

Alternate Method

Given: The number 8219x is divisible by 11.

Divisibility Rule of 11: (Sum of digits at odd positions) − (Sum of digits at even positions) = 0, 11, 22, ...

=> Sum of digits at odd places = 8 + 1 + x = 9 + x

=> Sum of digits at even places = 2 + 9 = 11

=> Difference = (9 + x) − 11

=> x − 2 = 0

=> x = 2

Therefore The correct answer is 2.

Additional Information

Divisibility by 9

A number is divisible by 9 if the sum of its digits is divisible by 9.

Divisibility by 8

A number is divisible by 8 if the last three digits of the number are divisible by 8.

Alternate Divisibility by 11

You can also subtract the last digit from the rest of the number; if the result is divisible by 11, the original number is too.

Q96. Answer: (d) 12

Shortcut Trick

Total remaining work in terms of men-days = 60 men × (17 − 6) days = 660 men-days.

Remaining workers = 60 − 5 = 55 men.

Remaining days = 660 ÷ 55 = 12 days.

Therefore The correct answer is 12 days.

Alternate Method

Given: Total men = 60, Total time = 17 days, Days worked = 6, Men left = 5.

Formula Used: M1D1 = M2D2 (for remaining work)

Remaining work was originally for 60 men for (17 − 6) days.

=> M1 = 60 men

=> D1 = 11 days

=> M2 = 60 − 5 = 55 men

=> 60 × 11 = 55 × D2

=> D2 = 660 ÷ 55

=> D2 = 12 days

Therefore The correct answer is 12 days.

Additional Information

Work-Efficiency Relation

Total Work = Number of Men × Days × Efficiency. If work is constant, M1D1 = M2D2.

Man-Day Concept

One man-day is the amount of work done by one man in one day. Total work is the sum of man-days required.

Chain Rule

For different work amounts: (M1D1H1)/W1 = (M2D2H2)/W2, where H is hours and W is work.

Q97. Answer: (a) Large area, which reduces pressure.

The correct answer is Large area, which reduces pressure.

• Wooden sleepers (timber) are used under the rail and it produces a large area, which reduces pressure. Hence, the correct option is 1.

Key Points

• There are many kinds of wood that can be used as the railroad sleeper in the world, but not every kind of wood can be used.

• At the different sections of the tracks, for example, common track section, turnout track section, bridge track section, etc.,

• wood can be divided into hardwood and softwood according to the hardness of wood texture.

• Hardwood railway sleepers are made chiefly from oak, beech, and hornbeam.

• softwood railway sleepers from Scots pine, maritime pine (Pines pinaster), and larch.

Additional Information

• Timber sleeper used:

• Railway sleepers can be used in lots of different applications, from raised beds and planters to retaining walls and water features.

• Railway sleepers are a great alternative to using brick or stone and look absolutely amazing, giving your garden area a rustic feel.

• Railroad construction, wood rail sleeper, steel rail sleeper, and concrete rail sleeper are the three most common rail sleepers.

• Tracing the source, the rail sleeper originates from a wooden sleeper.

• In the past 100 years, wood rail sleepers are the widest rail sleepers in the railroad, especially in heavy rail and bridge rail.

• With the development and technical requirements of railroad construction, rail sleepers are now made of varieties materials, such as steel, concrete, and rubber.

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Q98. Answer: (a) Kavya

Given,

Veena and Bindu play Carrom and Throwball.

Kavya and Pavitra play tennis and chess.

Bindu and Kavya play chess and throwball.

Veena and Pavitra play carrom and tennis.

Therefore,

Name	Games played
Kavya	Tennis, Chess, Throwball
Veena	Carrom, Throwball, Tennis
Bindu	Carrom, Throwball, Chess
Pavitra	Tennis, Chess, Carrom

Here we see Kavya plays chess, throwball and tennis.

Hence, the correct answer is Kavya.

Q99. Answer: (d) Both 1 and 2 together are sufficient.

Shortcut Trick

To find the total sales of Company Y, we need both the revenue from product Y and confirmation that no other products were sold.

Statement 1 provides the calculation: 2000 units × Rs. 1000 = Rs. 20,00,000 for Product Y.

Statement 2 confirms that Product Y was the only source of revenue in 2017.

Combining both, we get the exact total company sales as Rs. 20,00,000.

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

Alternate Method

Given:

Quantity of Product Y = 2000 units

Price per unit of Product Y = Rs. 1000

Other products released = 0 (from Statement 2)

Formula Used:

Total Sales = (Price1 × Quantity1) + (Price2 × Quantity2) + ... + (Price_n × Quantity_n)

=> Sales from Product Y = 2000 × 1000

=> Sales from Product Y = Rs. 20,00,000

=> Total Sales = Sales from Product Y + Sales from other products

=> Since Statement 2 states other products = 0

=> Total Sales = Rs. 20,00,000 + 0 = Rs. 20,00,000

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

Additional Information

Data Sufficiency Logic

A question is solvable only if all variables in the equation (Revenue = Σ P × Q) are defined or restricted.

Revenue Components

Total Revenue of a firm includes all sales, service income, and interest unless specified otherwise.

Exclusion Principle

In business math, knowing what was not sold is as important as knowing what was sold to determine the final total.

Q100. Answer: (c) 18

Shortcut Trick

The range of the data is the difference between the largest and smallest numbers (z − w).

Range = (Sum of largest 3) − (Sum of smallest 3)

Range = (29 × 3) − (23 × 3) = 3 × (29 − 23)

Range = 3 × 6 = 18

Therefore The correct answer is 18.

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Alternate Method

Given: Four numbers w, x, y, z in ascending order ($w \le x \le y \le z$).

Formula Used: Sum = Average × Number of observations | Range = Maximum − Minimum

=> Sum of smallest three $(w + x + y) = 23 \times 3 = 69$ → (1)

=> Sum of largest three $(x + y + z) = 29 \times 3 = 87$ → (2)

=> Subtracting equation (1) from equation (2):

=> $(x + y + z) - (w + x + y) = 87 - 69$

=> $z - w = 18$

Therefore The correct answer is 18.

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