# RRC Group D Previous Year Paper 27 (Held On: 23 Sept 2018 Shift 2)

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

**Take this paper as a timed mock test**

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

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

## CBT

**Q1.** The LCM of 15x³y^4and 12x²y^5is:

**(a)** 25x³y^5
**(b)** 15x³y^5
**(c)** 12x³y³
**(d)** 60x³y^5

**Q2.** An object of mass 1 kg has a potential energy of 2 J relative to the ground, when it is at a height of? (Take g = 10 m/s²)

**(a)** 0.2 m
**(b)** 1 m
**(c)** 0.1 m
**(d)** 0.5 m

**Q3.** Find the next number in the series:

13, 18, 28, 43, 63, ?

**(a)** 89
**(b)** 88
**(c)** 90
**(d)** 85

**Q4.** 84 ÷ [50-{4³ - (30-128 ÷ 8 × 4)}] = ?

**(a)** 12
**(b)** 3
**(c)** 4
**(d)** 7

**Q5.** Babur, an Afghan ruler, established the Mughal dynasty in India in _____.

**(a)** 1526 AD
**(b)** 1256 AD
**(c)** 1656 AD
**(d)** 1652 AD

**Q6.** Rahim started a journey 15 minutes late, and as a result, had to drive at a speed of 54 km/h instead of 45 km/h to reach his destination on time. What is the distance covered during the course of the journey?

**(a)** 90 Km
**(b)** 67.5 Km
**(c)** 13.5 Km
**(d)** 75.5 Km

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**Q7.** In a square having a side of 23 m, two 3 m wide paths run through the centre of the park. What will be the total cost of gravelling the path at the rate of Rs. 1/dm²?

**(a)** Rs. 129
**(b)** Rs. 13,800
**(c)** Rs. 12,900
**(d)** Rs. 138

**Q8.** Read the given statement and the following conclusions carefully and select which of the conclusions logically follow(s) from the statements.

Statement:

I. All emerald are gems.

II. All gems are rocks.

Conclusions:

I. All emeralds are rocks.

II. All rocks are emeralds.

**(a)** Only conclusion II follows.
**(b)** No conclusions follow.
**(c)** All the conclusions follow.
**(d)** Only conclusion I follows.

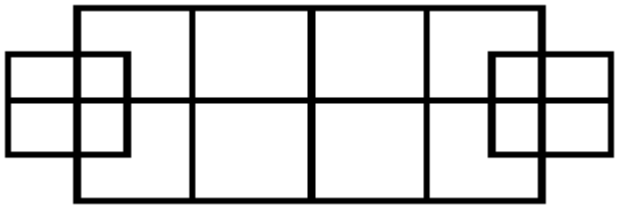
**Q9.** Who has been appointed as the first female chief justice of Pakistan?

**(a)** Syeda Tahira Safdar
**(b)** Fauziya Ahmed
**(c)** Jameela Khan
**(d)** Nabeela Hussain

**Q10.** How many banks were nationalised in 1969?

**(a)** 8
**(b)** 10
**(c)** 7
**(d)** 14

**Q11.** How many squares are present in the following figure?



**(a)** 15
**(b)** 18
**(c)** 16
**(d)** 17

**Q12.** The power of a lens is -2.5 D. The type of lens and its focal length are respectively:

**(a)** Convex, -0.40 m
**(b)** Concave, -0.40 m
**(c)** Concave, 0.40 m
**(d)** Convex, 0.40 m

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**Q13.** Which mela/fair to be listed in UNESCO's list of Intangible cultural heritage.

**(a)** Kumbh Mela
**(b)** Gangasagar Mela
**(c)** Jagannath Rath-Yatra Mela
**(d)** Pushkar Fair

**Q14.** Ce-58 is a member of _____ block of elements.

**(a)** d
**(b)** p
**(c)** f
**(d)** s

**Q15.** An object of mass 20 kg is moving with an uniform velocity of 5 ms^(-1). What is the kinetic energy possessed by it.

**(a)** 350 J
**(b)** 150 J
**(c)** 200 J
**(d)** 250 J

**Q16.** Who predicted the existence of some yet to be discovered elements on the basis of gaps in his periodic table?

**(a)** Mendeleev
**(b)** Dobereiner
**(c)** Newlands
**(d)** Mosely

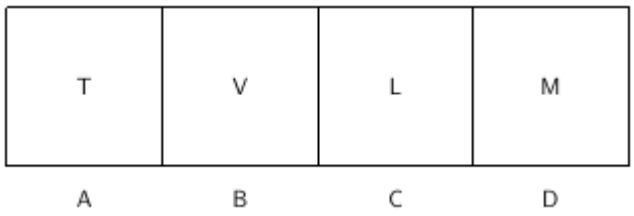
**Q17.** Which of the following three elements have filled outermost shells?

**(a)** Magnesium (Mg), Helium (He), Neon (Ne)
**(b)** Magnesium (Mg), Calcium (Ca), Barium (Ba)
**(c)** Lithium (Li), Sodium (Na), Potassium (K)
**(d)** Helium (He), Neon (Ne), Argon (Ar)

**Q18.** Seema got Rs. 50 from her father and bought a toffee for Rs. 15. Her mother gave her Rs. 30, but her brother took Rs. 42 from her. How much money was left with her?

**(a)** Rs. 20
**(b)** Rs. 5
**(c)** Rs. 23
**(d)** Rs. 24

**Q19.** Find the odd one out:




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

**Q20.** Qutub-ud-din Aibak became the first Sultan of Delhi in _____.

**(a)** 1206 AD
**(b)** 1060 AD
**(c)** 1260 AD
**(d)** 1606 AD

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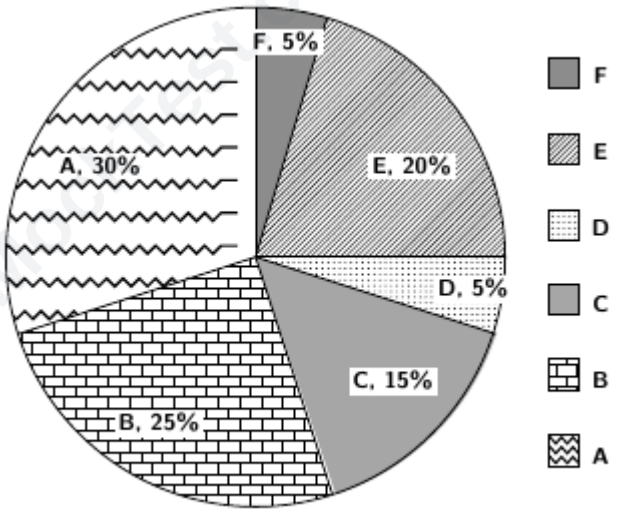
**Q21.** The area of an equilateral triangle is half the area of a square. The ratio of the height of the said triangle and an edge of the square is:

**(a)** √3:2
**(b)** √2 :4√3
**(c)** √3 :4√2
**(d)** 4√3 :√2

**Q22.** If PINE is written as SLQH, then how will you write ATE?

**(a)** DWH
**(b)** WEI
**(c)** EWI
**(d)** EUG

**Q23.** The following pie diagram shows the information about Non Performing Assets (NPA) processed by the various banks of India until December 2017. If the total NPA under all the banks is 300 lakh crores, which bank contains more NPA compared to the other banks?




**(a)** F
**(b)** B
**(c)** A
**(d)** E

**Q24.** Select the option that is related to the third word on the same basis as the second word is related to the first word.

Hot : Cold : : Talk : ?

**(a)** Walk
**(b)** Silence
**(c)** Composed
**(d)** Hot

**Q25.** Name the committee that has been constituted by the Union government to examine the existing framework with regard to virtual currencies?

**(a)** Dharamraj Committee
**(b)** Dinesh Sharma Committtee
**(c)** Dheeraj Sharma Committee
**(d)** Govind Rajan Committee

**Q26.** An express train moves with a speed of 144 km/hr. Calculate the distance covered by train in 15 minutes.

**(a)** 35 km
**(b)** 32 km
**(c)** 33 km

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**(d)** 36 km

**Q27.** A question is given followed by two arguments numbered I and II. you have to decide which of the arguments is a 'strong' argument.

Question: Should the people of India pay taxes to the government?

Arguments:

I. Yes, taxes have to be paid to the government to run the country.

II. No, taxes need not to be paid, as a person has to look after his/her needs first.

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

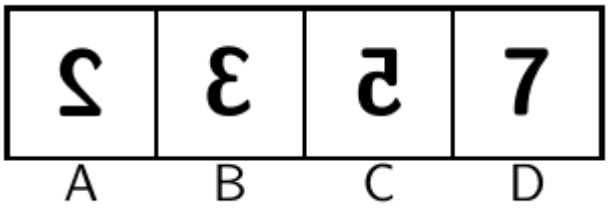
**Q28.** What is Sublimation?

**(a)** It is the process of conversion of a liquid into gas
**(b)** It is the process of conversion of a solid into liquid.
**(c)** It is the process of conversion of a solid into vapour.
**(d)** It is the process of conversion of a gas into liquid.

**Q29.** Pipes A and C can fill an empty cistern in 7 and 10.5 hours, respectively while pipe B can drain the filled cistern in 5.25 hours. If the three pipes are turned on together when the cistern is empty, how many hours will it take for the cistern to be 2/3 full?

**(a)** 21
**(b)** 12
**(c)** 14
**(d)** 15.75

**Q30.** Find the odd one out:




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

**Q31.** The _____ is connected in parallel in an electric circuit.

**(a)** Voltmeter
**(b)** Fuse
**(c)** Galvanometer
**(d)** Ammeter

**Q32.** Find the next term in the series.

C2, G12, K72, _____.

**(a)** O434
**(b)** O432
**(c)** P434
**(d)** P432

**Q33.** Read the given statements and the following conclusions carefully and select which of the conclusions logically follow(s) from the statements.

Statements:

All spectacles are glass.

All glass are sand.

Conclusions:

All spectacles are sand.

All sand are glass.

**(a)** Only conclusion 2 follows.
**(b)** All the conclusions follow.
**(c)** Only conclusion 1 follows.
**(d)** None of the conclusions follows.

**Q34.** Which of the following does NOT belong to this group?

A. Rock

B. River

C. Author

D. Mountain

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

**Q35.** Satya Pal Malik was appointed as the Governor of _____ by President Ram Nath Kovind.(2019)

**(a)** Goa
**(b)** Bihar
**(c)** Odisha
**(d)** Jharkhand

**Q36.** In 2018, who took charge as the chief of the Narcotics Control Bureau?

**(a)** H.P. Kumar
**(b)** Abhay
**(c)** S.C. Rohatgi
**(d)** Rakesh Goyal

**Q37.** Which of the following physical quantities has no unit?

**(a)** Momentum
**(b)** Density
**(c)** Pressure
**(d)** Relative density

**Q38.** Consider the given statement(s) and decide which of the given assumption(s) is/are implicit in the statement.

Statement:

Exercise improves overall health.

Assumptions:

I. Increased serotonin levels brings health benefits.

II. Exercise removes toxins naturally in the form of sweat.

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

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**Q39.** X = 63.5535/13.05

Find the value of x?

**(a)** 4.46
**(b)** 4.28
**(c)** 4.87
**(d)** 4.48

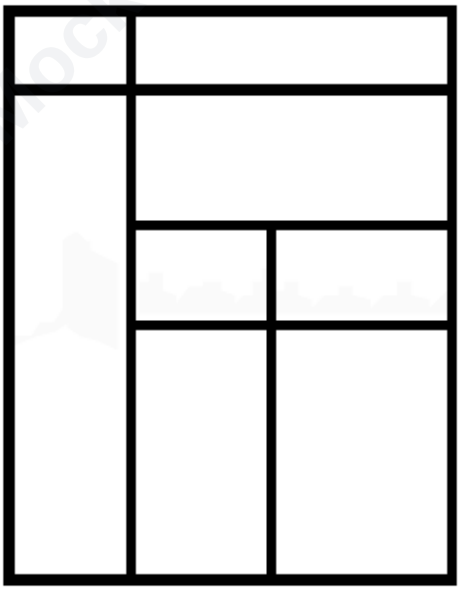
**Q40.** In a village, 15% of the population are females and there are 272 males. Find the total population of that village.

**(a)** 400
**(b)** 420
**(c)** 380
**(d)** 320

**Q41.** What is the GDP growth rate for India in 2019-20 projected by International Monetary Fund (IMF)?

**(a)** 6.5%
**(b)** 4.8%
**(c)** 6%
**(d)** 5.5%

**Q42.** How many rectangles are there in the following figure?

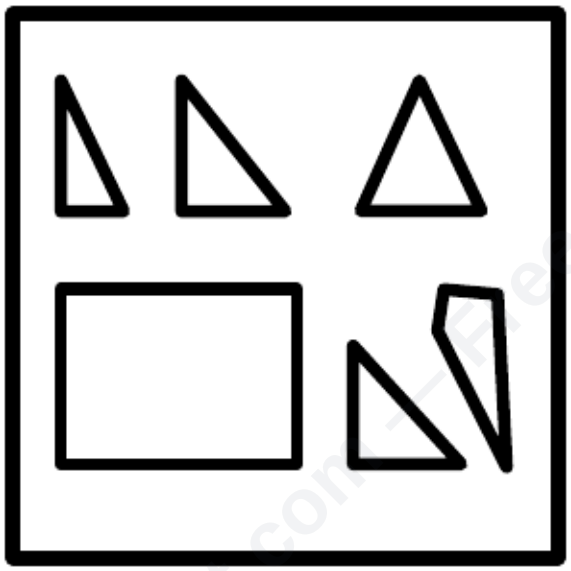


**(a)** 21
**(b)** 20
**(c)** 24
**(d)** 19

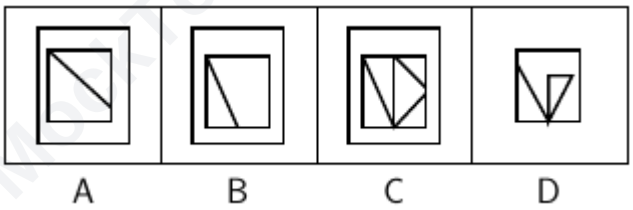
**Q43.** Which of the answer figures is formed from the shapes given in the problem figure?

Problem figure:

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Answer figure:




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

**Q44.** Which of the given assumptions is/are implied from the below statement?

Statement:

Too much urbanisation leads to mass pollution of land and water.

Assumptions:

I. The statement highlights the alarming condition of depleting natural resources.

II. Urbanisation is representative of economic empowerment.

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

**Q45.** An object floats in water with one–third of its volume underwater. The density of the object is n times the density of water where n is:

**(a)** 1/6
**(b)** 1/3
**(c)** 1/4
**(d)** 2

**Q46.** The state animal of Haryana is _____.

**(a)** Alligator
**(b)** Blackbuck
**(c)** Ox
**(d)** Rhinoceros

**Q47.** What is the chemical formula of Alkynes?

**(a)** CnH2n-1
**(b)** C_nH_(2n)
**(c)** C_nH_(2n-2)
**(d)** C_nH_(2n+1)

**Q48.** Which country recently overtook Saudi Arabia as India's top oil supplier?

**(a)** Kuwait
**(b)** Iraq
**(c)** United Arab Emirates
**(d)** Oman

**Q49.** The resistance of a metallic wire is

**(a)** directly proportional to its length and inversely proportional to its area of cross-section.
**(b)** inversely proportional to the product of its area of cross-section and length
**(c)** inversely proportional to its length and directly proportional to its area of cross-section
**(d)** directly proportional to the product of its area of cross-section and length

**Q50.** Let us say that the price of a pen has increased from 10 to 15. What is the ratio of its original price to the new price?

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

**Q51.** Read the given statements and conclusions carefully and select which of the conclusions follow(s) from the statements.

Statements:

I. All liquids are fluid.

II. All fluids are viscous.

Conclusions:

I. All viscous are liquids.

II. All liquids are viscous.

**(a)** Only conclusion I follows
**(b)** All the conclusions follow
**(c)** Only conclusion II follows
**(d)** No conclusion follows

**Q52.** Consider a two-digit number. The difference between the number and the number we get when its digits are reversed is 27. If the sum of the digits in the given number is 9, find the HCF of the number and the number when its digits are reversed.

**(a)** 6
**(b)** 4
**(c)** 9
**(d)** 5

**Q53.** The number of possible nets of a cube without reversing them is:

**(a)** 6
**(b)** 10
**(c)** 11
**(d)** 12

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**Q54.** Who was the winner of the Women's Singles event at Wimbledon 2018?

**(a)** Venus Williams
**(b)** Simona Halep
**(c)** Serena Williams
**(d)** Angelique Kerber

**Q55.** A field measures 90 m by 60 m. There is a concrete path 3 m wide all around its perimeter. Find the total area covered by the concrete path.

**(a)** 963 m²
**(b)** 639 m²
**(c)** 936 m²
**(d)** 693 m²

**Q56.** Which of the following does NOT belong to this group?

A. Cloth
B. Chalk
C. Scissors
D. Student

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

**Q57.** She plays as an all rounder for the Indian women's cricket team and has been awarded the prestigious Arjuna Award for contribution to cricket in the year 2017 by the Ministry of Youth Affairs and Sports. Identify the woman?

**(a)** Deepti Sharma
**(b)** Shikha Pandey
**(c)** Mona Meshram
**(d)** Harmanpreet Kaur

**Q58.** In a test, Chandran secured 16 out of 45 marks. He will take another test and to pass he needs to secure an overall 48% marks. If the second test was out of 80, and he just passed, what was his percentage marks in the second test?

**(a)** 48
**(b)** 60
**(c)** 44
**(d)** 55

**Q59.** Madhuri is Ramani's sister. How is Madhuri's father's sister related to Ramani?

**(a)** Grandmother
**(b)** Paternal aunt
**(c)** Sister
**(d)** Granddaughter

**Q60.** As of August 2018, which of the following is the ruling party in Rajasthan?

**(a)** BJP
**(b)** CPM
**(c)** Congress
**(d)** Samajwadi party

**Q61.** Kinetic energy will become/remain_____ when the momentum of the body is doubled.

**(a)** two times
**(b)** four times
**(c)** unchanged
**(d)** half

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**Q62.** The state tree of Haryana is _____.

**(a)** Mango
**(b)** Peepal
**(c)** Guava
**(d)** Neem

**Q63.** Murali's age 10 years ago was thrice the age of his son Satheesh. Ten years hence, Murali's age will be twice that of Satheesh. The ratio of their present ages is:

**(a)** 9 : 2
**(b)** 7 : 3
**(c)** 13 : 4
**(d)** 5 : 2

**Q64.** Which of the following displays a non-polar covalent bonding?

**(a)** Chlorine molecule
**(b)** Sulphuric acid
**(c)** Water molecule
**(d)** Ammonia molecule

**Q65.** Find the odd one out.

| A | B | C | D |
|---|---|---|---|
| 1520 | 142 | 172 | 132 |
| AET | ADB | AGB | ACB |

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

**Q66.** Which of the following is an example of a Rhizome?

**(a)** Ginger
**(b)** Sugarcane
**(c)** Onion
**(d)** Potato

**Q67.** Which of the following novels of Salman Rushdie was released in 2017?

**(a)** Midnight's Children
**(b)** The Golden House
**(c)** The Sellout
**(d)** The Satanic Verses

**Q68.** Plants in the _____ group are commonly called algae.

**(a)** Bryophyta
**(b)** Thallophyta
**(c)** Gymnosperms
**(d)** Pteridophyta

**Q69.** 62.5% of 4000 is

**(a)** 2400
**(b)** 2500
**(c)** 2720
**(d)** 2800

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**Q70.** The heat produced by current in wire during time t is determined by ____.

**(a)** $H = I^2R$
**(b)** $H = IRt$
**(c)** $H = I^2t$
**(d)** $H = I^2Rt$

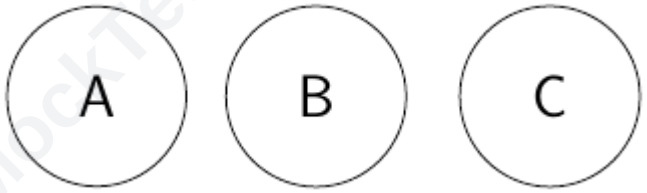
**Q71.** Vaishali is having dinner at 9.00 p.m. On her watch, she observes that the minutes hand is pointing towards the north direction. In which direction would the hours hand be facing at that time?

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

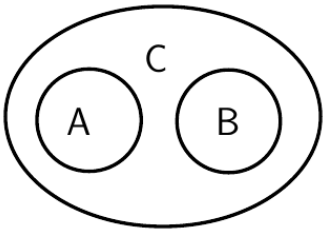
**Q72.** Which of the following correctly represents the relationship between:

A. Button
B. Sleeves
C. Shirt

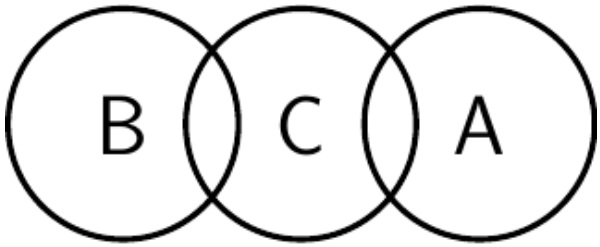
**(a)**



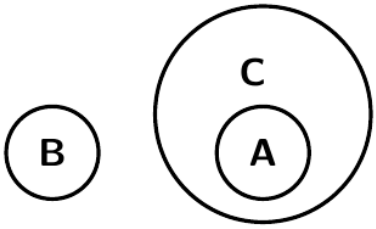

**(b)**




**(c)**




**(d)**




**Q73.** What is the junction between an axon ending with the dendrite of another nerve cell called?

**(a)** Synapse
**(b)** Neuron
**(c)** Synaptic Cleft
**(d)** Node of Ranvier

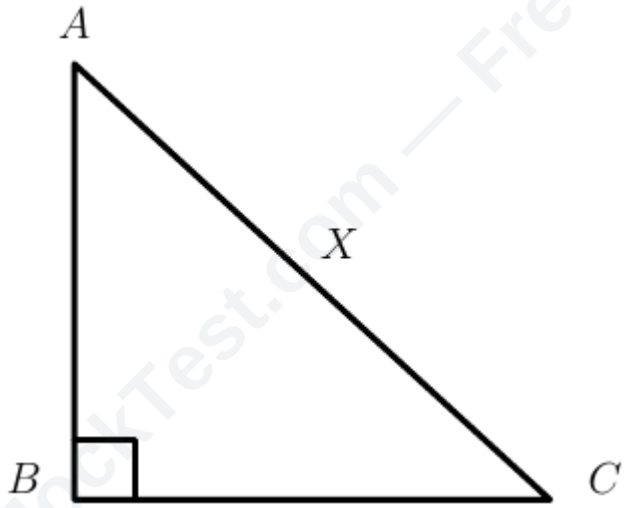
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**Q74.** If x – 2 is a common factor of $x^3 – 4x^2 + ax + b$, $x^3 – ax^2 + bx + 8$ then find the values of a and b, respectively?

**(a)** 0 and 4
**(b)** 4 and 0
**(c)** 3 and 5
**(d)** 2 and - 4

**Q75.** Read the following question and decide which of the statements is sufficient to answer the question.

Find the value of x, if:




Statements:

1. AB = 5 cm
2. BC = 12 cm

**(a)** Only statement 2 is sufficient
**(b)** Either statement 1 or 2 is sufficient
**(c)** both statement 1 and 2 are sufficient
**(d)** only statement 1 is sufficient

**Q76.** Based on the numerical analogy given, choose the correct answer from the options given below 4 : 16 :: 7 : ?

**(a)** 52
**(b)** 68
**(c)** 28
**(d)** 50

**Q77.** Which of the following governments has launched Anna Canteens?

**(a)** Tamil Nadu
**(b)** Maharashtra
**(c)** Kerala
**(d)** Andhra Pradesh

**Q78.** There are _____ bio-geographical regions in the world.

**(a)** 6
**(b)** 3
**(c)** 4
**(d)** 8

**Q79.** There are four blood groups: A, B, AB and O. The genes which control the inheritance of these blood groups are designated as IA, IB and i.

In which of the following gene combinations will the resultant blood group be ‘A’?

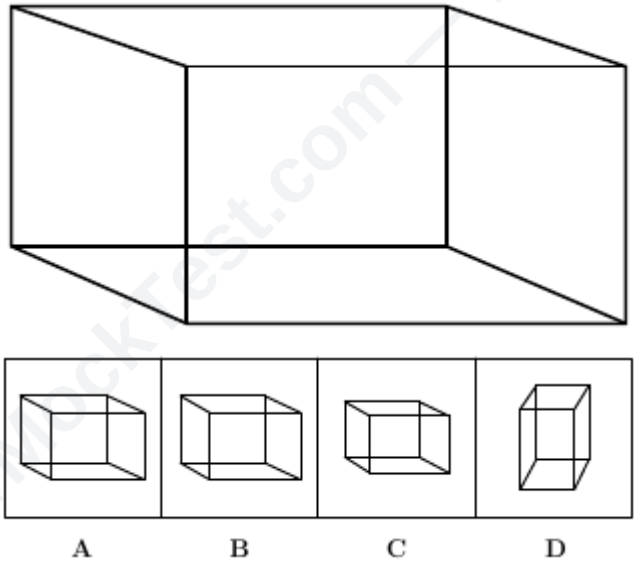
**(a)** IAIA or ii
**(b)** IAIA or IAi

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**(c)** IAIB
**(d)** IAIB or IAi

**Q80.** 3 men and 5 boys can complete a task in 15 days, whereas 6 men and 7 boys can complete the same task in 9 days. Find the relationship between the task done by the boys and the task done by the men.
**(a)** The work of 4 boys is equivalent to the work of 3 men
**(b)** The work of 6 boys is equivalent to the work of 2 men
**(c)** The work of 3 boys is equivalent to the work of 4 men
**(d)** The work of 7 boys is equivalent to the work of 3 men

**Q81.** Which of the options bears the closest resemblance to the following figure?




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

**Q82.** Take away 0.15 from 2.4 and add the result to 7.5. what do you get?
**(a)** 8.75
**(b)** 7.25
**(c)** 9.75
**(d)** 6

**Q83.** Which of the following is the most ancient literature which mentions about Indian music and dance?
**(a)** Natyashastra
**(b)** Bhagavad-Gita
**(c)** Mahabharata
**(d)** Ramayana

**Q84.** Which of the following are Mechanical waves?
**(a)** X rays
**(b)** Radio waves
**(c)** Microwaves
**(d)** Sound waves

**Q85.** The angle of elevation of a bird from a point 60 m above the water in a pond is 30 . The angle of depression of the reflection of the bird under the water from the same point is 60 . Find the height of the bird in meters hovering over the pond.
**(a)** 60
**(b)** 150

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**(c)** 120
**(d)** 90

**Q86.** In the process of Galvanisation, which metal is coated over iron?
**(a)** Lead
**(b)** Nickel
**(c)** Chromium
**(d)** Zinc

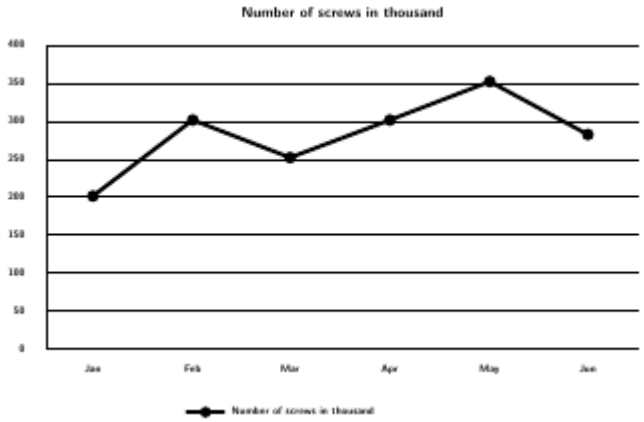
**Q87.** Given below is a statement followed by two assumptions numbered 1 and 2. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement.
Statement: “Mobile addiction is a psychological disorder,” a psychologist tells his client.
Assumptions:
I. A psychologist deals with mental disorders.
II. Surgery is the best option for any disorder
**(a)** Neither assumption I nor II is implicit
**(b)** Only assumption I is implicit
**(c)** Only assumption II is implicit
**(d)** Both assumptions I and II are implicit

**Q88.** An organic garment store wishes to move online. They allocate Rs.1,00,000 as capital for this initiative. After a discussion with an IT firm, they come up with an initial cost of development for Rs.50,000 followed by 6 months of additional support at 6% of the cost of developing the online store. What percentage of the initial capital the company saves from the website development activity?
**(a)** 22%
**(b)** 18%
**(c)** 30%
**(d)** 32%

**Q89.** If 123 × 356 = 43788, then 1.23 × 35.6 = ?
**(a)** 43.788
**(b)** 4.3788
**(c)** 0.43788
**(d)** 437.88

**Q90.** Which of the following cannot be easily cut with a knife?
**(a)** Magnesium
**(b)** Calcium
**(c)** Potassium
**(d)** Sodium

**Q91.** As per the following chart, in which month was the number of screws manufactured the highest?




**(a)** February

**(b)** May
**(c)** January
**(d)** June

**Q92.** In February 2018, Abhilasha Kumari was sworn in as the Chief Justice of the _____. She was administered the oath of office by Governor Najma Heptulla at the Raj Bhawan.
**(a)** Gujarat High Court
**(b)** Manipur High Court
**(c)** Meghalaya High Court
**(d)** Gauhati High Court

**Q93.** The base of a triangle is one-ninth of the base of a parallelogram having one-third of the area as that of the triangle. The ratio of the corresponding heights of the triangle to the parallelogram will be:
**(a)** 53 : 1
**(b)** 53 : 2
**(c)** 56 : 1
**(d)** 54 : 1

**Q94.** If P means ÷, Q means ×, R means + and S means -, then what is the value of 8Q24P6R10S5?
**(a)** 42
**(b)** 30
**(c)** 55
**(d)** 37

**Q95.** If the mean of the numbers 27 + x, 31 + x, 89 + x, 107 + x and 156 + x is 82, then the mean of 130 + x, 126 + x, 68 + x, 50 + x and 1 + x is:
**(a)** 80
**(b)** 75
**(c)** 50
**(d)** 70

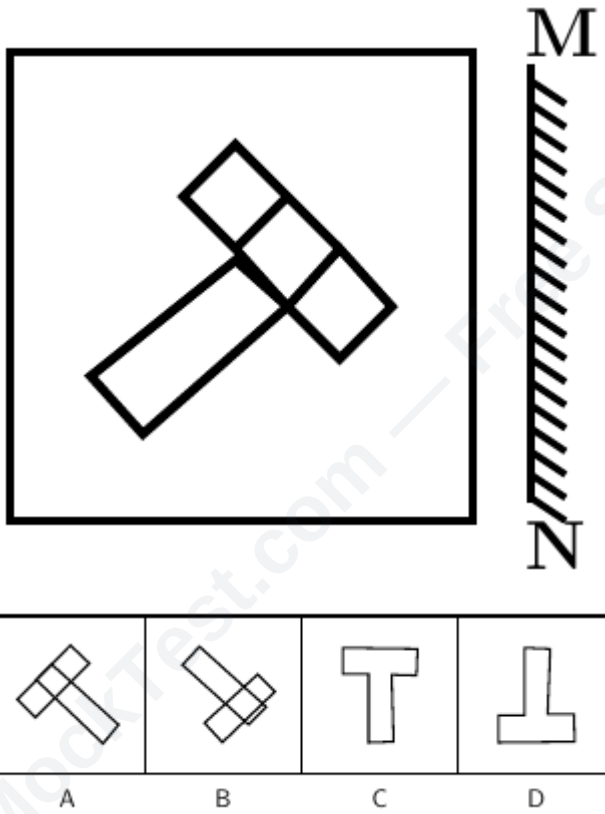
**Q96.** The square root of 3481 is:
**(a)** 63
**(b)** 59
**(c)** 67
**(d)** 57

**Q97.** Who among the following won the World Billiards Championship title in 2017?
**(a)** Micheal Ferreira
**(b)** Geet Sethi
**(c)** Pankaj Advani
**(d)** Saurav Kothari

**Q98.** When Copper Oxide is heated with hydrogen, Copper metal and water are formed. What happens to the hydrogen in this reaction?
**(a)** Both oxidation and reduction
**(b)** Reduction
**(c)** Oxidation
**(d)** Decomposition

**Q99.** Choose the mirror image for the following figure when the mirror is kept at the MN line.

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

**Q100.** Which one of the following is the unit of force?

**(a)** Pascal
**(b)** Watt
**(c)** Joule
**(d)** Newton

## ANSWER KEY

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

## SOLUTIONS

**Q1. Answer: (d) $60x^3y^5$**

Shortcut Trick

Identify the LCM of numerical coefficients: LCM(15, 12) = 60.

For variables, take the highest power of each: x^(max(3,2)) = $x^3$ and y^(max(4,5)) = y^5.

Combine them: 60 × $x^3$ × y^5.

Therefore The correct answer is $60x^3y^5$.

Alternate Method

Given: First expression = $15x^3y^4$ and Second expression = $12x^2y^5$.

Formula Used: LCM of algebraic terms = (LCM of numerical coefficients) × (Product of variables with highest powers).

Calculations:

=> Prime factorization of 15 = 3 × 5

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

=> LCM of (15, 12) = $2^2$ × 3 × 5 = 60

=> Highest power of variable x in both terms = $x^3$

=> Highest power of variable y in both terms = y^5

=> Combined LCM = 60 × $x^3$ × y^5 = $60x^3y^5$

Therefore The correct answer is $60x^3y^5$.

Additional Information

HCF of Algebraic Expressions

To find the HCF, take the HCF of numerical coefficients and multiply by the lowest power of common variables.

Product Rule

For any two expressions A and B: A × B = HCF(A, B) × LCM(A, B).

LCM of Fractions

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

**Q2. Answer: (a) 0.2 m**

CONCEPT:

• Potential energy (PE): The energy possessed by a body by virtue of its position or configuration is called potential energy.

PE = mgh

Where, m = mass of the body, g = acceleration due to gravity and h = height of the body

CALCULATION:

Given that:

Mass (m) = 1 kg, Potential energy (PE) = 2 J and g = 10 $m/s^2$

Since PE = m g h

Height (h) = PE/(m g) = 2/(1× 10) = 0.2 m

• Hence the height of the object is 0.2 m. So option 1 is correct.

**Q3. Answer: (b) 88**

The pattern followed here is:

13 + 5 = 18;

18 + 10 = 28;

28 + 15 = 43;

43 + 20 = 63;

Similarly,

63 + 25 = 88

Hence, “88” is the next number in the series.

**Q4. Answer: (d) 7**

Given:

We have to find the simplified value of the given simplification

Concept Used:

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

Calculation:

84 ÷ [50-{$4^3$ - (30-128 ÷ 8 × 4)}]
=> 84 ÷ [50-{$4^3$ - (30-128 ÷ 32)}]
=> 84 ÷ [50 – {64 – (30 – 4)}]
=> 84 ÷ [50 – {64 – 26}]
=> 84 ÷ [50 – 38]
=> 84 ÷ 12
=> 7
Therefore Required simplified value is 7

**Q5. Answer: (a) 1526 AD**

The correct answer is option 1, i.e., 1526 AD.
Key Points
• Babur, an Afghan ruler, established the Mughal dynasty in India in 1526 AD.
• He was the first emperor of the Mughal Empire.
• Babur conquered the first battle of Panipat by defeating Ibrahim Lodi in 1526 AD.
• Ibrahim Lodi was the last ruler of the Lodi dynasty of the Delhi Sultanate.
• Babur defeated Rana Sanga of Mewar in the Battle of Khanwa in the year 1527 AD.
• Babur died in 1530 AD.
• Humayun was his son and Akbar was his grandson.

**Q6. Answer: (b) 67.5 Km**

Shortcut Trick
Speed Ratio (Initial : New) = 45 : 54 = 5 : 6
Time Ratio (Initial : New) = 6 : 5 (since Distance is constant)
Difference in time ratio parts = 6 − 5 = 1 unit → 15 minutes
Initial time = 6 × 15 = 90 minutes = 1.5 hours
Distance = Speed × Time = 45 × 1.5 = 67.5 km
Therefore The correct answer is 67.5 Km.
Alternate Method
Given: Initial speed (S1) = 45 km/h, Final speed (S2) = 54 km/h, Time difference (Δt) = 15 minutes = 15/60 hour = 1/4 hour.
Formula Used: Distance (D) = [S1 × S2 / (S2 − S1)] × Δt
=> D = [45 × 54 / (54 − 45)] × (15/60)
=> D = [45 × 54 / 9] × (1/4)
=> D = [5 × 54] × (1/4)
=> D = 270 / 4
=> D = 67.5 km
Therefore The correct answer is 67.5 Km.
Additional Information
Inversely Proportional Relation
When the Distance is constant, Speed is inversely proportional to Time (S prop. to 1/T). Thus, S1/S2 = T2/T1.
Time Difference Formula
For problems involving Late/Early arrivals, the distance D = (Product of Speeds / Difference of Speeds) × Difference in arrival times.
Unit Conversion
Always ensure Time and Speed units are consistent. Convert minutes to hours by dividing by 60 when speed is in km/h.

**Q7. Answer: (c) Rs. 12,900**

Shortcut Trick
Area of paths = w(L + B − w) where w is width of path and L, B are square sides.
Area = 3 × (23 + 23 − 3) = 3 × 43 = 129 $m^2$.
Convert area to $dm^2$: 129 × 100 = 12,900 $dm^2$.
Total cost = 12,900 × Rs. 1 = Rs. 12,900.
Therefore The correct answer is Rs. 12,900.

Alternate Method

Given: Side of square (a) = 23 m, Width of path (w) = 3 m, Rate = Rs. 1/dm².

Formula: Total Area of Paths = (Area of Horizontal Path + Area of Vertical Path) − Area of Common Intersection.

=> Area of horizontal path = 23 m × 3 m = 69 m²

=> Area of vertical path = 23 m × 3 m = 69 m²

=> Area of common middle square = 3 m × 3 m = 9 m²

=> Total path area = 69 + 69 − 9 = 129 m²

=> Since 1 m = 10 dm, 1 m² = 100 dm²

=> Path area in dm² = 129 × 100 = 12,900 dm²

=> Total Cost = 12,900 × 1 = Rs. 12,900

Therefore The correct answer is Rs. 12,900.

Additional Information

Area of Paths running outside

For a rectangular park of length L and breadth B with a path of width w outside, Area = 2w(L + B + 2w).

Area of Paths running inside

For a rectangular park with a path of width w inside the boundary, Area = 2w(L + B − 2w).

Unit Conversion

Always check units: 1 meter = 10 decimeters (dm). Therefore, 1 m² = 100 dm².

**Q8. Answer: (d) Only conclusion I follows.**

The least possible Venn diagram is as follows:

Conclusions:

I. All emeralds are rocks. → True

II. All rocks are emeralds. → False (as it is possible but not definite)

Hence, only conclusion I follows.

**Q9. Answer: (a) Syeda Tahira Safdar**

The correct answer is option 1, i.e., Syeda Tahira Safdar.

• Syeda Tahira Safdar has been appointed as the first female chief justice of Pakistan.

• She was made Chief Justice of Balochistan High Court.

• Her appointment was confirmed by the then Chief Justice of Pakistan Supreme Court, Mian Saqib Nisar, on July 23, 2018.

• She assumed the office on September 1, 2018.

• Gulzar Ahmed is currently holding the position of Chief Justice of Supreme Court of Pakistan.

**Q10. Answer: (d) 14**

The correct answer is option 4, i.e., 14.

• 14 banks were nationalized in 1969.

• The nationalization of Indian banks happened in two phases.

• In the first phase, 14 banks were nationalized on July 19, 1969.

• In the second phase, 6 banks were nationalized in 1980.

• For the nationalization of the 14 banks the then PM of India, Indira Gandhi, brought an ordinance.

• The nationalization was done to take over the control of the major banks from the hands of industrialists as they were only providing financial assistance to the corporates and the agriculture sector was totally ignored.

**Q11. Answer: (d) 17**

Hence, there are 17 squares in the given figure.

**Q12. Answer: (b) Concave, -0.40 m**

CONCEPT:

• Power of a lens: The reciprocal of the focal length of a lens is called the power of that lens. It measures the converging or diverging power of the lens.

• The focal length of the concave lens is negative and hence its power is also negative.

• The focal length of the convex lens is positive and hence its power is also positive.

The formula for calculating the power of a lens is:

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P = 1/f

Where f is the focal length which is in metres

CALCULATION:

Given that:

Power (P) = - 2.5 D

From the formula of the power of the lens:

focal length (f) = 1/P.

f = 1/(-2.5)

So f = - 0.40 m

• Hence the given lens is a concave lens. So option 2 is correct.

**Q13. Answer: (a) Kumbh Mela**

The correct answer is option 1, i.e., Kumbh Mela.

Key Points

• Kumbh Mela is to be listed in UNESCO's list of Intangible cultural heritage.

• Kumbh Mela was inscribed on the Representative List of the Intangible Cultural Heritage of Humanity in the year 2017.

• The Kumbh Mela was declared as an Intangible Cultural Heritage in December, 2017.

• The UNESCO described Kumbh Mela as 'the festival of the sacred Pitcher'.

• Kumbh Mela, a sacred and pilgrimage festival, is organized after a span of 12 years at Haridwar, Allahabad, Ujjain, and Nashik.

• Gangasagar Mela is the second most popular festival after Kumbh and is held in West Bengal.

• Jagannath Rath-Yatra Mela is the oldest rath mela in the world and is held at Puri, Odisha. It is associated with Lord Jagannath.

• Pushkar Fair also known as the Pushkar Mela is one of India's largest camel, horse, and cattle fair, which takes place in Rajasthan.

**Q14. Answer: (c) f**

The correct answer is option 3, i.e., f.

• Ce-58 is a member of the f-block.

• Cerium (Ce) is a Lanthanide.

• Cerium is the second member of the Lanthanide series after Lanthanum.

• d-block elements are called the transition elements.

• p-block contains post-transition metals, metalloids, non-metals, and noble gases.

• s-block contains alkali metals and alkaline earth metals.

**Q15. Answer: (d) 250 J**

CONCEPT:

• Kinetic energy (KE): The energy possessed by a body by virtue of its motion is called kinetic energy.

$KE = 1/2mv^2$

Where m = mass of the body and v = velocity of the body

CALCULATION:

Given that:

Mass (m) = 20 kg

Velocity (v) = 5 m/s

K. E = 1/2 × 20 × 5 × 5

K. E = 10 × 25

K. E = 250 J

• The Kinetic Energy of the object will be 250 J. So option 4 is correct.

**Q16. Answer: (a) Mendeleev**

The correct answer is option 1, i.e., Mendeleev.

• Mendeleev predicted the existence of some yet to be discovered elements on the basis of gaps in his periodic table. This was a merit of his periodic table.

• Mendeleev was a Russian chemist known for predicting the properties of eight elements that were yet to be discovered.

• When Mendeleev prepared his periodic table, there were only 63 known elements.

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• According to his periodic law, 'The elements, if arranged according to their atomic weight, exhibit an apparent periodicity of properties'.

• The demerits of his periodic table include:

• Unable to locate Hydrogen

• The increase in the atomic mass was not regular.

• Discovery of isotopes.

• Dobereiner was known for his Law of Triads.

• Newlands was known for his Law of Octaves.

• Mosley gave the modern Long form of Periodic table where the base of classification was the atomic number and not the atomic mass.

**Q17. Answer: (d) Helium (He), Neon (Ne), Argon (Ar)**

The correct answer is option 4, i.e., Helium (He), Neon (Ne), Argon (Ar).

Key Points

• Helium (He), Neon (Ne), Argon (Ar) have filled outermost shells.

• These are group 18 members belonging to the Noble gas family.

• He (2) - 2 electrons in the K shell, the maximum it can have.

• Ne (10) - 8 electrons in the L shell, the maximum it can hold.

• Ar (18) - 8 electrons in the M shell, the maximum it can have when it the valence shell to give the stable octet.

• Since these elements have a stable configuration, they rarely form compounds as they do not take part in chemical reactions.

• This is the reason they as termed as Inert/Noble gases.

• Other options contain alkali metals or alkaline earth metals which have 1 electron and 2 electrons respectively in their valence shells.

**Q18. Answer: (c) Rs. 23**

Shortcut Trick

Net Amount = (Income − Expenditure)

Income = 50 (Father) + 30 (Mother) = Rs. 80

Expenditure = 15 (Toffee) + 42 (Brother) = Rs. 57

Remaining = 80 − 57 = Rs. 23

Therefore The correct answer is Rs. 23.

Alternate Method

Given:

Amount from Father = Rs. 50

Cost of Toffee = Rs. 15

Amount from Mother = Rs. 30

Amount taken by Brother = Rs. 42

Calculations:

=> Total money Seema had = 50 − 15 + 30 − 42

=> Sum of additions = 50 + 30 = Rs. 80

=> Sum of subtractions = 15 + 42 = Rs. 57

=> Final balance = 80 − 57 = Rs. 23

Therefore The correct answer is Rs. 23.

Additional Information

BODMAS Rule

While solving mixed operations, follow the sequence: Brackets, Orders, Division, Multiplication, Addition, and Subtraction.

Income and Expenditure

Savings or remaining balance is calculated by subtracting the total expenditure from the total income: Balance = Total Income − Total Expenditure.

**Q19. Answer: (d) D**

The logic follows here is:

In all the given figure except figure D, the number of line segment require to draw the given letter is 2 whereas minimum number of line segments required to draw figure D is 4.

Thus, this is odd one out.

Hence, the correct answer is "Figure D".

Alternate MethodPositional value of given alphabets:

| Alphabet | T | V | L | M |
|---|---|---|---|---|
| Positional Value | 20 | 22 | 12 | 13 |

Except for M, the positional values of other letters are even numbers.

Hence, ‘M’ is the odd one among the given alphabets

**Q20. Answer: (a) 1206 AD**

The correct answer is option 1, i.e., 1206 AD.

• Qutub-ud-din Aibak became the first Sultan of Delhi in 1206 AD.

• He was in-charge of the Ghurid territories and later became the ruler of the Delhi Sultanate ruled by the Mamluk Dynasty.

• His reign was from June 25, 1206 to December 1, 1210.

• He is known for commissioning the Qutub Minar in Delhi.

• Mamluk Dynasty (Slave Dynasty) was the first dynasty of the Delhi Sultanate.

**Q21. Answer: (d) 4√3 :√2**

Shortcut Trick

Area of equilateral triangle = (√3/4) × a² and Height (h) = (√3/2) × a.

Let square side be s, then Area = s². Given: (√3/4) × a² = (1/2) × s².

=> a²/s² = 2/√3. Also h² = (3/4) × a².

=> h²/s² = (3/4) × (2/√3) = √3/2.

=> h : s = √(√3) : √2 = ^4√3 : √2.

Therefore The correct answer is √^43 : √2.

Alternate Method

Given: Area of equilateral triangle = 1/2 × Area of square.

Formula Used: Area of triangle = (√3/4) × a²; Height (h) = (√3/2) × a; Area of square = s².

=> (√3/4) × a² = (1/2) × s²

=> a² = (2/√3) × s²

=> Height (h) = (√3/2) × a => h² = (3/4) × a²

=> Substitute a²: h² = (3/4) × (2/√3) × s²

=> h² = (√3/2) × s²

=> h/s = √(√3/2) = ^4√3 / √2

Therefore The correct answer is √^43 : √2.

Additional Information

Equilateral Triangle Properties

All sides are equal. Area = (√3/4)s² and Altitude = (√3/2)s. The inradius is h/3 and circumradius is 2h/3.

Square Properties

Area = side². The diagonal of a square is s√2. It is a special case of a rhombus and a rectangle.

Radical Rules

√(√x) is equal to the fourth root of x, written as ^4√x or x^(1/4).

**Q22. Answer: (a) DWH**

Similarly,

Hence, ATE is written as DWH in the given code language.

**Q23. Answer: (c) A**

NPA of bank F = 5%

NPA of bank B = 25%

NPA of bank A = 30%

NPA of bank E = 20%

Bank A has the maximum NPA’s which is 30% of the total.

**Q24. Answer: (b) Silence**

Hot is opposite of Cold. Similarly, Talk is opposite of Silence.

Hence, Silence is related to the third word on the same basis as the second word is related to the first word.

**Q25. Answer: (b) Dinesh Sharma Committtee**

The correct answer is option 2, i.e., Dinesh Sharma Committee.

• Dinesh Sharma Committee has been constituted by the Union government to examine the existing framework with regard to virtual currencies.

• It is an inter-disciplinary committee formed on April 12, 2017 to study the aspects related with virtual/digital/cryptocurrencies.

• This committee will go through the current status of virtual currency in India and around the world.

• Also the committee will examine the regulatory aspects and legal structure pertaining to the virtual currencies across the globe.

• Dinesh Sharma is the Special Secretary of Economic Affairs and the committee formed under his chairmanship will submit the report within 3 months.

**Q26. Answer: (d) 36 km**

Shortcut Trick

Speed = 144 km/hr

Time = 15 minutes = 1/4 hour

Distance = 144 × (1/4) = 36 km

Therefore The correct answer is 36 km.

Alternate Method

Given:

Speed of the express train = 144 km/hr

Time taken = 15 minutes

Formula Used:

Distance = Speed × Time

Calculations:

=> First, convert time from minutes to hours:

=> Time = 15 ÷ 60 hours = 0.25 hours

=> Distance = 144 km/hr × 0.25 hours

=> Distance = 36 km

Therefore The correct answer is 36 km.

Additional Information

Unit Conversion

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

Average Speed

For a journey with two equal distances at speeds x and y, Average Speed = (2 × x × y) ÷ (x + y).

Relative Speed

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

**Q27. Answer: (c) only argument I is strong**

Argument I states that taxes are ‘needed’ by the government for the country’s administration and hence can be considered a strong argument.

Argument II comes across as an excuse and is not applicable on the citizens who can afford to pay the taxes.

Therefore, argument II is not strong.

Hence, only argument I is strong.

**Q28. Answer: (c) It is the process of conversion of a solid into vapour.**

The correct answer is option 3.

Key Points

• Sublimation is a process in which a solid transforms directly into vapors without changing into liquid.

• This phenomenon can be seen in camphor or naphthalene balls.

• Evaporation - It is the process of conversion of a liquid into gas.

• Fusion/Melting - It is the process of conversion of a solid into a liquid.

• Condensation - It is the process of conversion of a gas into a liquid.

**Q29. Answer: (c) 14**

Shortcut Trick

Let total capacity = LCM(7, 10.5, 5.25) = 21 units.

Efficiency: A = +3, C = +2, B = −4. Combined efficiency = 3 + 2 − 4 = 1 unit/hr.

Required capacity = 2/3 × 21 = 14 units.

Time taken = 14 ÷ 1 = 14 hours.

Therefore The correct answer is 14 hours.

Alternate Method

Given: Filling time Pipe A = 7 hrs, Pipe C = 10.5 hrs. Draining time Pipe B = 5.25 hrs.

Formula Used: Total Work = Time × Efficiency

| Person | Days | Total Work | Efficiency |
|---|---|---|---|
| Pipe A | 7 | 21 | 3 |
| Pipe C | 10.5 | 2 | |
| Pipe B | 5.25 | −4 | |

=> Total combined efficiency of (A + C − B) = 3 + 2 − 4 = 1 unit/hour

=> Target volume to fill = 2/3 × 21 units = 14 units

=> Time required = Target Volume ÷ Combined Efficiency

=> Time = 14 ÷ 1 = 14 hours

Therefore The correct answer is 14 hours.

Additional Information

Negative Efficiency

In Pipes and Cisterns, an outlet or leak pipe is always assigned a negative efficiency value because it reduces the total amount of water in the tank.

Fractional Filling

If a tank is to be filled only to a certain fraction (f), the time taken is calculated as (f × Total Capacity) ÷ Net Efficiency.

Work and Wages

In scenarios involving wages, the payment is distributed based on the ratio of work done, which is Efficiency × Time for each individual pipe or person.

**Q30. Answer: (c) D**

1.

• Figure A is the mirror image of 2

2.

• Figure B is the mirror image of 3.

3.

• Figure C is the mirror image of 9

4.

• Figure D has the number 7 and not its mirror image.

Hence, D is the correct answer.

**Q31. Answer: (a) Voltmeter**

CONCEPT:

• Voltmeter: The electrical instrument which is used to measure the potential difference between two points in an electric circuit is called a voltmeter.

• The Voltmeter is connected in parallel in an electric circuit.

• Galvanometer: It is used to detect the presence of small electric current and voltage. It is connected in series.

• Fuse: A fuse is a safety device that melts and breaks the circuit when the current exceeds a particular level and thus save the other appliances connected to the circuit.

• It is connected in series.

• Ammeter: The electrical instrument which is used to measure the electric current in an electric circuit is called an ammeter.

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• An Ammeter is connected in the series combination because the current remains constant in the series combination.

• This helps in getting an accurate reading from the instruments.

EXPLANATION:

• Since the potential difference remains constant in the parallel combination. That's why the voltmeter is connected in parallel in an electric circuit. So option 1 is correct.

**Q32. Answer: (b) O432**

Given Series: C2, G12, K72, ?

The logic followed here is:

Hence, the next term in the series is 'O432'.

**Q33. Answer: (c) Only conclusion 1 follows.**

The least possible Venn diagram is as follows:

Conclusions:

All spectacles are sand.→ True

All sand are glass. → False (as it is possible but not definite)

Hence, only conclusion I follows.

**Q34. Answer: (c) C**

Here, Rock, River and Mountain are non – living whereas author is a living being.

Hence, 'Author' does not belong to the group.

**Q35. Answer: (a) Goa**

The correct answer is option 1, i.e., Goa.

• Satya Pal Malik was appointed as the Governor of Goa by President Ram Nath Kovind.

• Satya Pal Malik took the charge of the Governor of Goa on November 3, 2019.

• Before this he was the governor of Jammu and Kashmir.

• When Jammu and Kashmir was divided into two union territories then, the lieutenant governor was appointed there.

• Satya Pal Malik has also served as the governor of Bihar.

• He has also been a Member of Lok Sabha and Rajya Sabha.

• Governor of Bihar - Phagu Chauhan.

• Governor of Odisha - Ganeshi Lal.

• Governor of Jharkhand - Ramesh Bais.

Additional Information Current President Of India: Draupadi Murmu (Jully 2022)

**Q36. Answer: (b) Abhay**

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

• Abhay took charge as the chief of the Narcotics Control Bureau.

• He is an IPS officer of 1986 batch of Odisha cadre.

• He took the charge as the Director-General of NCB.

• Before this, he was Additional DG (Training), CRPF.

• In July 2019, Abhay was given the charge of Director, Sardar Vallabhbhai Patel National Police Academy.

• IPS officer Rakesh Asthana succeeded him.

• NCB is the highest body responsible for fighting drug trafficking and the abuse of illegal substances.

**Q37. Answer: (d) Relative density**

CONCEPT:

• Momentum: The product of mass and velocity is called momentum. It is denoted by P.

Momentum (P) = Mass (m) × Velocity (V)

• So the SI unit of momentum is kg m/s.

• Density: The mass per unit volume is called density. It is denoted by d or ρ.

• The SI unit of density is kg/m3.

Density (d) = Mass (m)/Volume (V)

• Pressure: The force per unit area is called pressure. It is denoted by P.

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• The SI unit of pressure is N/m2.

Pressure (P) = Force (F)/Area (A)

• Relative density: It is also known as the specific gravity. The ratio of the density of a substance and density of the substance taken as a reference is called relative density.

Relative density (RD) = density of substance/Density of reference substance

• For liquids, the reference substance is generally water.

• The relative density is a constant term. It is dimensionless and unitless.

EXPLANATION:

• Since the relative density is the ratio of same quantity. So there is no unit of relative density. Hence option 4 is correct.

**Q38. Answer: (d) Only II is implicit.**

The effect of serotonin levels on health is not implied in the given information.

Therefore, assumption I is not implicit.

However, it can be assumed the effect of exercise in general such as sweating and its benefits is known.

Therefore, assumption II is implicit.

Hence, only assumption II is implicit.

**Q39. Answer: (c) 4.87**

x = 63.5535/13.05

Therefore x = 4.87

**Q40. Answer: (d) 320**

Shortcut Trick

Total percentage = 100%

Females = 15% → Males = 100% − 15% = 85%

85% = 272

100% = (272 ÷ 85) × 100 = 3.2 × 100 = 320

Therefore The correct answer is 320.

Alternate Method

Given:

Percentage of females = 15%

Number of males = 272

Calculations:

=> Let the total population be x.

=> Percentage of males = 100% − 15% = 85%

=> 85% of x = 272

=> (85 ÷ 100) × x = 272

=> x = (272 × 100) ÷ 85

=> x = 32000 ÷ 85 = 320

Therefore The correct answer is 320.

Additional Information

Percentage Base Change

To find the original value when a percentage part is known: Original = (Given Value ÷ Percentage of that value) × 100.

Complementary Percentages

If a population is divided into two groups, the sum of their percentages always equals 100%. If A is p%, then B is (100 − p)%.

**Q41. Answer: (b) 4.8%**

The correct answer is option 2, i.e. 4.8%.

• The GDP growth rate for India in 2019-20 projected by the International Monetary Fund (IMF) is 4.8%.

• These are the predictions as per January 2020.

• Earlier, the prediction was 7.5% in January 2019. Then, in April 2020 the forecast was lowered by 20 basis point and it came to 7.3%.

• Due to COVID-19, the GDP growth rate for the year 2020, as per the IMF will be just 1.9%.

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• The global economy will face the worst recession since the Great Depression in the 1930s due to the Coronavirus pandemic.

**Q42. Answer: (a) 21**

The combination of 5 and 6 also gives a rectangle.

Hence, there are 21 rectangles in the given figure.

**Q43. Answer: (a) C**

Hence, figure C is formed from the shapes given in the problem figures.

**Q44. Answer: (d) Only assumption I is implicit**

Depletion of natural resources is one of the effects of mass pollution of land and water.

Therefore, assumption I is implicit.

The statement does not mention any positive impact of urbanisation.

Therefore, assumption II is not implicit.

Hence, only assumption I is implicit.

**Q45. Answer: (b) 1/3**

CONCEPT:

• Archimedes' principle states that when a body immersed in a fluid, whether fully or partially submerged, the upward buoyant force that is exerted on it, is equal to the weight of the fluid that the body displaces.

Fbuoyant = ρf Vf g

where ρf is the density of the fluid in which the object is submerged, Vf is the volume of the displaced fluid (or volume of the object that is submerged inside the fluid) and g is the gravitational acceleration.

• When an object is submerged in fluid fully or partially there are two forces, 1. buoyant force 2. weight of the object/Gravitational force

Here weight of object (W) = mg = ρo Vo g

Where ρo is the density of the object, Vo is the volume of the object, g is the gravitational acceleration.

CALCULATION:

Given that:

The object floats in water with one–third of its volume underwater:

V_f = V0/3

According to Archimedes principle:

Weight of the object (W) = Buoyancy force (F_b)

So ρo Vo g = ρf Vf g

ρo Vo g = ρf (V0/3) g

The density of the object (ρo) = 1/3 × Density of fluid (ρ_f)

**Q46. Answer: (b) Blackbuck**

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

• Blackbuck is the state animal of Haryana.

• Blackbuck is also the state animal of Andhra Pradesh and Punjab.

• One-horned Rhinoceros is the state animal of Assam and the Kaziranga National Park is famous for it.

• Alligators and Ox are not the state animals of any state.

• Each state has declared its state animal and state tree.

• The state tree of Haryana is Peepal.

**Q47. Answer: (c) C_nH_(2n-2)**

The correct answer is option 3, i.e., C_nH_(2n-2.)

_(Key Points)

• The general chemical formula of Alkynes is CnH2n-2.

• Alkynes are the hydrocarbons containing a triple bond between two carbon atoms. Eg: Propyne, etc.

• They have one sigma and two pi bonds between the carbon atoms bonded by the triple bond.

• Alkanes have the general formula C_nH_(2n+2). Eg: Methane, Ethane, etc.

• Alkenes have the general formula CnH2n. Eg: Ethene, Propene, etc.

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**Q48. Answer: (b) Iraq**

The correct answer is Iraq.

Key Points

• Iraq recently overtook Saudi Arabia as India's top oil supplier.

• Iraq supplied 38.9 MT crude oil in the year 2018, while Saudi Arabia supplied 30.9 MT.

• India imported more from Iraq because it supplied at relatively cheaper rates.

• The third-largest supplier was Iran and fourth in the row was Venezuela.

• India is 80% dependent on other countries for its oil demands.

**Q49. Answer: (a) directly proportional to its length and inversely proportional to its area of cross-section.**

CONCEPT:

• Resistance: The property of any conductor that opposes the flow of electric current through it is called resistance.

• It is denoted by R and the SI unit is the ohm (Ω).

• The resistance of a metallic wire is directly proportional to its length and inversely proportional to its area of cross-section.

The resistance (R) is given by:

$R = \rho L/A$

where ρ is resistivity, L is the length and A is the area of the cross-section.

EXPLANATION:

• The resistance of a metallic wire is directly proportional to its length and inversely proportional to its area of cross-section. So option 1 is correct.

**Q50. Answer: (b) 2 : 3**

Shortcut Trick

Identify the Original Price and New Price.

Original Price = 10, New Price = 15.

Ratio = 10 : 15 → Divide both by their Highest Common Factor (HCF) 5.

Ratio = 2 : 3.

Therefore The correct answer is 2 : 3.

Alternate Method

Given:

Initial cost of the pen = 10

Increased cost of the pen = 15

Formula: Ratio of A to B = A / B

=> Ratio = Original Price / New Price

=> Ratio = 10 / 15

=> Ratio = (2 × 5) / (3 × 5)

=> Ratio = 2 / 3

Therefore The correct answer is 2 : 3.

Additional Information

Ratio Definition

A ratio compares two quantities by division and is usually expressed in its simplest form by dividing by the HCF.

Percentage Increase

Percentage change = [(New Value − Original Value) / Original Value] × 100. In this case, (5/10) × 100 = 50%.

Inverse Ratio

The ratio of the new price to the original price would be the reciprocal, which is 3 : 2.

**Q51. Answer: (c) Only conclusion II follows**

The least possible Venn diagram is as follows:

Conclusions:

I. All viscous are liquids. → False (as it is possible but not definite)

II. All liquids are viscous. → True

Hence, only conclusion II follows.

**Q52. Answer: (c) 9**

Shortcut Trick

Difference between number and its reverse = 9 × (Difference of digits)

27 = 9 × (x − y) => (x − y) = 3

Given sum of digits (x + y) = 9. Solving gives digits 6 and 3.

Numbers are 63 and 36. Their HCF is 9.

Therefore The correct answer is 9.

Alternate Method

Let the two-digit number be 10x + y.

The reversed number is 10y + x.

=> (10x + y) − (10y + x) = 27

=> 9x − 9y = 27 => x − y = 3 ....(i)

=> x + y = 9 ....(ii)

=> Adding (i) and (ii): 2x = 12 => x = 6

=> y = 9 − 6 = 3

=> Numbers are 63 and 36.

=> 63 = 9 × 7 and 36 = 9 × 4

=> HCF(63, 36) = 9

Therefore The correct answer is 9.

Additional Information

Difference Rule

The difference between a two-digit number and its reverse is always a multiple of 9, specifically 9 × |x − y|.

Sum Rule

The sum of a two-digit number and its reverse is always a multiple of 11, specifically 11 × (x + y).

HCF of Reversed Numbers

The HCF of (10x+y) and (10y+x) must be a factor of their sum and their difference.

**Q53. Answer: (c) 11**

The number of possible nets of a cube without reversing them is 11.

See the following figure.

**Q54. Answer: (d) Angelique Kerber**

The correct answer is option 4, i.e., Angelique Kerber.

- Angelique Kerber was the winner of the Women's Singles event at Wimbledon 2018.
- The Grand Slam took place at the London, UK.
- Angelique Kerber was the winner of the Ladies singles.
- She defeated Serena Williams to win the title.
- Novak Djokovic was the champion in the Men's singles.
- He defeated Kevin Anderson to win the title.
- Venus Williams is a former World No.1 and has won many Grand Slams and 4 Olympic gold medals.
- Simona Halep is a two times World No.1 tennis player from Romania.
- UPDATE - In 2019, Simona Halep defeated Serena Williams to win her first Wimbledon women's singles title.

**Q55. Answer: (c) 936 m²**

Shortcut Trick

For a path of width w outside a rectangular field of length L and breadth B:

Area of path = 2w(L + B + 2w)

Given: L = 90 m, B = 60 m, w = 3 m

Area = 2 × 3 × (90 + 60 + 2 × 3) = 6 × (150 + 6) = 6 × 156 = 936 m²

Therefore The correct answer is 936 m².

Alternate Method

Given:

Length of inner field (L) = 90 m

Breadth of inner field (B) = 60 m

Width of path (w) = 3 m

Formula Used:

Area of Path = (Area of Outer Rectangle) − (Area of Inner Rectangle)

Calculations:

=> Outer Length = 90 + 3 + 3 = 96 m

=> Outer Breadth = 60 + 3 + 3 = 66 m

=> Area of Outer Rectangle = 96 × 66 = 6336 $m^2$

=> Area of Inner Rectangle = 90 × 60 = 5400 $m^2$

=> Area of path = 6336 − 5400 = 936 $m^2$

Therefore The correct answer is 936 $m^2$.

Additional Information

Path Inside the Perimeter

If the path is built inside the field, the area is given by Area = 2w(L + B − 2w).

Cross Paths

For two perpendicular paths crossing at the center, the area is given by Area = w(L + B − w).

Cost Calculation

Total cost of construction = Area of path × Rate per unit area.

**Q56. Answer: (b) D**

Here, cloth, chalk and scissors are non - living things whereas Student is a living being.

Hence, Student does not belong to the group.

**Q57. Answer: (d) Harmanpreet Kaur**

The correct answer is option 4, i.e. Harmanpreet Kaur.

• Harmanpreet Kaur was awarded the prestigious Arjuna Award for contribution to cricket in the year 2017 by the Ministry of Youth Affairs and Sports.

• She is the first to score a century in the Women's T20 International match.

• She is also the first player from India, male or female, to play in 100 international Twenty20 matches.

• Deepti Sharma is also an Indian cricketer and is currently ranked 4th in the top all-rounders in the ICC Cricket Rankings. She is is also the current third-highest individual scorer by a woman cricketer in ODIs.

• Shikha Pandey is a woman cricket player from India.

• Mona Meshram is a batswoman from India.

**Q58. Answer: (d) 55**

Shortcut Trick

Total maximum marks = 45 + 80 = 125

Required passing marks = 48% of 125 = 60

Marks needed in second test = 60 − 16 = 44

Required percentage = (44 ÷ 80) × 100 = 55%

Therefore The correct answer is 55%.

Alternate Method

Given: Marks in Test 1 = 16, Max marks Test 1 = 45, Max marks Test 2 = 80, Overall pass % = 48%.

Formula Used: Percentage = (Obtained Marks ÷ Total Marks) × 100

=> Total maximum marks = 45 + 80 = 125

=> Passing marks = 48% × 125 = (48 ÷ 100) × 125 = 60

=> Marks secured in Test 1 = 16

=> Marks required in Test 2 = 60 − 16 = 44

=> Percentage in Test 2 = (44 ÷ 80) × 100

=> Percentage in Test 2 = 0.55 × 100 = 55%

Therefore The correct answer is 55%.

Additional Information

Overall Percentage Calculation

When components have different maximum marks, the overall percentage is (Total marks obtained / Total maximum marks) × 100.

Weighted Average Method

Overall % = (w1p1 + w2p2) ÷ (w1 + w2), where w is the maximum marks and p is the percentage in each part.

Base Value Change

Always identify the correct base (denominator) when calculating percentages for specific segments of a total.

**Q59. Answer: (b) Paternal aunt**

Preparing the family tree using the following symbols:

Hence, Madhuri's father's sister is paternal aunt of Ramani.

**Q60. Answer: (a) BJP**

The correct answer is option 1, i.e., BJP.

• As of Aug 2018, BJP was the ruling party in the Rajasthan state.

• Vasundhra Raje Scindia was the Chief Minister of the state. She held the post from 2013 till Dec 11, 2018.

• Currently, the ruling party is BJP.

• Bhajan Lal Sharma is serving as the Chief Minister.

**Q61. Answer: (b) four times**

CONCEPT:

• Kinetic energy (KE): The energy possessed by a body by virtue of its motion is called kinetic energy.

$KE = 1/2mv^2$

Where m = mass of the body and v = velocity of the body

• Momentum (p): It is the product of the mass and velocity of an object.

p = m v

• The relationship between the kinetic energy (KE) and Linear momentum (p) is

$p = \sqrt{2mKE}$

Or $KE = P^2/2m$

EXPLANATION:

KE = P2/2m

• Since the mass of an object is constant, therefore we can say that Kinetic energy is directly proportional to the square of the Momentum.

• Hence, when momentum is doubled, kinetic energy will become four times. Sp option 2 is correct.

**Q62. Answer: (b) Peepal**

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

• The state tree of Haryana is Peepal.

• Peepal is also the state tree of Bihar.

• Peepal is considered as a sacred tree in the Hindu religion and its Biological name is Ficus religiosa.

• Neem is the state tree of Andhra Pradesh. The tree is known for its medicinal value.

• Mango tree is the state tree of Maharashtra. The famous Alphonso mango comes from Maharashtra.

**Q63. Answer: (b) 7 : 3**

Let the present age of Sateesh = x

Let the present age of Murali's age be = y

10 years ago:

(y – 10) = 3 (x – 10)

y = 3(x – 10) + 10

10 years hence:

(y + 10) = 2 (x + 10)

(3(x – 10) + 10 + 10) = 2 (x + 10)

3x – 30 + 20 = 2x + 20

3x – 2x = 30 – 20 + 20

x = 30

So, y = 3(x – 10) + 10

y = 3(30 - 10) + 10

y = 60 + 10 = 70

The ratio of Murali's age to Sateesh's age = 70 : 30 = 7 : 3

Hence, 7 : 3 is the correct answer.

**Q64. Answer: (a) Chlorine molecule**

The correct answer is option 1, i.e., Chlorine molecule.

• The Chlorine molecule displays a non-polar covalent bonding.

• Chlorine belongs to group 17 of the modern periodic table and thus has 7 electrons in the valence shell.

• The two chlorine atoms share one electron pair between each other to get a stable octet.

• Since the two atoms are the same, the covalent bond is non-polar.

• When a bond is formed between two or more different electron, which have a difference in their electronegativities, then a polar covalent bond is formed.

• Sulphuric acid is $H_2SO_4$.

• Sulphuric Acid is very polar, meaning that it has a positive and negative center, and the electrons are closer to one element in the covalent bonds that are present between hydrogen, sulfur, and oxygen

• Water is $H_2O$.

• A water molecule is formed when two atoms of hydrogen bond covalently with an atom of oxygen.

• In a covalent bond electrons are shared between atoms.

• In water the sharing is not equal.

• Ammonia is $NH_3$.

• $NH_3$ has a covalent single bond among its nitrogen and hydrogen atoms.

**Q65. Answer: (a) A**

The logic followed here is:

| A | B | C | D |
|---|---|---|---|
| 1520 | 142 | 172 | 132 |
| A(1)E(5)T(20) | A(1)D(4)B(2) | A(1)G(7)B(2) | A(1)C(3)B(2) |

AET is the only set of letters the code for which does not end in 2 and the third letter is not B.

Hence, AET is the odd one out.

**Q66. Answer: (a) Ginger**

The correct answer is option 1, i.e., Ginger.

• Ginger is an example of a Rhizome.

• Rhizome is a type of stem that is thick, fleshy, and usually horizontal.

• It bears nodes and internodes and is the underground modification of stem.

• Sugarcane - It is a grass with lateral shoots.

• Onion - Bulb - underground modification of stem.

• Potato - Tuber - underground modification of stem.

**Q67. Answer: (b) The Golden House**

The correct answer is Option 2, i.e., The Golden House.

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

• This is the 13th novel by Salman Rushdie and starts with the time when Barack Obama became the US President.

• Midnight's Children - Salman Rushdie - 2012

• The Sellout - Paul Beaty

• The Satanic Verses - Salman Rushdie - 1988

• Home: Vintage Minis and Do Saal O Hasht Maah O Bist O Hasht Shab are the other novels of Salman Rushdie released in 2017.

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**Q68. Answer: (b) Thallophyta**

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

• Plants in the Thallophyta group are commonly called algae.
• The group Thallophyta includes plants that are without embryo.
• This group includes algae and fungi.
• The other plants are included in the Embryophyta.
• Examples are Spirogyra, Ulothrix, Cladophora and Chara.
• Bryophyta comprises plants that are without vascular tissues. Eg: Funaria, etc.
• Pteridophyta comprises of plants with vascular tissue. Eg: Ferns, etc.
• Gymnosperms are the non-flowering plant with naked seed. Eg: Cycas, etc.

**Q69. Answer: (b) 2500**

Shortcut Trick
Fractional equivalent of 62.5% is 5/8.
Direct calculation => 4000 × (5/8)
=> 500 × 5 = 2500
Therefore The correct answer is 2500.
Alternate Method
Given: 62.5% of 4000
Formula Used: Percentage value = (Percentage/100) × Total Value
=> Required Value = (62.5/100) × 4000
=> Required Value = (625/1000) × 4000
=> Required Value = 625 × 4
=> Required Value = 2500
Therefore The correct answer is 2500.
Additional Information
Common Percentage to Fraction Conversions
12.5% = 1/8, 37.5% = 3/8, 62.5% = 5/8, and 87.5% = 7/8. Memorizing these helps in fast Simplification.
Percentage Change Formula
Percentage Change = (Difference/Original Value) × 100. This is the base for Profit and Loss and DI calculations.

**Q70. Answer: (d) $H = I^2Rt$**

The correct answer is option 4, i.e., H = I2Rt.

• The heat produced by the current in the wire during time t is determined by H = I2Rt.
• It is known as Joule heating or Ohmic heating.

| Physical Quantity | Formula | SI unit | Dimension |
|---|---|---|---|
| Voltage | IR | Volt | $[ML^2T^{(-3)}A^{(-1)}]$ |
| Power | $I^2R$, $V^2/R$, VI | Watt | $[ML^2T^{(-3)}]$ |
| Heat Energy, Work done | $I^2Rt$, Pt, VIt | Joule | $[ML^2T^{(-2)}]$ |

**Q71. Answer: (b) West**

The diagrammatic representation of the watch is as follows:
Hence, hour hand will be facing West at 9:00 p. m.

**Q72. Answer: (b) [figure]**

Hence, the correct relation between Shirt, Sleeves, Buttons can be represented as the figure given above.

**Q73. Answer: (a) Synapse**

The correct answer is option 1, i.e., Synapse.

• The junction between an axon ending with the dendrite of another nerve cell is called Synapse.
• The electrical or chemical signals from one neuron pass to another through the synapse.
• Neuron is the functional unit of the Nervous System.

• The gap that separates the pre-synaptic and post-synaptic neurons is termed as the Synaptic Cleft.
• Node of Ranvier is the gap on the myelin sheath of the axon which serves to facilitate rapid conduction of nerve impulses.

**Q74. Answer: (b) 4 and 0**

Shortcut Trick
If (x − 2) is a common factor, then substituting x = 2 in both polynomials must result in zero.
For the first polynomial: $2^3 - 4(2^2) + a(2) + b = 0 \Rightarrow 8 - 16 + 2a + b = 0 \Rightarrow 2a + b = 8$.
For the second polynomial: $2^3 - a(2^2) + b(2) + 8 = 0 \Rightarrow 8 - 4a + 2b + 8 = 0 \Rightarrow -4a + 2b = -16 \Rightarrow 2a - b = 8$.
Adding the two simplified equations: $4a = 16 \Rightarrow a = 4$. Substituting a = 4 gives b = 0.
Therefore The correct answer is 4 and 0.
Alternate Method
Given: (x − 2) is a factor of $f(x) = x^3 - 4x^2 + ax + b$ and $g(x) = x^3 - ax^2 + bx + 8$.
Formula Used: According to Factor Theorem, if (x − k) is a factor of p(x), then p(k) = 0.
$\Rightarrow f(2) = 2^3 - 4 \times 2^2 + a \times 2 + b = 0$
$\Rightarrow 8 - 16 + 2a + b = 0$
$\Rightarrow 2a + b = 8$ ... (Equation 1)
$\Rightarrow g(2) = 2^3 - a \times 2^2 + b \times 2 + 8 = 0$
$\Rightarrow 8 - 4a + 2b + 8 = 0$
$\Rightarrow 16 - 4a + 2b = 0$
$\Rightarrow 4a - 2b = 16$
$\Rightarrow 2a - b = 8$ ... (Equation 2)
=> Adding (1) and (2): $(2a + b) + (2a - b) = 8 + 8$
$\Rightarrow 4a = 16 \Rightarrow a = 4$
=> Substituting a = 4 in (1): $2(4) + b = 8 \Rightarrow 8 + b = 8 \Rightarrow b = 0$
Therefore The correct answer is 4 and 0.
Additional Information
Factor Theorem
A polynomial f(x) has a factor (x − k) if and only if f(k) = 0. This is a special case of the Remainder Theorem.
Remainder Theorem
When a polynomial p(x) is divided by (x − a), the remainder is given by p(a).
Common Factors
If p(x) and q(x) share a common factor (x − k), then the value x = k is a root for both equations p(x) = 0 and q(x) = 0.

**Q75. Answer: (c) both statement 1 and 2 are sufficient**

Shortcut Trick
To find the hypotenuse (x) of a right-angled triangle, both the base and the height must be known.
Statement 1 provides the height (AB = 5 cm) and Statement 2 provides the base (BC = 12 cm).
Using the Pythagorean triplet (5, 12, 13), the value of x is uniquely determined as 13 cm.
Therefore, both statements are necessary to solve the problem.
Therefore The correct answer is both statement 1 and 2 are sufficient.
Alternate Method
Given:
=> Triangle ABC is right-angled at B (angle B = 90°).
=> Statement 1: AB = 5 cm
=> Statement 2: BC = 12 cm
Formula Used:
=> Pythagoras Theorem: $AC^2 = AB^2 + BC^2$
Calculations:
=> To find x (AC), we need the values of both legs AB and BC.
=> From Statement 1 and 2: $x^2 = 5^2 + 12^2$
$\Rightarrow x^2 = 25 + 144$
$\Rightarrow x^2 = 169$

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=> x = √169 = 13 cm

=> Since a unique value of x is obtained only when both AB and BC are known, both statements are sufficient together.

Therefore The correct answer is both statement 1 and 2 are sufficient.

**Q76. Answer: (c) 28**

The logic followed here is:

4 × 4 = 16;

Similarly,

4 × 7 = 28.

Hence, 28 is the correct answer.

**Q77. Answer: (d) Andhra Pradesh**

The correct answer is Option 4, i.e., Andhra Pradesh.

• Andhra Pradesh government has launched the 'Anna Canteens'.

• The canteen was inaugurated by the then CM of Andhra Pradesh N Chandrababu Naidu in Vijayawada in July 2018.

• In the first phase 60 such canteens were opened across the state.

• The responsibility of running these canteens was taken by the Akshaya Patra Foundation.

• The canteen promised to offer each meal at Rs 5.

• Amma canteen - Tamil Nadu.

**Q78. Answer: (d) 8**

The correct answer is option 4, i.e. 8.

• Bio-geographic regions were originally identified by Philip L Sclater and H.G. Adolf Engler.

• Bio-geographic regions are large areas with particular flora and fauna, due to their isolation during continental drift.

• At first, six regions were identified:

• Palearctic (Europe and Asia)

• Nearctic (North America)

• Neotropical (Mexico, Central America, and South America)

• Ethiopian (Africa)

• Indian (Southeast Asia and Indonesia)

• Australian (Australia and New Guinea)

• Later, two more were added:

• Oceania (Polynesia, Fiji, and Micronesia)

• Antarctica

• Hence, now there are 8 bio-geographical regions in the world.

**Q79. Answer: (b) IAIA or IAi**

The correct answer is option 2, i.e., IAIA or IAi.

• IA and IB are the dominant alleles, while i is the recessive allele which make the different blood groups.

• The human blood is an example of Multiple allelism (i.e. one trait is controlled by different variants of a gene).

| Blood Group | Gene combination |
|---|---|
| A | IAIA or IAi |
| B | IBIB or IBi |
| AB | IAIB |
| O | ii |

**Q80. Answer: (a) The work of 4 boys is equivalent to the work of 3 men**

Shortcut Trick

Equate Total Work: (3M + 5B) × 15 = (6M + 7B) × 9

Divide by 3: (3M + 5B) × 5 = (6M + 7B) × 3

15M + 25B = 18M + 21B

4B = 3M

Therefore The correct answer is The work of 4 boys is equivalent to the work of 3 men.

Alternate Method

Given:

Case 1: 3 Men and 5 Boys in 15 days.

Case 2: 6 Men and 7 Boys in 9 days.

Formula Used:

Total Work = (M1 × D1) = (M2 × D2)

| Person | Days | Total Work | Efficiency Ratio |
|---|---|---|---|
| 3M + 5B | 15 | Constant | 4B = 3M |
| 6M + 7B | 9 | | |

Calculations:

=> (3M + 5B) × 15 = (6M + 7B) × 9

=> 45M + 75B = 54M + 63B

=> 75B − 63B = 54M − 45M

=> 12B = 9M

=> 4B = 3M

Therefore The correct answer is The work of 4 boys is equivalent to the work of 3 men.

Additional Information

Work Equivalence Principle

When multiple types of workers (Men, Women, Boys) are involved, always express the total work in terms of one variable by equating the efficiency: M1D1H1 = M2D2H2.

Man-Day Efficiency

Efficiency is inversely proportional to the time taken to complete a specific task. If 4 boys = 3 men, then the ratio of efficiency B:M is 3:4.

**Q81. Answer: (a) D**

By rotating the question figure, we can obtain figure D.

Hence, the figure D bears the closest resemblance to the following figure

**Q82. Answer: (c) 9.75**

According to the question

2.4 – 0.15 + 7.5

=> 9.75

**Q83. Answer: (a) Natyashastra**

The correct answer is option 1, i.e., Natyashastra.

• Natyashastra is the most ancient literature which mentions about Indian music and dance.

• Natyashastra deals with all aspects of Sanskrit theatre.

• The text is associated with Bharata Muni and consists of 36 chapters with a cumulative total of 6000 poetic verses describing performance arts.

• Bhagavad-Gita, a manuscript is part of Indian epic Mahabharata. It consists of the sayings of the Lord Krishna.

• Mahabharata is an Indian epic depicting the battle of Kauravas and the Pandavas and was written by Vyasa.

• Ramayana, authored by Valmiki, is divided into seven books and it narrates the life of Lord Ram.

**Q84. Answer: (d) Sound waves**

The correct answer is option 4, i.e., Sound waves.

• Sound wave is a Mechanical wave.

• Mechanical waves require medium for their propagation.

• Sound travels as a longitudinal wave in gas and liquids, while in solids it can be both longitudinal or transverse.

• Speed of sound is maximum in solids and minimum in gases.

• X-ray is an electromagnetic radiation of high energy.

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• Radio waves are electromagnetic waves which have the longest wavelength in the electromagnetic spectrum.
• Microwaves are electromagnetic waves with wavelength between infrared waves and radio waves.

**Q85. Answer: (c) 120**

BE is the height of the bird from the pond.
=> BE = ED = h m
=> AF = CE = 60 m
=> BC = (h – 60) m and CD = (h + 60) m
In ΔABC,
tan 30 = BC/AC
=> 1/√3 = (h – 60)/AC
=> AC = √3 (h – 60) ----(i)
In ΔADC
tan 60 = CD/AC
=> √3 = (h + 60)/AC
=> AC = (h + 60)/√3 ----(ii)
From equation (i) and equation (ii)
√3 (h – 60) = (h + 60)/√3
=> 3 (h – 60) = (h + 60)
=> 3h – 180 – h = 60
=> 2h = 240
=> h = 120 m
Therefore Height of the bird from the pond is 120 m.

**Q86. Answer: (d) Zinc**

The correct answer is option 4, i.e. Zinc.
• In the process of Galvanisation, Zinc is coated over iron.
• Zinc is coated over iron to protect the latter from rusting.
• The most common way of galvanizing iron is dipping it in the hot molten zinc.
• When iron comes in contact with air and moisture, rust forms over it and eats away the metal.
• Rust is hydrated iron oxide with the chemical formula $Fe_2O_3 . nH_2O$.
• When Zinc gets coated over the iron it protects iron from coming in contact with air and moisture.

**Q87. Answer: (b) Only assumption I is implicit**

Since the psychologist is discussing a psychological/mental disorder with his clients, it can be assumed that he deals with mental disorders.
Therefore, assumption I is implicit.
The statement does not find any mention of the measures to deal with any disorder.
Therefore, assumption II is not implicit.
Hence, only assumption I is implicit.

**Q88. Answer: (d) 32%**

Shortcut Trick
Total Expenditure = Development Cost + (Monthly Support × Time)
Support Cost = 6% of Rs. 50,000 = Rs. 3,000 per month.
Total Cost = Rs. 50,000 + (Rs. 3,000 × 6) = Rs. 68,000.
Savings = Rs. 1,00,000 − Rs. 68,000 = Rs. 32,000.
Savings % = (32,000 / 1,00,000) × 100 = 32%.
Therefore The correct answer is 32%.
Alternate Method
Given:
Initial Capital = Rs. 1,00,000
Development Cost = Rs. 50,000

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Monthly Support Rate = 6% of Development Cost

Support Duration = 6 months

Calculations:

=> Cost of Support per month = 50,000 × (6 / 100) = Rs. 3,000

=> Total Support Cost for 6 months = 3,000 × 6 = Rs. 18,000

=> Total Expenditure = Development Cost + Total Support Cost

=> Total Expenditure = 50,000 + 18,000 = Rs. 68,000

=> Total Savings = Initial Capital − Total Expenditure

=> Total Savings = 1,00,000 − 68,000 = Rs. 32,000

=> Savings Percentage = (Savings / Initial Capital) × 100

=> Savings Percentage = (32,000 / 1,00,000) × 100 = 32%

Therefore The correct answer is 32%.

Additional Information

Percentage Change

To find the percentage saved or spent, always use the Initial Value or Base Capital as the denominator.

Successive Costs

When costs are recurring (like monthly support), multiply the periodic cost by the number of periods before subtracting from the total budget.

Capital Budgeting

Savings = Total Capital − (Fixed Costs + Variable Costs). Here, development is fixed and support is variable based on time.

**Q89. Answer: (a) 43.788**

123 × 356 = 43788

Therefore 1.23 × 35.6 = 123/100 × 356/10 = 43788/1000 = 43.788

**Q90. Answer: (a) Magnesium**

The correct answer is option 1, i.e. Magnesium.

• Magnesium, though not easily, can be cut with a knife.

• Sodium and Potassium are very soft metal can be very easily cut with a knife, just like wax.

• These metals have large size and only 1 electron in their valence shell, due to this the atomic bonding is quite weak.

• Also, these metals have body centred cubic structure that has a lot of empty space and this makes metallic bond weak.

• Hence, these can be easily cut using a knife.

• Calcium is an alkaline earth metal. It can also be easily cut with a knife.

• Magnesium is a bit hard as it has a small size and 2 electrons in the valence shell. So, it has comparatively better atomic bonding than others given in the options.

**Q91. Answer: (b) May**

In month May the number of manufactured screws is the highest.

**Q92. Answer: (b) Manipur High Court**

The correct answer is option 2, i.e., Manipur High Court.

• In February 2018, Abhilasha Kumari was sworn in as the Chief Justice of the Manipur High Court.

• She was the first female Chief justice of Manipur High Court.

• She has served as a former judge at the Gujarat High Court and as the chairperson of the Human Rights Commission of the Gujarat.

• Currently, she is serving as the Judicial member of the Lokpal Committee of India since Mar 23, 2019.

**Q93. Answer: (d) 54 : 1**

Shortcut Trick

Area of Triangle = (1/2) × b_t × h_t and Area of Parallelogram = b_p × h_p

Given: b_t = (1/9)b_p and A_p = (1/3)A_t => A_t = 3 × A_p

Ratio of heights h_t : h_p = (A_t / (0.5 × b_t)) : (A_p / b_p)

h_t / h_p = (3 × A_p / (0.5 × (1/9)b_p)) / (A_p / b_p) = 3 / (1/18) = 54

Therefore The correct answer is 54 : 1.

Alternate Method
Given:
Base of triangle (b1) = (1/9) × Base of parallelogram (b2)
Area of parallelogram (A2) = (1/3) × Area of triangle (A1)
Formula Used:
Area of Triangle (A1) = (1/2) × b1 × h1
Area of Parallelogram (A2) = b2 × h2
Calculations:
=> From area relation: A1 = 3 × A2
=> (1/2) × b1 × h1 = 3 × (b2 × h2)
=> Substitute b1 = b2/9
=> (1/2) × (b2/9) × h1 = 3 × b2 × h2
=> (1/18) × h1 = 3 × h2
=> h1 / h2 = 3 × 18 / 1
=> h1 : h2 = 54 : 1
Therefore The correct answer is 54 : 1.
Additional Information
Area of Triangle
Basic formula is Area = (1/2) × base × height. Also calculated via Heron's formula: √(s(s−a)(s−b)(s−c)).
Area of Parallelogram
Calculated as base × perpendicular height. A rectangle and rhombus are special types of parallelograms.
Ratio and Proportion
When comparing geometric dimensions, ensure the units are the same before calculating the ratio.

**Q94. Answer: (d) 37**

| Code | P | Q | R | S |
|---|---|---|---|---|
| Meaning | ÷ | × | • | • |

So, 8Q24P6R10S5 can be decoded as 8 × 24 ÷ 6 + 10 – 5;
Applying BODMAS
8 × 24 ÷ 6 + 10 – 5 → 8 × 4 + 10 – 5 = 32 + 10 – 5 = 42 – 5 = 37
Hence, the value of '8Q24P6R10S5' will be 37.

**Q95. Answer: (b) 75**

Shortcut Trick
The Mean of (a + x, b + x, c + x...) is simply Mean(a, b, c...) + x.
Average of first set: (27 + 31 + 89 + 107 + 156) ÷ 5 + x = 82 + x.
Given Mean = 82 => 82 + x = 82 => x = 0.
Required Mean = Average of (130, 126, 68, 50, 1) + x = 375 ÷ 5 + 0 = 75.
Therefore The correct answer is 75.
Alternate Method
Given: Mean of 5 observations = 82.
Formula Used: Mean = Sum of observations ÷ Total number of observations
Step 1: Find the value of x
=> Mean = [(27 + x) + (31 + x) + (89 + x) + (107 + x) + (156 + x)] ÷ 5 = 82
=> (27 + 31 + 89 + 107 + 156 + 5x) = 82 × 5
=> 410 + 5x = 410
=> 5x = 410 − 410 = 0
=> x = 0
Step 2: Find the mean of the second set
=> Mean = [(130 + x) + (126 + x) + (68 + x) + (50 + x) + (1 + x)] ÷ 5
=> Substitute x = 0: (130 + 126 + 68 + 50 + 1) ÷ 5

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=> Total Sum = 375

=> Required Mean = 375 ÷ 5 = 75

Therefore The correct answer is 75.

Additional Information

Linear Property of Mean

If every value in a data set is increased by a constant k, the new mean becomes Original Mean + k.

Multiplication Property

If every value in a data set is multiplied by a constant k, the new mean becomes Original Mean × k.

Combined Mean Formula

For two groups with means m1, m2 and sizes n1, n2, the Combined Mean = (n1m1 + n2m2) ÷ (n1 + n2).

**Q96. Answer: (b) 59**

√3481

=> √(59 × 59)

=> 59

**Q97. Answer: (c) Pankaj Advani**

The correct answer is option 3, i.e. Pankaj Advani.

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

• The venue of the game was Doha, Qatar.

• Pankaj Advani defeated Mike Russell of England to win the title.

• Pankaj Advani is a renowned Indian billiards and snooker player.

• Pankaj Advani has won the amateur IBSF World Billiards Championship and the IBSF World Snooker Championship 14 times and 3 times respectively.

**Q98. Answer: (c) Oxidation**

The correct answer is option 3, i.e. Oxidation.

• Hydrogen gets oxidized in the reaction.

• CuO + H2 → Cu + H2O

• A reactant is said to get oxidized in the following cases:

• The Oxygen gets added to it

• The Hydrogen gets removed from it.

• Its Oxidation state increases.

• It loses electrons

• In the above reaction, Oxygen is added to the Hydrogen, and also its Oxidation state changes from 0 to +2.

• Hence we can say hydrogen is oxidized in the reaction.

**Q99. Answer: (c) A**

Hence, figure A is the correct mirror image of the given question figure.

**Q100. Answer: (d) Newton**

The correct answer is option 4, i.e., Newton.

Key Points

• Newton is the SI unit of Force.

• The unit has been named after Sir Issac Newton, the very famous scientist who gave the laws of motion, etc.

| Physical Quantity | SI Unit | Dimension |
|---|---|---|
| Pressure | Pascal | [ML^(-1)T^(-2)] |
| Power | Watt | [ML²T^(-3)] |
| Work, Energy | Joule | [ML²T^(-2)] |
| Force | Newton | [MLT^(-2)] |

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