# RRC Group D Previous Year Paper 55 (Held On: 15 Oct 2018 Shift 1)

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

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

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

**yourmocktest.com/pyq/rrb-group-d/rrc-group-d-previous-year-paper-55-held-on-15-oct-2018-sh…**

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

2 questions are in Hindi and not printed here. Each one links to the online version, where you can read it.

## CBT

**Q1.** Who was the lead actress in the movie 'Padmavat' released in 2018.

**(a)** Deepika Padukone
**(b)** Kareena kapoor
**(c)** Priyanka Chopra
**(d)** Radhika Apte

**Q2.** Which of the following statements is/are true/false?

1. By increasing the temperature and pressure, we can convert atmospheric gases into liquid state.

2. A hot dry day means that the atmospheric temperature is high and the air humidity is low. Both these factors lead to an increase in the rate of evaporation and thus a large amount of cold formation.

**(a)** Both 1 and 2 are true.
**(b)** Only 1 is true.
**(c)** 1 and 2 are both false
**(d)** Only 2 is true.

**Q3.** In a group of 300 students, each student reads 7 subjects and each subject is read by 50 students. What is the total number of subjects?

**(a)** more than 20
**(b)** total 42
**(c)** at least 100
**(d)** possibly 50

**Q4.** Which ministry has launched 'Mission 41K' program?

**(a)** Ministry of Railways
**(b)** Ministry of MSME
**(c)** Ministry of Environment
**(d)** Ministry of Culture

**Q5.** Who is the first woman in the world to climb Mount Everest twice in one season?

**(a)** Lakpa Sherpa
**(b)** Junko Tabei
**(c)** Anshu Jamshenpa
**(d)** Anga Rita

**Q6.** A statement below followed by two assumptions I and II is given. Considering the statement and assumptions, you have to decide which of the assumption/s is implicit in the given statement.

Statement: X said to Y, "I want to research the spurious behavior of adolescents about their use of Facebook and Instagram."

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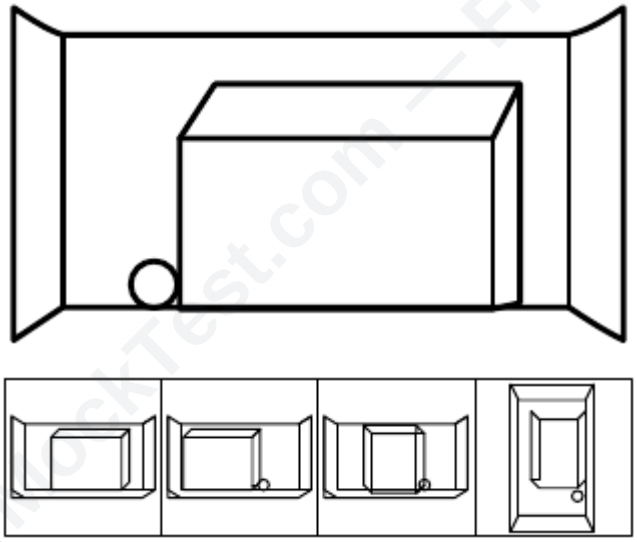
Assumptions:

I. Changes in attitudes of adolescents due to the use of Facebook and Instagram can be targeted.

II. X has the skill and proficiency to do this type of research.

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

**Q7.** Which of the following option figure shows the closest resemblance to the question figure?



A B C D

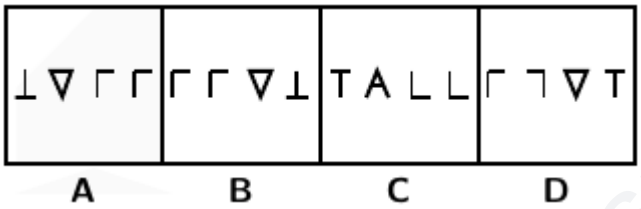
**(a)** D
**(b)** B
**(c)** A
**(d)** C

**Q8.** If a body is projected vertically upward, what will be the velocity of the body at the highest point of motion? (g = acceleration due to gravity, h = height, t = time)

**(a)** zero
**(b)** -g
**(c)** -gh
**(d)** gt

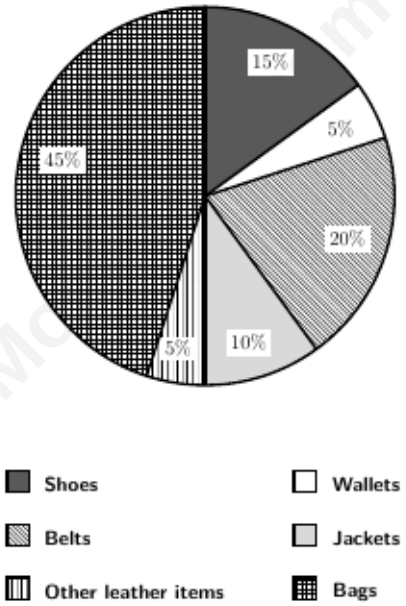
**Q9.** If the mirror is on the line MN, then what will be the mirror image of the following figure?






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

**Q10.** The following pie diagram shows the revenue of ABC, a company manufacturing leather products. The total revenue of the company for the year 2015 was Rs. 3,628,000.




How much revenue (in Rs) did the company earn from the sale of "Bags" in the year 2015?

**(a)** Rs. 9,07,000
**(b)** Rs. 16,32,600
**(c)** Rs. 3,62,800
**(d)** Rs. 18,140,000

**Q11.** Areolar tissue acts as a filler tissue between _____.

**(a)** skin and muscles
**(b)** skin and bone
**(c)** blood and skin
**(d)** bones and muscles

**Q12.** The atomic numbers of the four basic elements of a period are 11, 13, 16 and 17. The atomic number of the highest metallic parent element in the modern periodic table will be _____.

**(a)** 9
**(b)** 13
**(c)** 32
**(d)** 11

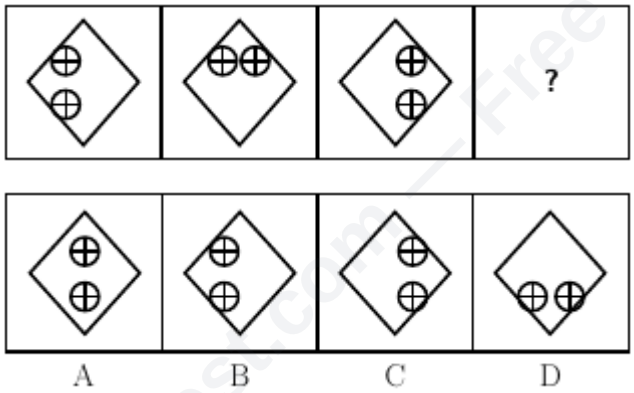
**Q13.** In the modern periodic table, bromine occurs in the _____ period.

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

**Q14.** Which celebrity has been appointed by the well-known cab company 'Uber' as its first brand ambassador?

**(a)** Priyanka Chopra
**(b)** Sachin Tendulkar
**(c)** Amir Khan
**(d)** Virat Kohli

**Q15.** Select the option figure that will complete the series of the question figure.




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

**Q16.** Which is the 2016 Indian-Assamese biographical 2D computer animation film directed by Manju Bora?

**(a)** Sarvagunakar Shrimant Shankardev
**(b)** Mahayoddha Ram
**(c)** Chaar Saahibzade
**(d)** Modu Patlu: King of Kings

**Q17.** Which country will host the 2023 Cricket World Cup?

**(a)** England
**(b)** South Africa
**(c)** Australia
**(d)** India

**Q18.** Which of the following does not belong to the given group?

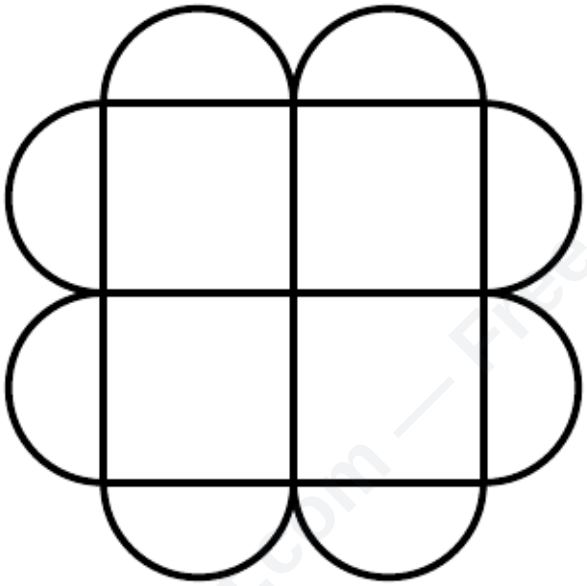
**(a)** C V Raman
**(b)** Shakuntala Devi
**(c)** Satyendra Nath Bose
**(d)** Sudha Chandran

**Q19.** The average of three numbers is 7. The average of the first two is 5, while that of the last 2 is 8. Which are the three numbers (respectively)?

**(a)** 3, 7 and 9
**(b)** 2, 8 and 8
**(c)** 5, 5 and 11
**(d)** 4, 6 and 10

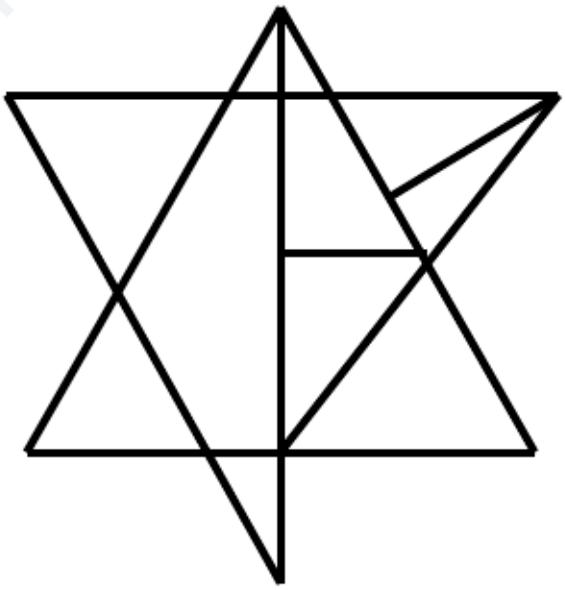
**Q20.** Find the number of squares in the given figure.

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

**Q21.** How many triangles are there in the following figure?



**(a)** 16
**(b)** 11
**(c)** 19
**(d)** 17

**Q22.** When a natural number is divided by 5, 6, 7 and 9, each leaves a remainder 1. Which is the least number among such numbers?

**(a)** 421
**(b)** 1261
**(c)** 211
**(d)** 631

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**Q23.** What is the growth rate projected by IMF for the Indian economy in the year 2019?

**(a)** 8.5%
**(b)** 9%
**(c)** 7.4%
**(d)** 10%

**Q24.** A rich man divided his property (in the form of land) among his five sons. But later he took back his youngest son's share and divided it among other sons. If the eldest son would now own 93.75 m², how much land did the rich man actually own?

**(a)** 375 m²
**(b)** 395 m²
**(c)** 315 m²
**(d)** 275 m²

**Q25.** There is _____ in the class aves.

**(a)** dry and glandular skin without hair
**(b)** dry and glandular skin with feathers
**(c)** dry and glandular skin without feathers
**(d)** dry and glandular skin with hair

**Q26.** A purse contains equal number of 25 paise and 50 paise coins. If their value is Rs. 22.50, then what is the number of coins of each type?

**(a)** 35
**(b)** 45
**(c)** 30
**(d)** 40

**Q27.** In the following series what number will come in place of ?

15, 21, 30, ?, 57

**(a)** 45
**(b)** 38
**(c)** 40
**(d)** 42

**Q28.** A × B means A is mother of B

A / B means A is brother of B

A @ B means A is sister of B.

A % B means A is father of B

Based on the above information, which of the following means P is the maternal uncle of Q?

**(a)** P × S @ N / B
**(b)** Q / N × M @ P
**(c)** Q / S % P
**(d)** P / M × N @ Q

**Q29.** In a town with a population of 5000, 3200 people drink tea, 2500 people drink coffee and 1500 people drink both tea and coffee. How many of them neither drink tea nor coffee?

**(a)** 800
**(b)** 770
**(c)** 900
**(d)** 1800

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**Q30.** Five years ago the age of the son was one third of that of his mother at that time. If the sum of their present ages is 70 years, then find the present age of the mother.

**(a)** 45
**(b)** 55
**(c)** 50
**(d)** 60

**Q31.** Chetna went from her home to the city at the speed of 8 km/hr but came back home by the same route at the speed of 5 km/hr. It took her 19 1/2 hours to travel two-way. What is the distance of the city from Chetna's house?

**(a)** 45 km
**(b)** 60 km
**(c)** 52.5 km
**(d)** 37.5 km

**Q32.** The square of a number is 3 more than twice the number. What is that possible number?

**(a)** 1 or 3
**(b)** 1 or -3
**(c)** -1 or -3
**(d)** -1 or 3

**Q33.** If one side of an equilateral triangle is $6\sqrt{3}$ cm, what is its height?

**(a)** 9 cm
**(b)** 6 cm
**(c)** 3 cm
**(d)** $3\sqrt{3}$ cm

**Q34.** This question is in Hindi. Read it online.

**Q35.** If in a particular code language, KITE is coded as LITE and SUTE is coded as TUTE, then what will PLUE be coded as in that code language?

**(a)** UTLE
**(b)** QLTU
**(c)** LUTE
**(d)** QLUE

**Q36.** It has been decided to provide electricity connections to all 1200 households living without electricity in the village. If the rate of electrification is 75% per annum, then what is the number of households living without electricity connection after 2 years?

**(a)** 45
**(b)** 75
**(c)** 55
**(d)** 65

**Q37.** When a body is immersed wholly or partially in a liquid, a force is exerted on it in an upward direction, which is equal to the weight of the liquid displaced by that body. What rule makes this clear?

**(a)** Archimedes' principle
**(b)** Lenz's law
**(c)** Pauli's Exclusion principle
**(d)** Faraday's law

**Q38.** _____ is the capital of Uttarakhand.

**(a)** Mussoorie
**(b)** Roorkee
**(c)** Dehradun
**(d)** Nainital

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**Q39.** Read the given statements and conclusions carefully and choose which of the conclusions is logical in the context of the given statements.

Statements:

1. All files are paper.
2. All paper is pulp.

Conclusion:

1. All files are pulp.
2. Some pulp is paper.

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

**Q40.** The sum of the kinetic energy and potential energy of an object is called _____.

**(a)** Mechanical energy
**(b)** Latent energy
**(c)** Chemical energy
**(d)** Muscular energy

**Q41.** Find the least number which when divided by 6, 15 and 18 leaves a remainder 5 each time.

**(a)** 95
**(b)** 92
**(c)** 96
**(d)** 90

**Q42.** What is the energy contained in an object of 15 kg when it is at a height of 5 m above the ground? Given g = 9.8 ms^(-2).

**(a)** 520 J
**(b)** 528 J
**(c)** 738 J
**(d)** 735 J

**Q43.** What is the relationship between the electric current flowing through a conductor and the potential difference?

**(a)** I - V is a constant.
**(b)** V × I is a constant.
**(c)** V/I is a constant.
**(d)** V + I is a constant.

**Q44.** A man spends 2/5 part of his income and has Rs. 90 left. How much money did he have in the beginning?

**(a)** Rs. 130
**(b)** Rs. 150
**(c)** Rs. 140
**(d)** Rs. 120

**Q45.** 'Inert gases' are in _____ group.

**(a)** I A
**(b)** III A
**(c)** VIII A
**(d)** IV A

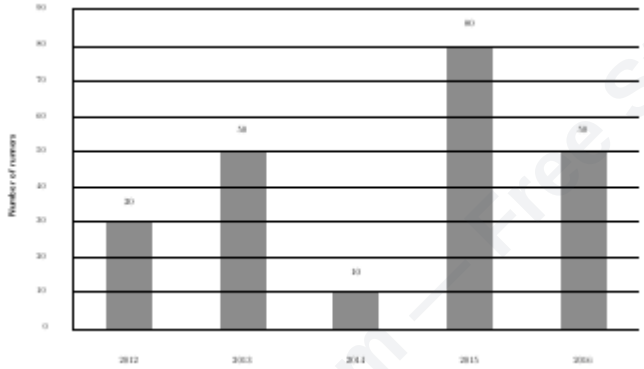
**Q46.** If you place _____ metal on your palm, that metal melts.

**(a)** K
**(b)** Ga
**(c)** Na

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**(d)** Ba

**Q47.** The following bar graph gives the details of students passed out of the institute 'ABC' in the national level entrance examination in the last 5 years.



In the year 2016, how many students passed from the institute 'ABC'?

**(a)** 40
**(b)** 50
**(c)** 30
**(d)** 60

**Q48.** Which of the following statement(s) is/are true regarding the speed of sound at 25°C in different mediums?

1. The speed of sound in aluminum is 6220 m/s.
2. The speed of sound in nickel is 6240 m/s.

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

**Q49.** The selling price of an article with 16.5% profit was Rs.466. Had it been sold for Rs.330, what would have been the percentage loss?

**(a)** 17.25
**(b)** 17.75
**(c)** 17
**(d)** 17.5

**Q50.** 5th February 2018 was Monday. In which of the following years will 5th February be Monday again?

**(a)** 2025
**(b)** 2021
**(c)** 2023
**(d)** 2024

**Q51.** An eminent personality of the film industry has recently been made the official brand ambassador of Sikkim. Who is he?

**(a)** Aamir Khan
**(b)** Naseeruddin Shah
**(c)** Akshay Kumar
**(d)** A. R. Rahman

**Q52.** The _____ reaction requires energy to split the reactants.

**(a)** Combination
**(b)** Decomposition
**(c)** Double displacement
**(d)** Displacement

**Q53.** How many testicles does a man have?

**(a)** Two
**(b)** One
**(c)** Three
**(d)** Eight

**Q54.** This question is in Hindi. Read it online.

**Q55.** _____ was the capital of the Maurya Empire.

**(a)** Magadh
**(b)** Pataliputra
**(c)** Nalanda
**(d)** Takshshila

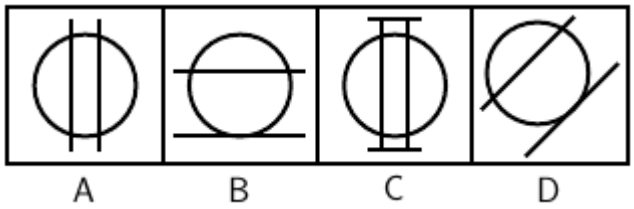
**Q56.** In 2017, who won the Denmark Open title in the men's singles category of badminton?

**(a)** Lee Hyun-il
**(b)** Srikanth Kidambi
**(c)** Liu Cheng
**(d)** Kevin Sanjaya Sukamuljo

**Q57.** In the medieval period, travelers to India wrote their biographies and court poets wrote poems to praise their kings. These literary sources are called _____.

**(a)** Inscription
**(b)** Chronicle
**(c)** Theology
**(d)** Chronology

**Q58.** Find out the odd one from the following :



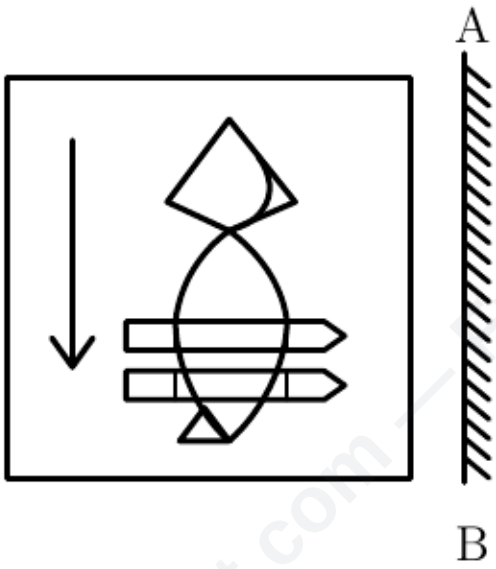

**(a)** A
**(b)** B
**(c)** C
**(d)** D

**Q59.** An electric bulb of 200 W is used for 5 hours per day. Calculate the energy consumed by the bulb in a week.

**(a)** 0.1 Unit
**(b)** 0.7 Unit
**(c)** 7 Unit
**(d)** 1 Unit

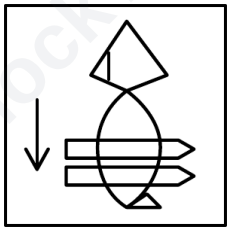
**Q60.** Question Figure :

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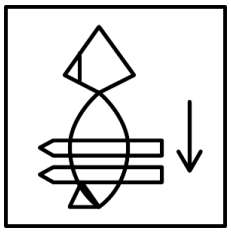



Which will be the mirror image of the above figure with respect to line AB?

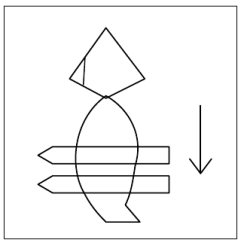
**(a)**



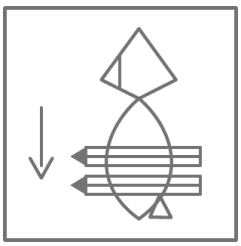
**(b)**



**(c)**



**(d)**



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**Q61.** In CaO, the ratio of Ca and O by mass is

**(a)** 5 : 2
**(b)** 3 : 8
**(c)** 2 : 5
**(d)** 8 : 3

**Q62.** Srikanth, Pradeep, Kirtana and Priyanka are playing carrom in the morning. While playing kirtana is watching the sunrise and her face is also towards the sunrise. Priyanka is sitting opposite to Kirtana and Pradeep is sitting to the right of Kirtana. In which direction is Srikanth facing?

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

**Q63.** If √3 = 1.732, then what will be the approximate value of 1/(√3) ?

**(a)** 0.577
**(b)** 2.577
**(c)** 1.577
**(d)** 0.770

**Q64.** A private swimming pool provides different time slots for its users, and the following table shows the number of pool visitors per week.

| Day | Swimming pool users number |
|---|---|
| Monday | 8 |
| Tuesday | 4 |
| Wednesday | 15 |
| Thursday | 15 |
| Friday | 20 |
| Saturday | 25 |
| Sunday | 25 |

On average, how many visitors were there on one day of that week?

**(a)** 12
**(b)** 16
**(c)** 14
**(d)** 15

**Q65.** Two numbers are in the ratio 3 : 5, if 10 is added to each, the ratio will change to 5 : 7. What are those numbers?

**(a)** 15, 25
**(b)** 10, 30
**(c)** 35, 49
**(d)** 20, 22

**Q66.** The ratio of the sides of a cuboid is 5 : 3 : 1. If his total surface area = 414 m², then the measure of his sides in meters will be respectively.

**(a)** 15, 9, 3
**(b)** 3, 9, 15
**(c)** 20, 12, 4
**(d)** 10, 6, 2

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**Q67.** Which one of the following places has not been selected for setting up a water aerodrome in the country?

**(a)** Sabarmati river bank
**(b)** Nile River
**(c)** Sardar Sarovar Dam
**(d)** Chilika Lake

**Q68.** _____ reacts with acids and bases.

**(a)** CuO
**(b)** Al2O3
**(c)** Na2O
**(d)** K2O

**Q69.** What will come next in the series below?

W5, U8, S11, Q14, ?

**(a)** B8
**(b)** O17
**(c)** P15
**(d)** T25

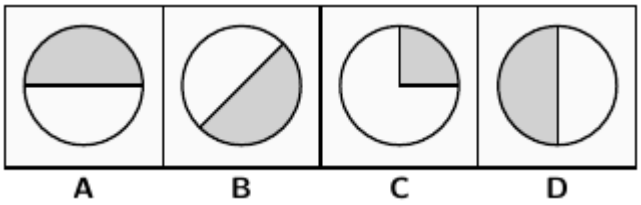
**Q70.** Who has been appointed as the general manager of cricket activities of B.C.C.I.? (2017)

**(a)** Saba Kareem
**(b)** Anil Kumble
**(c)** Venkatesh Prasad
**(d)** Kiran More

**Q71.** A bus travels uniformly from 36 kmh^(-1) to 72 kmh^(-1)in 5s. Calculate the acceleration of the bus.

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

**Q72.** Find out the odd one from the following.




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

**Q73.** 800 men can do a piece of work in 30 days. After working for 12 days 80 men left the work. In how many days can the remaining work be completed by the remaining people?

**(a)** 22
**(b)** 20
**(c)** 28
**(d)** 24

**Q74.** What is the square root of 3364?

**(a)** 64
**(b)** 62
**(c)** 58
**(d)** 52

**Q75.** Which of the following Indian national political party is headed by Mamata Banerjee?

**(a)** Indian National Congress
**(b)** Bahujan Samaj Party
**(c)** All India Trinamool Congress
**(d)** Nationalist Congress Party

**Q76.** P 3 R I M J 3 Q % W @ / N $ E 5 X Y 1 # 8

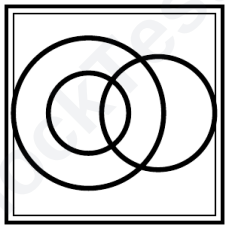
How many such consonants are there in the above sequence, each of which is immediately preceded by a consonant and immediately followed by a symbol?

**(a)** 0
**(b)** 1
**(c)** 3
**(d)** 2

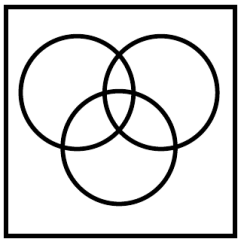
**Q77.** Select the most suitable Venn diagram for the following groups.

Mat, Bat, Van

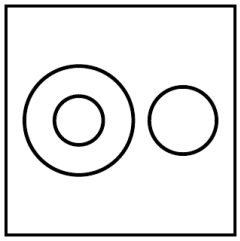
**(a)**



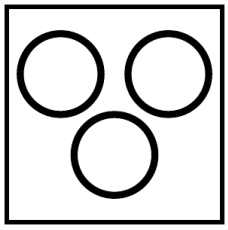
**(b)**



**(c)**



**(d)**



**Q78.** Nichrome is an alloy of which of the following?

**(a)** Ni, Cr, Mn and Fe
**(b)** Ni, Cr, Mg and Fe
**(c)** Ni, Cu, Mn and Fe
**(d)** Ni, Cr, Mn and Al

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**Q79.** Breaking a century-old tradition, which of the following has been extended for a month till February 1, 2017?

**(a)** Budget Presentation
**(b)** Annual Agriculture Report
**(c)** Annual Financial Plan
**(d)** Annual Economic Forecast

**Q80.** During the making of the Indian Constitution, who among the following presented the 'Objective Resolution?

**(a)** Motilal Nehru
**(b)** Dr. B.R. Ambedkar
**(c)** Jawaharlal Nehru
**(d)** Dr. Rajendra Prasad

**Q81.** Which of the following will be the correct value of 0.0006697 up to three decimal places?

**(a)** 0.000670
**(b)** 0.00669
**(c)** 0.001
**(d)** 0

**Q82.** Find the least number in which when 19 is added, it is completely divisible by 36, 64, and 90.

**(a)** 2861
**(b)** 2731
**(c)** 2951
**(d)** 3051

**Q83.** A person buys a product at the rate of 20 pieces for Rs. 80 and sells them at the rate of 9 pieces for Rs. 50. Then find the percentage of profit or loss made by the person.

**(a)** 36.8% Loss
**(b)** 37.8% Profit
**(c)** 38.8% Profit
**(d)** 39.8% Loss

**Q84.** Abhimanyu introduced a girl to his friend as "the only daughter of the only son of his father". The girl's relationship with Abhimanyu is of _____.

**(a)** Cousin
**(b)** Daughter
**(c)** Sister
**(d)** Aunt

**Q85.** A pipe can fill a cistern in 12 hours and another pipe can fill it in 15 hours. If both the pipes are opened simultaneously, then how much time will be taken to fill the tank halfway?

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

**Q86.** Which university has won the Visitor's Award for 'Best University 2017'?

**(a)** Visva Bharati University
**(b)** Delhi University
**(c)** Aligarh Muslim University
**(d)** Jawahar Lal Nehru University (JNU)

**Q87.** An object is thrown vertically from the top of a tower and it reaches the ground after 5 seconds. The initial velocity of the object is 12 m/s. What is the height of the tower?

**(a)** 55 m
**(b)** 75 m

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**(c)** 62.5 m
**(d)** 45 m

**Q88.**



Which of the following figures correctly fits in the above blank space?



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

**Q89.** Which state was ranked first in the medal tally of the 'Khelo India School Games' held for the first time in 2018?
**(a)** Maharashtra
**(b)** Kerala
**(c)** Delhi
**(d)** Haryana

**Q90.** Read the given statements and conclusions carefully and choose which of the given conclusions is/are logical from the given statements.

Statement:

Talking to the players, the coach said, "The club has high-class talent in abundance."

Conclusion:

I. The coach is able to judge the potential of the players

II. The coach is acknowledging his team's talent

**(a)** Only conclusion II is logical
**(b)** Only conclusion I is logical
**(c)** None of the conclusions are logical
**(d)** Both conclusions are logical

**Q91.** Which of the following statement is true?
**(a)** The radius of curvature is equal to the focal length
**(b)** The radius of curvature is half of the focal length
**(c)** The radius of curvature is equal to three times the focal length
**(d)** The radius of curvature is twice the focal length

**Q92.** The distance between the two stations is 440 km. At the same time both the trains run on parallel tracks from those stations and cross each other. The speed of one train is 5 km/hr more than that of the other train. If the distance between the trains after two hours is 210 km, then their speed in km/hr will be respectively.
**(a)** 75 km/hr and 70 km/hr respectively
**(b)** 60 km/hr and 55 km/hr respectively
**(c)** 55 km/hr and 50 km/hr respectively
**(d)** 65 km/hr and 60 km/hr respectively

**Q93.** _____ combines with O2 present in the cells of our body to provide energy.

**(a)** Glycogen
**(b)** Glucose
**(c)** Pyruvate
**(d)** Amino Acids

**Q94.** In the following question, a statement is given followed by arguments numbered I and II. You have to decide which of the following arguments is a strong argument.

Statement: Should hunting be banned in India?

Argument:

I. Yes, some species become extinct due to hunting.

II. No, hunting is one of the entertainment interests of the people.

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

**Q95.** _____ are the three parts of the seed.

**(a)** cotyledon, zygote and ovule
**(b)** cotyledon, radicle and ovule
**(c)** cotyledon, embryo and ovule
**(d)** cotyledon, zygote and radicle

**Q96.** Read the following question and decide which of the statement(s) is/are sufficient to answer the question?

Question :

J, K, N and O are standing in a row. If we rank them in order from tallest to smallest, who will stand first?

Statement:

1. J is taller than K.

2. N is the smallest among them.

3. K is taller than O.

**(a)** Statements 1 and 2 are sufficient.
**(b)** Statements 1 and 3 are sufficient.
**(c)** Statements 1, 2, and 3 all together are sufficient.
**(d)** The given statements are not sufficient.

**Q97.** What is a cyton called

**(a)** perikaryon, Cell
**(b)** Neurofibril
**(c)** Stimulus
**(d)** Olfactory Receptors

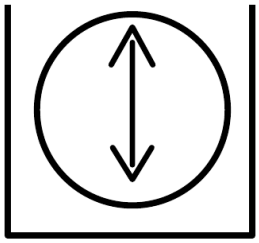
**Q98.** Manu's father's sister's son is Raju. How is Manu related to Raju?

**(a)** Mother
**(b)** Cousin
**(c)** Sister
**(d)** Aunt

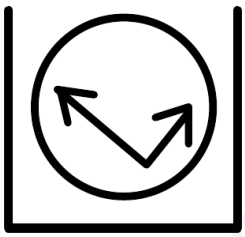
**Q99.** Identify the odd one from the given set of figures.

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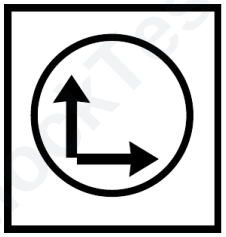
**(a)**



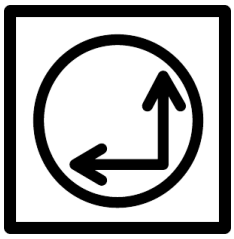
**(b)**



**(c)**



**(d)**



**Q100.** The least number of 5 digits when divided by 4, 5, and 7, leaves the remainder 3 in each case. What is that number?

**(a)** 10083
**(b)** 10003
**(c)** 10013
**(d)** 10077

## ANSWER KEY

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

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 91 d | 92 b | 93 b | 94 a | 95 b | 96 c | 97 a | 98 b | 99 a | 100 a |

## SOLUTIONS

**Q1. Answer: (a) Deepika Padukone**

The correct answer is Deepika Padukone.

Key Points

• Deepika Padukone was the lead actress in the movie 'Padmavat' released in 2018.

• Padmaavat is a 2018 Indian period drama romance film directed by Sanjay Leela Bhansali.

• Based on the epic poem of the same name by Malik Muhammad Jayasi, it stars Deepika Padukone as Rani Padmavati, a Rajput queen known for her beauty, wife of Maharawal Ratan Singh, played by Shahid Kapoor.

• Sultan Alauddin Khilji, played by Ranveer Singh, hears of her beauty and attacks her kingdom to enslave her.

• Aditi Rao Hydari, Jim Sarbh, Raza Murad, and Anupriya Goenka featured in supporting roles.

Additional Information

• Deepika Padukone is an Indian actress who works in Hindi films.

• One of the highest-paid actresses in India, her accolades include three Filmfare Awards.

• She features in listings of the nation's most popular personalities, and Time named her one of the 100 most influential people in the world in 2018.

• In 2021, Kangana Ranaut won another National Film Award for Best Actress at the 67th National Film Awards for her performance in the 2019 Hindi period drama film Manikarnika: The Queen of Jhansi.

• In 2020, She won Padma Shri for the Hindi sports drama film Panga.

• This was Ranaut's 3rd win in the best actress category and overall her 4th National Award.

**Q2. Answer: (d) Only 2 is true.**

The correct answer is Only 2 is true.

Key Points

• The gases can be converted into liquids by bringing their particles closer, so atmospheric gases can be liquified either by decreasing temperature or by increasing pressure.

• Hence statement 1 is incorrect.

• On a hot dry day, the temperature is high and humidity is less, which helps in better evaporation.

• Due to the higher rate of evaporation, it gives a better cooling effect.

• Hence statement 2 is correct.

Additional Information

• Hygrometer :

• A hygrometer is an instrument used to measure the amount of water vapour in the air, in soil, or in confined spaces.

• Humidity is the measure of the amount of moisture in the air.

• Hygrometer works on the phenomenon called evaporative cooling.

• When water evaporates from any surface, it becomes cool because water molecules take heat energy from the surface during evaporation.

• Due to this cooling effect wet-bulb always shows low temperature than a dry bulb.

• Manometer :

• Manometers are devices used for measuring the pressure at a point in a fluid, by balancing the column of fluid by the same or another column of fluid.

• The most common form of the manometer is the conventional mercury barometer used to measure atmospheric pressure.

**Q3. Answer: (b) total 42**

Shortcut Trick

Total Study Units = Total Students × Subjects per Student

Total Study Units = 300 × 7 = 2100

Total Subjects = Total Study Units ÷ Students per Subject

Total Subjects = 2100 ÷ 50 = 42

Therefore The correct answer is total 42.

Alternate Method

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Given:

Number of students (N) = 300

Subjects per student (n) = 7

Students per subject (s) = 50

Formula Used:

Total Students × Subjects per Student = Total Subjects × Students per Subject

Calculations:

=> 300 × 7 = Total Subjects × 50

=> 2100 = Total Subjects × 50

=> Total Subjects = 2100 ÷ 50

=> Total Subjects = 42

Therefore The correct answer is total 42.

Additional Information

Total Instances Principle

In any group distribution where members are mapped to items, the total number of connections remains constant regardless of whether you count from the member side or the item side.

Work Equivalence Logic

This problem follows the same logic as Man-Days in Time & Work, where M1D1 = M2D2. Here, Student-Subjects (300 × 7) is equivalent to Subject-Students (S × 50).

Handshake Lemma (Graph Theory)

In a bipartite graph, the sum of degrees of students equals the sum of degrees of subjects. ∑ deg(v_(student)) = ∑ deg(v_(subject)).

**Q4. Answer: (a) Ministry of Railways**

The correct answer is Ministry of Railways.

Key Points

• Ministry of Railways has launched the 'Mission 41K' program.

• The former Union Minister of Railway, Suresh Prabhu launched “Mission 41K” to save Rs. 41,000 crores on the Indian Railways’ expenditure on energy consumption over the next 10 years.

• This target will be achieved by taking a slew of measures which include moving 90% of traffic to electric traction over diesel.

• Ashwini Vaishnaw is the current rail Minister of India (as of August 2022).

Additional Information

• Deen Dayal Upadhyaya Antyodaya Yojana

• Deen Dayal Antyodaya Yojana or DAY is one of the Government of India's schemes for helping the poor by providing skill training.

• It replaces Aajeevika.

• In Jammu and Kashmir, Saffron Mission was initiated in 2010.

• The National Saffron Mission (NSM) was launched in 2010-11 but it was only applicable for the cultivation of saffron in Jammu and Kashmir.

• However, in 2020, the Government decided to revive this mission and expand the cultivation of saffron to the northeastern part of the country.

**Q5. Answer: (c) Anshu Jamshenpa**

The correct answer is Anshu Jamshenpa.

Key Points

• Anshu Jamshenpa is the first woman in the world to climb Mount Everest twice in one season.

• Anshu Jamsenpa is an Indian mountaineer and the first woman in the world to scale the summit of Mount Everest twice in a season, and the fastest double summitter to do so within 5 days.

• It is also the fastest double ascents of the tallest crest by a woman. She is from Bomdila, headquarters of West Kameng district, Arunachal Pradesh - the state that holds most north-eastern position of India.

• She was awarded India's fourth-highest civilian award the Padma Shri in 2021.

Additional Information

• Mount Everest is Earth's highest mountain above sea level, located in the Mahalangur Himal sub-range of the Himalayas.

• The China–Nepal border runs across its summit point. Its elevation of 8,848.86 m was most recently established in 2020 by the

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Chinese and Nepali authorities.

• Lhakpa Sherpa is a Nepalese Sherpa mountain climber.

• She has climbed Mount Everest nine times, the most of any woman in the world.

• In 2000, she became the first Nepalese woman to climb and descend Everest successfully.

• Junko Tabei was a Japanese mountaineer, author, and teacher.

• She was the first woman to reach the summit of Mount Everest and the first woman to ascend the Seven Summits, climbing the highest peak on every continent.

• Ang Rita Sherpa was a Nepali mountaineer who climbed Mount Everest ten times without the use of supplemental oxygen between 1983 and 1996.

• His sixth climb set the world record for the most successful ascents of Mount Everest, which he re-set on his tenth climb.

• He was also the first, and to date only, person to climb Mount Everest without supplementary oxygen in winter.

**Q6. Answer: (a) Both Assumption I and II are implicit**

• Since X has identified the topic - 'changes in attitudes of adolescents' i.e. the spurious behaviour (fake or unnatural behaviour), due to the use of Facebook or Instagram - as a subject of research, it is safe to assume that it can be targeted (i.e. analysed and studied for research.) Thus, assumption I is implicit.

• As X states that s/he wants to research on the given type of case, it is safe to assume that s/he has the ability or skill to do it. Thus, assumption II is also implicit.

Hence the correct answer is option 1.

**Q7. Answer: (a) D**

The option figure that bears the closest resemblance to the question figure is shown below:-

The answer figure D is like to rotate 90^0 anticlockwise direction. Also, it is the only figure among the answer figure that has one cube and small circle present, similar to that of the question figure.

Hence, "option 1" is the correct answer.

**Q8. Answer: (a) zero**

The correct answer is Zero.

Concept:

• If a body is projected vertically upward, the velocity of the body at the highest point of motion will be zero.

• As the body is thrown upward, it is clear that due to gravity it will come back down.

• Thus we can say the body has reached its maximum height.

• From here, we can conclude that the final velocity of the body will be zero (at its maximum height or its highest point).

Additional Information

Gravitation:

• Each and every massive body attracts each other by virtue of their masses.

• This phenomenon is called gravitation.

Newton’s law of Gravitation

• The gravitational force of attraction between two bodies is directly proportional to the product of their masses and inversely proportional to the square of the distance between them.

Gravitational force (F)=(G*m1*m2)/($r^2$)

• Where G is the gravitational constant its value is 6.67×10^(-11) $Nm^2kg^{-2}$.

• m1, m2 is the mass of two bodies and r is the distance between them.

• Gravitational force is central as well as a conservative force.

**Q9. Answer: (a) A**

The correct mirror image of the given figure when the mirror is held at the side is:-

Hence, "option 1" is the correct answer.

**Q10. Answer: (b) Rs. 16,32,600**

Calculation:

The revenue of company from the sale of bags = 45%

The total revenue of the company in 2015 = Rs. 3,628,000

Required earn from the sale of bags in 2015 = (3,628,000 × 45/100)

=> (163,260,000/100)

=> Rs. 1,632,600

Therefore The required sale of bags in the year 2015 is Rs. 1,632,600

**Q11. Answer: (a) skin and muscles**

The correct answer is skin and muscles.

Key Points

• Areolar tissue acts as a filler tissue between skin and muscles.

• The areolar tissue is a loose connective tissue that can be seen between the skin and muscles; in the bone marrow as well as around the blood vessels and nerves.

• The areolar tissue fills the spaces between the different organs and connects the skin to the underlying muscles.

Additional Information

• Loose connective tissue is a category of connective tissue which includes areolar tissue, reticular tissue, and adipose tissue.

• Loose connective tissue is the most common type of connective tissue in vertebrates.

• It holds organs in place and attaches epithelial tissue to other underlying tissues.

• For example, it forms telae, such as the tela submucosa and tela subserosa, which connect mucous and serous membranes to the muscular layer.

• It also surrounds the blood vessels and nerves.

• Epithelial type of tissue makes gland.

• Glands are an organized collection of secretory epithelial cells.

• Most glands are formed during development by the proliferation of epithelial cells so that they project into the underlying connective tissue.

• Some glands retain their continuity with the surface via a duct and are known as Exocrine Glands.

• Other glands lose this direct continuity with the surface when their ducts degenerate during development.

• These glands are known as Endocrine glands.

**Q12. Answer: (d) 11**

The correct answer is 11.

• The atomic numbers of the four basic elements of a period are 11, 13, 16, and 17.

• The atomic number of the highest metallic parent element in the modern periodic table will be 11.

Key Points

• The metallic character in a period decreases from left to right.

• Hence, the element having the least atomic number in a period will be the highest metallic parent element.

• The element with the atomic number 11 will be the metallic parent of the period.

Additional Information

• Periodic Table: It is a tabular presentation of the chemical elements, organized on the basis of their properties:

• Mendeleev's Periodic Table (1869):

• It is based upon Mendeleev's periodic law, which states, "Properties of the elements are the periodic function of their atomic masses."

• Mendeleev is known as the father of the periodic table.

• Modern Periodic Law was given by Moseley.

• According to him: "The physical and chemical properties of the elements are the periodic function of their atomic numbers."

• Modern Periodic Table:

• It is a graphical representation of the Aufbau principle.

• It is based on the electronic configuration of elements and contains 118 elements.

• There are 7 periods and 18 groups.

**Q13. Answer: (d) 4**

The correct answer is 4.

Key Points

• In the modern periodic table, bromine occurs in the 4th period.

• A period 4 element is an element in the fourth period (row) of the periodic table.

• It begins at potassium and ends at krypton.

• Many of the transition metals in period 4 are very strong, and therefore commonly used in industry, especially iron.

• Three adjacent elements are known to be toxic, with arsenic one of the most well-known poisons, selenium being toxic to humans in large quantities, and bromine, a toxic liquid.

Additional Information

• The modern or long form of the periodic table is based on the modern periodic law.

• The table is the arrangement of elements in increasing order of their atomic numbers.

• The modern periodic table is the present form of the periodic table.

• And it consists of 18 vertical columns and 7 horizontal rows.

• Bromine

• Bromine (symbol Br and atomic number 35) is a reddish-brown liquid.

**Q14. Answer: (d) Virat Kohli**

The correct answer is Virat Kohli.

Key Points

• Virat Kohli has been appointed by the well-known cab company 'Uber' as its first brand ambassador.

• Uber officially signed Virat Kohli as its Brand Ambassador in March 2018.

• Besides being the face of the brand, Kohli has actively been involved in a series of marketing and customer experience initiatives that were rolled out by Uber India.

Additional Information

| Personalities | Awards |
|---|---|
| Virat Kohli | • Sir Garfield Sobers Trophy (ICC Men's Cricketer of the Decade): 2011–2020. - He was awarded the Arjuna Award in 2013, the Padma Shri under the sports category in 2017, and the Rajiv Gandhi Khel Ratna award, the highest sporting honour in India, in 2018. |
| Aamir Khan | • 2003 - Padma Shri - 2010 - Padma Bhushan |
| Sachin Tendulkar | • 1994: Arjuna Award recipient for achievements in cricket - 1999: Padma Shri – India's fourth-highest civilian award - 2008: Padma Vibhushan – India's second-highest civilian award - 2014: Bharat Ratna – India's highest civilian award |
| Priyanka Chopra | • 2016 - Padma Shri |

**Q15. Answer: (b) D**

The logic followed here is:

• The first figure of both plus with circle (

) move 900 clockwise direction then we get the second figure, then the second figure of both plus with circle (

) move 900 clockwise direction then we get the third figure.

• Similarly, the third figure of both plus with circle (

) move 900 clockwise direction then we get the fourth figure.

Hence, "option 2" is the correct answer.

**Q16. Answer: (a) Sarvagunakar Shrimant Shankardev**

The correct answer is Sarvagunakar Shrimant Shankardev.

Key Points

• Sarvagunakar Shrimant Shankardev is the 2016 Indian-Assamese biographical 2D computer animated film directed by Manju Bora.

• Sarvagunakar Srimanta Sankardeva is an Indian Assamese language 2D Computer animation biographical film directed by Manju Borah, Director of Animation, and all animation work was single-handedly done by Dr. Gautam k. Das at "24 illusion factory", animation studio, Guwahati, and produced by Sanjive Narain under the banner of AM Television.

• This is a story about the life of Assam's Great saint Srimanta Sankardeva.

Additional Information

• Srimanta Sankardev, the legend of Assamese literature and culture, comes across several challenges in his life.

• Director: Manju Borah

• Music director: Tarali Sarma

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• Production company: AM Television
• Screenplay: Manju Borah
• Producer: Sanjive Narain

**Q17. Answer: (d) India**

The correct answer is India.

Key Points

• India will host the 2023 Cricket World Cup.
• The 2023 ICC Men's Cricket World Cup will be the 13th edition of the men's Cricket World Cup, scheduled to be hosted by India during October and November 2023.
• This will be the first time the competition is held entirely in India.

Additional Information

• ODI Cricket World Cup Records
• Most Cricket World Cup wins: Australia (5 World Cups)
• Most runs scored at the Cricket World Cup: Sachin Tendulkar (2,278 runs)
• Fastest double century: Chris Gayle v Zimbabwe (2015) – 138 balls
• Most sixes scored at the Cricket World Cup: Chris Gayle (49 Sixes)
• Most Centuries at the Cricket World Cup: Sachin Tendulkar and Rohit Sharma (6 centuries Each)
• Most wickets were taken at the Cricket World Cup: Glenn McGrath (71 Wickets)
• Most wickets in consecutive balls: Lasith Malinga v South Africa (2007) – 4
• T20 Cricket World Cup Records
• Most T20 World Cup wins: West Indies (2 World Cups)
• Highest successful chase: England v South Africa (230-8)
• Fastest century: Chris Gayle (47 balls)
• Most Runs: Mahela Jayawardene (1,016 Runs)
• Highest individual score: Brendon McCullum (123 runs)
• Most wickets: Shahid Afridi – 39 wickets

**Q18. Answer: (d) Sudha Chandran**

The correct answer is Sudha Chandran.

Key Points

• Sudha Chandran does not belong to the given group.
• Sudha Chandran is an actress but in the given options other three persons are from Maths and Science background.
• So Sudha Chandran does not belong to the given group.

Additional Information

• Sir Chandrasekhara Venkata Raman was an Indian physicist known for his work in the field of light scattering.
• Using a spectrograph that he developed, he and his student K. S. Krishnan discovered that when light traverses a transparent material, the deflected light changes its wavelength and frequency.
• Satyendra Nath Bose was an Indian mathematician and physicist specializing in theoretical physics.
• He is best known for his work on quantum mechanics in the early 1920s, collaborating with Albert Einstein in developing the foundation for Bose-Einstein statistics and the theory of the Bose-Einstein condensate.
• Shakuntala Devi was an Indian mathematician, writer and mental calculator, popularly known as the "Human-Computer".
• Her talent earned her a place in the 1982 edition of The Guinness Book of World Records.
• Sudha Chandran is an Indian actress who appears in Indian films and Television shows.
• She is an accomplished Bharatanatyam dancer. In 1981, she hurt her leg in a road accident near Tiruchirapalli, Tamil Nadu while coming back from Madras with her parents.

**Q19. Answer: (c) 5, 5 and 11**

Shortcut Trick

Total Sum of 3 numbers = 3 × 7 = 21.

Middle (2^(nd)) number = (Sum of first 2 + Sum of last 2) − Total Sum.

Middle number = (10 + 16) − 21 = 5.

1^(st) number = 10 − 5 = 5 and 3^(rd) number = 16 − 5 = 11.

Therefore The correct answer is 5, 5 and 11.

Alternate Method

Given: Average of 3 numbers = 7, Average of 1^(st) two = 5, Average of last 2 = 8.

Formula Used: Sum of observations = Average × Number of observations

=> Let the numbers be A, B, and C.

=> Total Sum (A + B + C) = 3 × 7 = 21

=> Sum of first two (A + B) = 2 × 5 = 10

=> Sum of last two (B + C) = 2 × 8 = 16

=> Third number (C) = (A + B + C) − (A + B) = 21 − 10 = 11

=> First number (A) = (A + B + C) − (B + C) = 21 − 16 = 5

=> Second number (B) = (A + B) − A = 10 − 5 = 5

Therefore The correct answer is 5, 5 and 11.

Additional Information

Sum of Observations

The sum of a set of observations is always equal to the Average multiplied by the Number of terms (n).

Overlapping Middle Term

In a sequence, if the sum of parts is greater than the total sum, the middle term is equal to (Sum of first part + Sum of last part) − Total Sum.

Weighted Average

When two groups with different averages are combined, the resulting average is (n1x1 + n2x2) ÷ (n1 + n2).

**Q20. Answer: (b) 5**

Given figure:-

The squares are AFEI, FEGB, GEHC, HDIE, and ABCD.

So, the number of squares is 5.

Hence, "option 2" is the correct answer.

**Q21. Answer: (c) 19**

Given figure:-

So, a total of 19 triangle is there in the above figure.

Hence, "option 3" is the correct answer.

**Q22. Answer: (d) 631**

Shortcut Trick

The least number leaving the same remainder in each case is given by: LCM of (divisors) + Remainder.

LCM of (5, 6, 7, 9) = 630.

Required number = 630 + 1 = 631.

Therefore The correct answer is 631.

Alternate Method

Given:

Divisors: 5, 6, 7, 9

Remainder (R): 1

Formula Used:

Required Least Number = LCM(x, y, z, ...) + R

Calculations:

=> Prime factorization of 5 = $5^1$

=> Prime factorization of 6 = $2^1 \times 3^1$

=> Prime factorization of 7 = $7^1$

=> Prime factorization of 9 = $3^2$

=> LCM = $2^1 \times 3^2 \times 5^1 \times 7^1$

=> LCM = 2 × 9 × 5 × 7 = 630

=> Least Number = 630 + 1 = 631

Therefore The correct answer is 631.

Additional Information

LCM Method for Different Remainders

If remainders are different (r1, r2, ...) such that (divisor − remainder) = K (constant), then Required Number = LCM(divisors) − K.

HCF Relationship

For any two numbers a and b, the product of the numbers is equal to the product of their HCF and LCM (a × b = HCF × LCM).

Divisibility Rule of 9

A number is divisible by 9 if the sum of its digits is divisible by 9. This can often be used to eliminate options quickly.

**Q23. Answer: (c) 7.4%**

The correct answer is 7.4%.

Key Points

• The growth rate projected by IMF for the Indian economy in the year 2019 is 7.4%.

• The IMF on Tuesday slashed India's GDP growth projection for the year 2019 to 6.1%, which is 1.2% down from its April projections.

• The International Monetary Fund (IMF) in April said India will grow at 7.3% in 2019.

• However, three months later it projected a slower growth rate for India in 2019, a downward revision of 0.3%.

• As against India's real growth rate of 6.8% in 2018, the IMF in its latest World Economic Outlook projected India's growth rate at 6.1% in 2019 and noted that the Indian economy is expected to pick up the next year at 7.0% in 2020.

Additional Information

• The International Monetary Fund (IMF) is an international financial institution, headquartered in Washington, D.C., consisting of 190 countries.

• It claims to be "working to foster global monetary cooperation, secure financial stability, facilitate international trade, promote high employment and sustainable economic growth, and reduce poverty around the world.

• Formed in 1944, started on 27 December 1945 primarily with the ideas of Harry Dexter White and John Maynard Keynes.

**Q24. Answer: (a) 375 m²**

Shortcut Trick

Initially, 5 sons get 1/5 share each.

The youngest son's share (1/5) is divided among 4 sons: Each gets 1/5 ÷ 4 = 1/20 extra.

New share of eldest son = 1/5 + 1/20 = 5/20 = 1/4.

Total land = Eldest son's share × 4 = 93.75 × 4 = 375 m².

Therefore The correct answer is 375 m².

Alternate Method

Given: Total sons = 5, Share of eldest son = 93.75 m²

Let the total land be x m².

=> Initial share of each son = x / 5

=> Youngest son's share = x / 5

=> This share is divided among the remaining 4 sons = (x / 5) ÷ 4 = x / 20

=> New share of eldest son = Initial share + Extra share

=> 93.75 = (x / 5) + (x / 20)

=> 93.75 = (4x + x) / 20

=> 93.75 = 5x / 20

=> 93.75 = x / 4

=> x = 93.75 × 4

=> x = 375 m²

Therefore The correct answer is 375 m².

Additional Information

Ratio and Proportion

When a quantity is divided into equal parts, each part is 1/n of the total. If one part is redistributed, the increment depends on the number of recipients.

Fraction Addition

To add fractions like 1/5 and 1/20, use a common denominator: (4/20) + (1/20) = 5/20 = 1/4.

**Q25. Answer: (b) dry and glandular skin with feathers**

The correct answer is dry and glandular skin with feathers.

Key Points

• The class avians have dry and glandular skin with feathers.

• The skin of birds is not moist, it is completely dry as there are no glands on the skin of birds.

• There is only one gland present at the base of their tail to lubricate the feathers.

• The effect of friction due to air blowing is reduced by the presence of hollow bones in them, not by moist skin.

Additional Information

• The characteristic features of Aves (birds) are the presence of feathers and most of them can fly except flightless birds (e.g., Ostrich).

• Skin is dry without glands except for the oil gland at the base of the tail.

• Birds live on land and have scaly legs and lay eggs with shells (like reptiles), but they have feathers covering their bodies.

• Their forelimbs are modified into wings and they have a bill or beak without teeth.

• The study of birds is called Ornithology and a person who studies birds is called an Ornithologist.

• Respiration is by lungs in Class Aves (birds).

• The lungs are spongy and inelastic.

• Air sacs are connected to the lungs to supplement respiration.

**Q26. Answer: (c) 30**

Shortcut Trick

Total value of 1 pair (one 25 paise + one 50 paise) = 75 paise = Rs. 0.75.

Number of coins of each type = Total Value ÷ Value of one pair.

Number of coins = 22.50 ÷ 0.75 = 2250 ÷ 75.

Number of coins = 30.

Therefore The correct answer is 30 coins.

Alternate Method

Given: Total value = Rs. 22.50. Ratio of coins = 1 : 1.

Formula: Total Value = (Value1 × Quantity1) + (Value2 × Quantity2)

=> Let the number of 25 paise and 50 paise coins be x each.

=> (0.25 × x) + (0.50 × x) = 22.50

=> 0.75x = 22.50

=> x = 22.50 ÷ 0.75

=> x = 2250 ÷ 75 = 30

Therefore The correct answer is 30 coins.

Additional Information

Unit Conversion

Always ensure the units are consistent. Convert paise to rupees by dividing by 100 or rupees to paise by multiplying by 100.

Ratio of Values

If the ratio of the number of coins is a : b, then the ratio of their values is (a × Value of 1 coin) : (b × Value of 1 coin).

Denomination Concept

Total Money = ∑ (Denomination × Number of items). This concept is also used in currency note and stamp problems.

**Q27. Answer: (d) 42**

The logic followed here is:

Hence, "option 4" is the correct answer.

**Q28. Answer: (d) P / M × N @ Q**

Let us first decode the given symbols and then draw a family tree:-

From option 1:-

P × S @ N / B

The family tree is given below:-

It is not followed.

From option 2:-

Q / N × M @ P
The family tree is given below:-
It is not followed.
From option 3:-
Q / S % P
The family tree is given below:-
It is not followed.
From option 4:-
P / M × N @ Q
The family tree is given below:-
It is followed, P is the maternal uncle of Q.
Hence, "option 4" is the correct answer.

**Q29. Answer: (a) 800**

Shortcut Trick
Total people drinking at least one drink = Tea + Coffee − Both
Total drinkers = 3200 + 2500 − 1500 = 4200
Neither = Total Population − Total drinkers
Neither = 5000 − 4200 = 800
Therefore The correct answer is 800.
Alternate Method
Given:
Total Population n(U) = 5000
People drinking Tea n(T) = 3200
People drinking Coffee n(C) = 2500
People drinking Both n(T ∩ C) = 1500
Formula: n(T U C) = n(T) + n(C) − n(T ∩ C)
Calculations:
=> n(T U C) = 3200 + 2500 − 1500
=> n(T U C) = 5700 − 1500 = 4200
=> People who drink neither = n(U) − n(T U C)
=> People who drink neither = 5000 − 4200 = 800
Therefore The correct answer is 800.
Additional Information
Set Theory - Two Sets
For any two sets A and B, the number of elements in their union is given by n(A U B) = n(A) + n(B) − n(A ∩ B).
Complement of a Set
The number of elements outside sets A and B is n(A' ∩ B') = n(U) − n(A U B).
Venn Diagram Application
Always fill the intersection (common area) first to find 'only' values easily.

**Q30. Answer: (c) 50**

Shortcut Trick
5 years ago, let Son : Mother age ratio = 1 : 3.
Sum of ages 5 years ago = 70 − (2 × 5) = 60 years.
Total ratio parts = 1 + 3 = 4 parts.
Mother age 5 years ago = (3 ÷ 4) × 60 = 45 years.
Present age of Mother = 45 + 5 = 50 years.
Therefore The correct answer is 50 years.
Alternate Method
Given: Sum of present ages = 70 years. Ratio 5 years ago = 1 : 3.
Let the age of the son 5 years ago be x and the mother be 3x.

=> Present age of son = x + 5
=> Present age of mother = 3x + 5
=> (x + 5) + (3x + 5) = 70
=> 4x + 10 = 70
=> 4x = 60
=> x = 15
=> Present age of mother = 3(15) + 5 = 45 + 5 = 50
Therefore The correct answer is 50 years.
Additional Information
Sum of Ages Change
When moving back in time by 'n' years for 'm' people, the total sum of their ages decreases by (n × m) years.
Ratio and Proportion in Ages
If the age ratio of two people is a:b at any point, their ages can be represented as ak and bk, where k is a constant multiplier.
Age Difference Property
The difference between the ages of two individuals remains constant regardless of the number of years that pass.

**Q31. Answer: (b) 60 km**

Shortcut Trick
Product of speeds method: Distance = [(S1 × S2) ÷ (S1 + S2)] × Total Time
Given: S1 = 8 km/hr, S2 = 5 km/hr, Total Time = 19.5 hours
Distance = [(8 × 5) ÷ (8 + 5)] × 19.5
Distance = [40 ÷ 13] × 19.5 = 40 × 1.5 = 60 km
Therefore The correct answer is 60 km.
Alternate Method
Given:
Forward Speed (S1) = 8 km/hr
Return Speed (S2) = 5 km/hr
Total Time (T) = 19½ hours = 39/2 hours
Formula Used:
Time = Distance ÷ Speed
Calculations:
Let the distance between home and city be 'D' km.
=> Time taken to go + Time taken to return = 39/2
=> (D/8) + (D/5) = 39/2
=> (5D + 8D) / 40 = 39/2
=> 13D / 40 = 39/2
=> 13D = (39/2) × 40
=> 13D = 39 × 20
=> D = (39 × 20) / 13
=> D = 3 × 20
=> D = 60 km
Therefore The correct answer is 60 km.
Additional Information
Average Speed
When the same distance is covered at two different speeds x and y, Average Speed = (2 × x × y) ÷ (x + y).
Ratio Method for Distance
If distance is constant, the ratio of time taken is the inverse of the ratio of speeds. Time1 : Time2 = Speed2 : Speed1.
Relative Speed
Objects moving in the same direction: Speed = |S1 − S2|. Objects moving in opposite directions: Speed = S1 + S2.

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**Q32. Answer: (d) -1 or 3**

Shortcut Trick

Test the given options against the condition: Square = 2 × Number + 3.

For 3: 32 = 9 and (2 × 3) + 3 = 9. (Satisfied)

For −1: (−1)2 = 1 and (2 × −1) + 3 = 1. (Satisfied)

Since both values in option (4) satisfy the equation, it is the correct choice.

Therefore The correct answer is -1 or 3.

Alternate Method

Given:

Let the possible number be x.

Square of the number = x2

Twice the number = 2x

According to the question: x2 = 2x + 3

Calculations:

=> x2 − 2x − 3 = 0

=> x2 − 3x + x − 3 = 0

=> x(x − 3) + 1(x − 3) = 0

=> (x − 3)(x + 1) = 0

=> x − 3 = 0 or x + 1 = 0

=> x = 3 or x = −1

Therefore The correct answer is -1 or 3.

Additional Information

Quadratic Equation Standard Form

A quadratic equation is represented as ax2 + bx + c = 0, where a ≠ 0.

Nature of Roots

The nature of roots depends on the discriminant D = b2 − 4ac. If D > 0, roots are real and distinct.

Sum and Product of Roots

For the equation ax2 + bx + c = 0, Sum of roots = −b/a and Product of roots = c/a.

**Q33. Answer: (a) 9 cm**

Shortcut Trick

For an equilateral triangle, the height (h) is always √3/2 times the side (a).

Given side a = 6√3 cm.

Height = (√3/2) × 6√3 = 3 × 3 = 9 cm.

Therefore The correct answer is 9 cm.

Alternate Method

Given:

Side of the equilateral triangle (a) = 6√3 cm.

Formula Used:

Height of an equilateral triangle (h) = (√3/2) × a

Calculations:

=> h = (√3/2) × 6√3

=> h = (√3 × √3 × 6) / 2

=> h = (3 × 6) / 2

=> h = 18 / 2

=> h = 9 cm

Therefore The correct answer is 9 cm.

Additional Information

Area of Equilateral Triangle

The area is calculated using the formula: Area = (√3/4) × a².

Perimeter of Equilateral Triangle

The sum of all three equal sides: Perimeter = 3 × a.

Inradius and Circumradius

Inradius (r) = a / (2√3) and Circumradius (R) = a / √3. Note that R = 2r.

**Q34. Answer: (d)**

The statement implies that if a person has the will to do something, that person will find a way to do it.

• From the given statement, it cannot be determined if people make excuses to delay things. The statement does not talk about it. So, assumption I is not implicit.

• As explained above, the will i.e. the intention to do something is important and that helps in finding a way to do the task. Thus, assumption II is implicit.

Hence the correct answer is option 4.

**Q35. Answer: (d) QLUE**

The alphabet table is given below:-

The logic followed here is:

KITE → LITE

And SUTE → TUTE

Similarly,

PLUE → QLUE

Hence, "option 4" is the correct answer.

**Q36. Answer: (b) 75**

Shortcut Trick

Rate of electrification = 75% = 3/4

Remaining households after 1 year = 1 − 3/4 = 1/4

After 2 years = 1200 × (1/4) × (1/4)

Remaining = 1200 ÷ 16 = 75

Therefore The correct answer is 75.

Alternate Method

Given:

Total households = 1200

Rate of electrification (r) = 75%

Time (n) = 2 years

Formula Used:

Remaining value = Initial Value × $(1 - r/100)^n$

Calculations:

=> Households without electricity = 1200 × $(1 - 75/100)^2$

=> Households without electricity = 1200 × $(25/100)^2$

=> Households without electricity = 1200 × (1/4) × (1/4)

=> Households without electricity = 1200 × 1/16

=> Households without electricity = 75

Therefore The correct answer is 75.

Additional Information

Percentage Decrease Formula

When a value decreases by r% successively for n years, the final value is $P(1 - r/100)^n$.

Successive Percentage Change

If a value changes by a% and then by b%, the net effective change is (a + b + ab/100)%.

Base Change Property

A 75% decrease is equivalent to the remaining value being 25% of the previous value.

**Q37. Answer: (a) Archimedes' principle**

The correct answer is Archimedes' principle.

Key Points

• When a body is immersed wholly or partially in a liquid, a force is exerted on it in an upward direction, which is equal to the weight of the liquid displaced by that body.

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• Archimedes' principle makes this clear.

• Archimedes' principle states that the upward buoyant force that is exerted on a body immersed in a fluid, whether fully or partially submerged, is equal to the weight of the fluid that the body displaces and acts in the upward direction at the center of mass of the displaced fluid.

Additional Information

• Archimedes' principle, physical law of buoyancy, was discovered by the ancient Greek mathematician and inventor Archimedes, stating that anybody completely or partially submerged in a fluid (gas or liquid) at rest is acted upon by an upward, or buoyant, force, the magnitude of which is equal to the weight of the fluid displaced by the body.

• The volume of displaced fluid is equivalent to the volume of an object fully immersed in a fluid or to that fraction of the volume below the surface for an object partially submerged in a liquid.

• The weight of the displaced portion of the fluid is equivalent to the magnitude of the buoyant force.

• The buoyant force on a body floating in a liquid or gas is also equivalent in magnitude to the weight of the floating object and is opposite in direction; the object neither rises nor sinks.

**Q38. Answer: (c) Dehradun**

The correct answer is Dehradun.

Key Points

• Dehradun is the capital of Uttrakhand.

• Dehradun is the capital of the Indian state of Uttarakhand, near the Himalayan foothills.

• At its core is the 6-sided Ghanta Ghar clock tower.

• In Clement Town to the city's southwest, Mindrolling Monastery is a Tibetan Buddhist center with shrine rooms in its Great Stupa.

Additional Information

• Uttarakhand, a state in northern India crossed by the Himalayas, is known for its Hindu pilgrimage sites.

• The city hosts the evening Ganga Aarti, a spiritual gathering on the sacred Ganges River.

• The state's forested Jim Corbett National Park shelters Bengal tigers and other native wildlife.

• Mussoorie is a hill station and a municipal board in the Dehradun district of the Indian state of Uttarakhand.

• It is about 35 kilometers from the state capital of Dehradun and 290 km north of the national capital of New Delhi.

• The hill station is in the foothills of the Garhwal Himalayan range.

• Roorkee is a city in North India and a municipal corporation in the Haridwar district of the state of Uttarakhand, India.

• It is spread over a flat terrain under the Sivalik Hills of the Himalayas.

• The city is developed on the banks of the Ganges Canal, its dominant feature, which flows from the north-south through the middle of the city.

• Nainital is a Himalayan resort town in the Kumaon region of India's Uttarakhand state.

• Formerly a British hill station, it's set around Nainital Lake, a popular boating site with Naina Devi Hindu Temple on its north shore.

**Q39. Answer: (d) Both 1 and 2 are logical.**

The Venn diagram is given below:-

Conclusion:

1. All files are pulp. → True (All files are paper, all paper is pulp then combining the statement then we get all files are pulp.)

2. Some pulp is paper. → True (All paper is pulp then we can say that some pulp is paper.)

Hence, "option 4" is the correct answer.

**Q40. Answer: (a) Mechanical energy**

The correct answer is Mechanical energy.

Key Points

• The sum of the kinetic energy and potential energy of an object is called mechanical energy.

• The total amount of mechanical energy is merely the sum of the potential energy and the kinetic energy.

• This sum is simply referred to as the total mechanical energy (abbreviated TME).

• TME = PE (Potential Energy) + KE (Kinetic Energy).

Additional Information

• Mechanical energy, sum of the kinetic energy, or energy of motion, and the potential energy, or energy stored in a system by reason of the position of its parts.

• Neglecting friction at the pivot and air resistance, the sum of the kinetic and potential energy.

• Kinetic energy is a form of energy that an object or a particle has by reason of its motion.

• Kinetic energy is a property of a moving object or particle and depends not only on its motion but also on its mass.

• In physics, potential energy is the energy held by an object because of its position relative to other objects, stresses within itself, its electric charge, or other factors.

**Q41. Answer: (a) 95**

Shortcut Trick

Required number = LCM(6, 15, 18) + Remainder

LCM of 6, 15, and 18 is 90.

Required number = 90 + 5 = 95.

Therefore The correct answer is 95.

Alternate Method

Given: Divisors are 6, 15, 18 and common remainder is 5.

Formula Used: Number = LCM(Divisors) × k + Remainder

=> Prime factorization of 6 = 2 × 3

=> Prime factorization of 15 = 3 × 5

=> Prime factorization of 18 = $2 \times 3^2$

=> LCM = $2 \times 3^2 \times 5 = 2 \times 9 \times 5 = 90$

=> Least number = 90 + 5 = 95

Therefore The correct answer is 95.

Additional Information

LCM (Least Common Multiple)

The smallest positive integer that is perfectly divisible by two or more numbers.

Remainder Property

If a number leaves a remainder 'r' when divided by x, y, and z, the smallest such number is LCM(x, y, z) + r.

HCF (Highest Common Factor)

The greatest factor that divides two or more numbers without leaving a remainder.

**Q42. Answer: (d) 735 J**

The correct answer is 735 J.

Key Points

• Given

• Mass of the object = 15 kg

• Height = 5 m

• Potential energy (P.E) is given by the expression,

• P.E = m × g × h

• Where,

• m = Mass of the object

• h = Vertical displacement

• g = Acceleration due to gravity (9.8 $ms^2$)

• P.E = 15 × 9.8 × 5

• P.E = 735 J

**Q43. Answer: (c) V/I is a constant.**

The correct answer is V/I is a constant.

Key Points

• Ohm's law states that the current through a conductor between two points is directly proportional to the voltage or potential difference across the two points.

• V = I R

• R =V/I

• V = Voltage

• I = Current

• R = Resistance or a constant

Additional Information

• Ohm's Law can be used to validate the static values of circuit components, current levels, voltage supplies, and voltage drops.

• The resistance of a conductor is directly proportional to length.

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

• Resistance also depends on the material of the conductor.

• The ohm is the common unit of electrical resistance, equivalent to one volt per ampere and represented by the capital Greek letter omega, Ω.

**Q44. Answer: (b) Rs. 150**

Given:

A man spends 2/5 part of his income and left with Rs.90.

Calculation:

Let the total income be = 1

Part of the income spent = 2/5

=> Remaining part = 1 - 2/5

=> (5 - 2)/5 = 3/5

=> 3/5 = Rs.90

=> 1 = Rs.90 × 5/3

=> 1 = Rs. 150

Therefore The amount of income the man had in the begining = Rs.150

**Q45. Answer: (c) VIII A**

The correct answer is VIII A.

Key Points

• 'Inert gases' are in VIII A group.

• Noble gas, any of the seven chemical elements that make up Group 18 (VIII a) of the periodic table.

• The elements are helium (He), neon (Ne), argon (Ar), krypton (Kr), xenon (Xe), radon (Rn), and oganesson (Og).

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

Additional Information

The discoverers of noble gases are :

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

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

The correct answer is Ga.

Key Points

• If you place Ga metal on your palm, that metal melts.

• The element gallium is an unexpected metal.

• it's a soft, silvery-white metal that is solid at room temperature (similar to aluminum) but it can literally melt in the palm of your hand.

• It's bizarre and a little unsettling to see, but it makes sense.

Additional Information

• Important facts about metals

• The metal used to kill rats is zinc phosphide.

• The disease caused by an excess of copper in humans is - Wilson.

• Galvanized iron is coated with – Zinc.

• Rusting increases the weight of iron.
• A zinc chloride coat protects wooden furniture from termites.
• Calcium hydride is called a hydrolith.
• Calcium hydride is used to produce fireproof and waterproof fabrics.
• The metal used in airplanes is palladium.
• Pearl ash is potassium carbonate.
• Chromium trioxide is known as chromic acid.
• Selenium metal is used in the photoelectric cell.
• Zeolite is used to remove the hardness of the water.
• Radium is extracted from pitchblende.
• The smell of onion and garlic is due to Sulphur compounds.

**Q47. Answer: (b) 50**

Calculation:
From the above bar graph,
The number of students passed from the institute 'ABC' in 2016 = 50
Therefore The required result = 50

**Q48. Answer: (c) Neither 1 nor 2 is true.**

The correct answer is Neither 1 nor 2 is true.
Key Points
• In Nickel speed of sound is 6040 m/s.
• In Aluminium, the speed of sound is 6420 m/s.
• Hence option 1 and 2 both are not true.
Additional Information
• The speed of sound in a medium depends:
• The temperature of the medium.
• The speed of sound decreases when we go from solid to a gaseous state.
• In any medium, as we increase the temperature the speed of sound increases.
• The velocity of sound through a gas is inversely proportional to the square root of the density of the gas.
• Sound is mechanical energy that produces a sensation of hearing.
• Sound is produced due to the vibration of different objects.
• The sound wave propagates as compressions & rarefactions in the medium.
• Sound waves are longitudinal waves.
• Sounds of frequencies below 20 Hz are called infrasonic sound or infrasound.
• Rhinoceroses communicate using infrasound of frequency as low as 5 Hz.
• Whales and elephants produce sound in the infrasound range.
• Frequencies higher than 20 kHz are called ultrasonic sound or ultrasound.
• Ultrasound is produced by dolphins, bats, and porpoises.

**Q49. Answer: (d) 17.5**

Shortcut Trick
Ratio of Selling Prices to their respective Percentage Multipliers: 116.5% => 466.
Unitary method: 1 unit => 466 ÷ 116.5 = 4.
For the new Selling Price of 330: Percentage value = 330 ÷ 4 = 82.5%.
Since 82.5% is less than 100%, the Loss Percentage = 100% − 82.5% = 17.5%.
Therefore The correct answer is 17.5%.
Alternate Method
Given → Profit% = 16.5%, SP1 = Rs. 466, SP2 = Rs. 330.
Formulas: CP = SP × 100 ÷ (100 + Profit%) | Loss% = (CP − SP) ÷ CP × 100.
=> First, find Cost Price (CP): CP = 466 × 100 ÷ 116.5
=> CP = 466000 ÷ 1165 = Rs. 400.
=> New Selling Price (SP2) = Rs. 330.

=> Loss = CP − SP2 = 400 − 330 = Rs. 70.

=> Loss Percentage = (70 ÷ 400) × 100 = 17.5%.

Therefore The correct answer is 17.5%.

Additional Information

Cost Price & Selling Price Relationship

When SP > CP, it results in Profit. When SP < CP, it results in Loss. The base for calculating both percentage profit and loss is always the Cost Price unless stated otherwise.

Profit and Loss Multipliers

A profit of x% means SP = CP × (1 + x/100). A loss of y% means SP = CP × (1 − y/100). These multipliers are useful for quick Ratio-Unitary calculations.

**Q50. Answer: (d) 2024**

5th February 2018 to 5th February 2019 = 1 odd day

• 5th February 2019 = Tuesday

5th February 2019 to 5th February 2020 = 1 odd day

• 5th February 2020 = Wednesday

5th February 2020 to 5th February 2021 = 2 odd days (because 2020 is a leap year, February will have 29 days)

• 5th February 2021 = Friday

5th February 2021 to 5th February 2022 = 1 odd day

• 5th February 2022 = Saturday

5th February 2022 to 5th February 2023 = 1 odd day

• 5th February 2023 = Sunday

5th February 2023 to 5th February 2024 = 1 odd day

• 5th February 2024 = Monday.

Hence, 2024 is the correct answer.

**Q51. Answer: (d) A. R. Rahman**

The correct answer is A. R. Rahman.

Key Points

• A.R. Rahman eminent personality of the film industry has recently been made the official brand ambassador of Sikkim.

• Extending a warm welcome to Rahman at the opening ceremony of the Sikkim Red Panda Winter Carnival, Chief Minister Pawan Kumar Chamling said he was grateful to the musician for accepting his proposal.

• Allah Rakha Rahman is an Indian film composer, record producer, singer, and songwriter who works predominantly in Tamil and Hindi films.

• In 2010, the Indian government awarded him the Padma Bhushan, the nation's third-highest civilian award.

**Q52. Answer: (b) Decomposition**

The correct answer is Decomposition.

Key Points

• The decomposition reaction requires energy to split the reactants.

• Decomposition Reactions require energy in the form of heat or light or electricity for breaking down the reactants.

• This energy can be termed as Initiation Energy. Complete step by step solution:

• A decomposition reaction can be defined as a chemical reaction in which one reactant breaks down into two or more products.

Additional Information

• A combination reaction is a reaction where two or more elements or compounds combine to form a single compound.

• Such reactions are represented by equations of the following form: X + Y → XY.

• The combination of two or more elements to form one compound is called a combination reaction.

• A double-replacement (or double-displacement) reaction is a reaction in which the positive and negative ions of two ionic compounds exchange places to form two new compounds.

• Double-replacement reactions can form precipitates, gases, or molecular compounds.

• A displacement reaction is one wherein the atom or a set of atoms is displaced by another atom in a molecule.

• For instance, when the iron is added to a copper sulphate solution, it displaces the copper metal. A + B-C → A-C + B.

• The above equation exists when A is more reactive than B.

**Q53. Answer: (a) Two**

The correct answer is Two.

Key Points

• A man has two testicles.

• The testicles reside in the scrotum, attached at each end to the spermatic cord.

Additional Information

• The testicles produce the primary male sex hormone testosterone, as well as sperm.

• The average size of a man testicle is about 4 x 3 x 2 centimeters (cm) in size and is oval-shaped.

• Most men have two testicles, also known as testes.

• It’s common for one of a man’s testicles to be a different size than the other testicle.

• Testicles reside in the scrotum, attached at each end to the spermatic cord.

• Biologically male people always inherit their X chromosome from their mother.

• The X chromosome is about three times larger than the Y chromosome.

• Female mammals have two X chromosomes in every cell.

• The X chromosome is one of the two sex chromosomes in humans (the other is the Y chromosome).

• The sex chromosomes form one of the 23 pairs of human chromosomes in each cell.

**Q54. Answer: (a)**

The correct answer is Kerela.

Key Points

• Periyar Tiger Reserve is in Kerela.

• Periyar National Park, also known as Periyar Tiger Reserve, is in the mountainous Western Ghats of Kerala, southern India.

• This wildlife sanctuary is home to tigers and a significant elephant population, as well as rare lion-tailed macaques, sambar deer, leopards and Indian bison. In the park's north, Periyar Lake is popular for boat rides.

Additional Information

• Dudhwa National Park

• The Dudhwa Tiger Reserve is a protected area in Uttar Pradesh located on the India-Nepal border.

• The Dudhwa National Park has a number of species of birds, reptiles, wild elephants, aquatic animals, one-horned rhinos, wild elephants besides its enriched flora and fauna. Its undisturbed natural forest cover, vast spans of grasslands, and wetlands.

• It is the only place in U.P. where both Tigers and Rhinos can be spotted together.

• Jim Corbett National Park is a forested wildlife sanctuary in northern India’s Uttarakhand State.

• Rich in flora and fauna, it’s known for its Bengal tigers. Animals, including tigers, leopards and wild elephants, roam the Dhikala zone.

• On the banks of the Ramganga Reservoir, the Sonanadi zone is home to elephants and leopards, along with hundreds of species of birds.

• Manas National Park ' is a national park, UNESCO Natural World Heritage site, a Project Tiger reserve, an elephant reserve and a biosphere reserve in Assam, India.

• Located in the Himalayan foothills, it is contiguous with the Royal Manas National Park in Bhutan.

**Q55. Answer: (b) Pataliputra**

The correct answer is Pataliputra.

Key Points

• Patliputra was the capital of the Mauryan Empire.

• Age historical power in South Asia based in Magadha, founded by Chandragupta Maurya in 322 BCE, and existed in loose-knit fashion until 185 BCE.

• The Maurya Empire was centralized by the conquest of the Indo-Gangetic Plain, and its capital city was located at Pataliputra (modern Patna).

• Outside this imperial center, the empire's geographical extent was dependent on the loyalty of military commanders who controlled the armed cities sprinkling it.

• Pataliputra was the capital of the Mauryan empire.

Additional Information

• The last of the Nanda rulers, Dhana Nanda was highly unpopular due to his oppressive tax regime.

• Also, post-Alexander’s invasion of North-Western India, that region faced a lot of unrest from foreign powers.

• Some of these regions came under the rule of the Seleucid Dynasty, founded by Seleucus Nicator I.

• He was one of the generals of Alexander the Great.

• Chandragupta, with the help of an intelligent and politically astute Brahmin, Kautilya usurped the throne by defeating Dhana Nanda in 321 BC and establishing the Mauryan empire.

• The Maurya Empire was geographically extensive.

• During Ashoka's rule (ca. 268–232 BCE) the empire briefly controlled the major urban hubs and arteries of the Indian subcontinent except for the deep south.

• It declined for about 50 years after Ashoka's rule and dissolved in 185 BCE with the assassination of Brihadratha by Pushyamitra Shunga and the foundation of the Shunga dynasty in Magadha.

**Q56. Answer: (b) Srikanth Kidambi**

The correct answer is Srikanth Kidambi.

Key Points

• In 2017, Srikant Kidambi won the Denmark Open title in the men's singles category of badminton.

• Srikanth Kidambi is an Indian badminton player who trains at the Gopichand Badminton Academy, Hyderabad.

• He ranked as world number 1 at the BWF ranking in April 2018.

• Kidambi was awarded the Padma Shri, India's fourth-highest civilian award in 2018 and the Arjuna award in 2015.

Additional Information

• Liu Cheng is a Chinese badminton player.

• He was the men's doubles World Champion in 2017 partnered with Zhang Nan, also the mixed doubles World and Asian Junior Champion in 2010 with Bao Yixin.

• HS Prannoy :

• Prannoy Haseena Sunil Kumar, also known as Prannoy H. S.

• He is an Indian badminton player and currently trains at the Gopichand Badminton Academy in Hyderabad.

• Kumar originally hails from Thiruvananthapuram and is the Indian number 2 in badminton.

• Parupalli Kashyap

• Parupalli Kashyap is a badminton player from India.

• He trains at Gopichand Badminton Academy. He was awarded the Arjuna Award by the Government of India in 2012.

**Q57. Answer: (b) Chronicle**

The correct answer is Chronicle.

Key Points

• In the medieval period, travelers to India wrote their biographies and court poets wrote poems to praise their kings. These literary sources are called chronicles.

• The literary works of Persian and Arab people are the most important sources of the history of the medieval period (the Sultanate period).

• These Persian and Arabic works can be divided into three broad categories such as – chronicles, travel stories, and modern works.

Additional Information

• Examples of some chronicles

• Tarikh-i-hind (Literary Works of Al-Beruni)

• Al-Beruni, came to India and took up service under Mahmud of Ghazni.

• Chach-Nama

• Chach-Nama is a historical work about the Atab conquest of Sindh.

• The book was originally written in Arabic and later translated into Persian.

**Q58. Answer: (c) C**

The logic followed here is:

In figure A, B, and D there are only two lines with open both the ends are intersect the circle but in figure C only two lines with closed ends by two lines are intersect the circle.

figure C is different from others.

Hence, "option 3" is the correct answer.

**Q59. Answer: (c) 7 Unit**

The correct answer is 7 Unit.

Concept:

Electric bulb: It is an electric device which converts electric energy into heat and light energy.

• Resistance of the bulb R = ((Rated voltage)²)/((Rated power))

• If we consider the bulb as a resistor then, we can easily find the current and voltage drops.

• Power consumed = i²R

• Power consumed prop. to Brightness

The rate of work done by the electric current is called as electric power.

The difference of potential between two points is called a potentia l difference.

Electric energy (E) = electric power (P) × time (t)

Unit of electric energy = unit of electric power × unit of time = kilowatt × hour = kilowatt-hour

Key Points

• Given that

• Power of the bulb = 200 W

• Time = 5 hours

We know that,

Energy = Power × Time

=> Energy consume = 200 w × 5 hrs = 0.2 kw × 5 = 1 Unit

This means bulb uses 1 Unit in one day.

So in a week = 1 unit/day × 7 day = 7 unit per week

**Q60. Answer: (c) [figure]**

The correct mirror image of the given figure when the mirror is held at the side is:-

Hence, "option 3" is the correct answer.

**Q61. Answer: (a) 5 : 2**

The correct answer is 5 : 2

Key Points

• In CaO, the ratio of Ca and O by mass is 5 : 2.

• The atomic mass of calcium = 40 u

• The atomic mass of Oxygen = 16 u

• Ratio by mass of Ca and O in CaO = 40 : 16 = 5 : 2

Additional Information

• Calcium oxide, commonly known as quicklime or burnt lime, is a widely used chemical compound.

• It is a white, caustic, alkaline, crystalline solid at room temperature.

• Calcium oxide is usually made by the thermal decomposition of materials, such as limestone or seashells, that contain calcium carbonate in a lime kiln.

• This is accomplished by heating the material to above 825 °C (1,517 °F), a process called calcination or lime-burning, to liberate a molecule of carbon dioxide (CO2), leaving quicklime.

**Q62. Answer: (c) South**

Four person :- Srikanth, Pradeep, Kirtana and Priyanka.

• They are playing carrom in the morning.

• While playing kirtana is watching the sunrise and her face is also towards the sunrise.

• Priyanka is sitting opposite to Kirtana and Pradeep is sitting to the right of Kirtana.

The diagram is given below:-

Srikanth is facing south direction.

Hence, "option 3" is the correct answer.

**Q63. Answer: (a) 0.577**

Given:

√3 = 1.732

Calculation:

1/√3

By rationalization

=>1/√3 × √3/√3

=>√3/3

=> 1.732/3

=> 0.577

Therefore 1/(√3) = 0.577

**Q64. Answer: (b) 16**

Formula used:

Average number of users per day in a week = Total users/7

Calculation:

Total users in all 7 days = 8 + 4 + 15 + 15 + 20 + 25 + 25 = 112

Average number of users per day = 112/7 = 16

Therefore The required result = 16

**Q65. Answer: (a) 15, 25**

Shortcut Trick

Initial Ratio = 3 : 5

Final Ratio = 5 : 7

Difference in both ratio parts = 5 − 3 = 2 units and 7 − 5 = 2 units.

Since the difference is constant, 2 units = 10 (the added value).

1 unit = 5. Therefore Numbers = 3 × 5 and 5 × 5.

Therefore The correct answer is 15, 25.

Alternate Method

3x5x+10+10New Ratio = 5 : 7

Given: Initial ratio = 3 : 5, Added value = 10, Final ratio = 5 : 7.

Formula: Let the numbers be 3x and 5x.

=> (3x + 10) ÷ (5x + 10) = 5 ÷ 7

=> 7 × (3x + 10) = 5 × (5x + 10)

=> 21x + 70 = 25x + 50

=> 25x − 21x = 70 − 50

=> 4x = 20

=> x = 5

=> First Number = 3 × 5 = 15

=> Second Number = 5 × 5 = 25

Therefore The correct answer is 15, 25.

Additional Information

Ratio and Proportion Basics

A ratio a : b represents the relative size of two quantities. If a : b = c : d, then ad = bc (Product of extremes = Product of means).

Constant Difference Method

When the same value is added to or subtracted from both terms, the difference between the ratio parts must be equalized to solve using units.

Compounded Ratio

The compounded ratio of (a : b) and (c : d) is (ac : bd).

**Q66. Answer: (a) 15, 9, 3**

Shortcut Trick

Ratio of sides l : b : h = 5 : 3 : 1.

Area proportional to 2 × (5×3 + 3×1 + 1×5) = 2 × 23 = 46 units.

Given TSA = 414 m², so 1 unit² = 414 ÷ 46 = 9.

Common factor x = √9 = 3.

Sides = 5×3, 3×3, 1×3 = 15, 9, 3.

Therefore The correct answer is 15, 9, 3 m.

Alternate Method

Given:

Ratio of length (l), breadth (b), and height (h) = 5 : 3 : 1

Total Surface Area (TSA) = 414 m²

Formula Used:

TSA of Cuboid = 2(lb + bh + hl)

Let the sides be 5x, 3x, and x.

=> 2[(5x × 3x) + (3x × x) + (x × 5x)] = 414

=> 2[15x² + 3x² + 5x²] = 414

=> 2[23x²] = 414

=> 46x² = 414

=> x² = 414 ÷ 46 = 9

=> x = √9 = 3

=> Length = 5 × 3 = 15 m

=> Breadth = 3 × 3 = 9 m

=> Height = 1 × 3 = 3 m

Therefore The correct answer is 15, 9, 3 m.

Additional Information

Volume of Cuboid

The space occupied by the cuboid is calculated as Volume = l × b × h.

Lateral Surface Area (LSA)

The area of the four side walls is given by LSA = 2h(l + b).

Diagonal of Cuboid

The longest rod that can be placed inside is Diagonal = √(l² + b² + h²).

**Q67. Answer: (b) Nile River**

The correct answer is Nile River.

Key Points

• Nile River has not been selected for setting up a water aerodrome in the country.

• India is getting water aerodromes and the very first ones in the country are slated to come up in Chilika Lake in Odisha, Sardar Sarovar Dam, and Sabarmati River Front in Gujarat.

Additional Information

• An area of open water that can be used by seaplanes or amphibious planes for landing and takeoff is called a water aerodrome.

• They might have a connected terminal building on land where the plane can choose to dock like a ship.

• "In the first phase, Chilika Lake in Odisha, Sardar Sarovar Dam and Sabarmati River Front in Gujarat have been identified for development of water aerodromes,".

• Sites in Odisha, Gujarat, Assam, Maharashtra and Andhra Pradesh have been identified by the Airports Authority of India.

• Water aerodromes would be set up near tourist spots and locations of religious importance as per the proposal.

**Q68. Answer: (b) Al2O3**

The correct answer is Al2O3.

Key Points

• Al2O3 reacts with acids and bases.

• Aluminum oxide (Al2O3) is an amphoteric substance.

• The amphoteric substance is a substance that can react with both acids and bases usually to produce salt and water.

• Aluminium oxide therefore can react with both acids as well as bases. We will take the example of its reaction with hydrochloric acid (strong acid) and sodium hydroxide (strong base).

• When mixed with these two compounds aluminium oxide either acts like acid with a base and a base with an acid.

Additional Information

• Al2O3 + 6 HCl → 2 AlCl3 + 3 H2O (acts like a base)

• Al2O3 + 2 NaOH + 3 H2O → 2 NaAl(OH)4 (sodium aluminate) (acts like an acid)

• On reacting Al2O3 with HCl, we get Aluminium Chloride as the salt and water as a by-product.

• Likewise, the reaction between NaOH (Strong Base) and Al2O3 results in the formation of Sodium Aluminate as salt and water.

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**Q69. Answer: (b) O17**

The alphabet table is given below:-

The logic followed here is:

• Each letter is decreased by +2.

• Each number is increased by +3.

Hence, "option 2" is the correct answer.

**Q70. Answer: (a) Saba Kareem**

The correct answer is Saba Kareem.

• Saba Kareem has been appointed as the general manager of cricket activities of B.C.C.I (2017).

Key Points

• Delhi Capitals CEO Dhiraj Malhotra will be the BCCI's new General Manager for Game Development, replacing Saba Karim.

• Malhotra, in his more than a two-decade-long stint in the cricket industry, has also held senior positions at the ICC and has been responsible for overseeing cricket operations of various ICC events.

Additional Information

• The full form of BCCI is the Board of Control for Cricket in India.

• The Board of Control for Cricket in India (BCCI) is the governing body for cricket in India and is under the jurisdiction of the Ministry of Youth Affairs and Sports, the Government of India.

• It is an autonomous organization and does not come under the National sports federation of India.

• The board was formed in December 1928 as a society, registered under the Tamil Nadu Societies Registration Act.

• BCCI is an autonomous body and does not review any grants or fundings from the Sports Ministry of India.

**Q71. Answer: (d) 2 ms^(-2)**

The correct answer is 2 ms-2

Key Points

• Given that

• u = 36 km/h = 10 m/s

• v =72 km/h = 20 m/s

• t = 5 s

• Where,

• u = initial velocity

• v = final velocity

• t = time

• Acceleration = (v - u)/t

• Acceleration = (20 - 10)/5

• Acceleration = 2 ms^(-2)

**Q72. Answer: (d) C**

The logic followed here is:

In figures A, B, and D there is half part of the circle is dark but in figure C one-fourth of the circle is dark.

figure C is different from others.

Hence, "option 4" is the correct answer.

**Q73. Answer: (b) 20**

Shortcut Trick

Remaining days for 800 men = 30 − 12 = 18 days.

Remaining men = 800 − 80 = 720 men.

Using Chain Rule (M1D1 = M2D2): 800 × 18 = 720 × D.

D = (800 × 18) ÷ 720 = 20 days.

Therefore The correct answer is 20 days.

Alternate Method

Given: Total men = 800, Total time = 30 days, Work done = 12 days, Men left = 80.

Formula Used: Total Work = Men × Days (M1D1 = M2D2 for equal work segments).

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=> Total Work = 800 × 30 = 24000 units.

=> Work completed in 12 days = 800 × 12 = 9600 units.

=> Remaining Work = 24000 − 9600 = 14400 units.

=> Remaining Men = 800 − 80 = 720 men.

=> Time required for remaining work = 14400 ÷ 720

=> Required Days = 20 days.

Therefore The correct answer is 20 days.

Additional Information

Chain Rule Formula

The general formula is (M1D1H1)/W1 = (M2D2H2)/W2, where M is men, D is days, H is hours, and W is work.

Efficiency Relationship

Work is directly proportional to the number of men and time, but number of men is inversely proportional to time (M prop. to 1/D) for constant work.

Work & Wages

Wages are distributed in the ratio of work done by each person or their efficiency if they work for the same duration.

**Q74. Answer: (c) 58**

Shortcut Trick

Number: 3364. Splitting into groups from right: 33 and 64.

The last digit is 4, so the square root must end in 2 or 8.

The first part 33 lies between $5^2$ (25) and $6^2$ (36). So, the tens digit is 5.

Possible numbers are 52 or 58. Since 33 is closer to 36 ($6^2$), the answer is the larger value 58.

Therefore The correct answer is 58.

Alternate Method

Given: Number = 3364

Formula Used: Long Division Method for square root calculation.

=> Group the digits in pairs from right to left: 33 64.

=> Find the largest number whose square is less than or equal to 33: $5^2 = 25$.

=> Remainder = 33 − 25 = 8. Bring down the next pair: 864.

=> Double the divisor: 5 × 2 = 10. Find digit 'x' such that 10x × x ≤ 864.

=> Try 8: 108 × 8 = 864.

=> Remainder = 864 − 864 = 0.

=> √3364 = 58.

Therefore The correct answer is 58.

Additional Information

Unit Digit Rule

If a perfect square ends in 4, its square root must end in either 2 or 8 (as $2^2=4$ and $8^2=64$).

Estimation Method

Since $50^2 = 2500$ and $60^2 = 3600$, the square root of 3364 must lie between 50 and 60.

Perfect Square Property

A perfect square never ends in the digits 2, 3, 7, or 8.

**Q75. Answer: (c) All India Trinamool Congress**

The correct answer is All India Trinamool Congress.

Key Points

• All India Trinamool Congress is headed by Mamata Banerjee.

• The All India Trinamool Congress, colloquially the Trinamool Congress is an Indian political party which is predominantly active in West Bengal.

• The party is led by Mamata Banerjee.

Additional Information

• Smt. Sonia Gandhi is the President of the Indian National Congress Party.

• The Indian National Congress is a political party in India with widespread roots.

• Founded in 1885, it was the first modern nationalist movement to emerge in the British Empire in Asia and Africa.

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• The Bahujan Samaj Party is a national-level political party in India that was formed to represent Bahujans, referring to Scheduled Castes, Scheduled Tribes, and Other Backward Classes, along with religious minorities.
• The President of the party is Mayawati.
• The Nationalist Congress Party is one of the eight national parties in India.
• The President of the party is Sharad Pawar.

**Q76. Answer: (a) 0**

Given that:-

P 3 R I M J 3 Q % W @ / N $ E 5 X Y 1 # 8

Condition to be checked:

i) Consonants are immediately preceded by a consonant and immediately followed by a symbol.

Consonant → Consonant → Symbol

No such consonants are there in the above sequence, each of which is immediately preceded by a consonant and immediately followed by a symbol.

Hence, "option 1" is the correct answer.

Mistake Points

Immediately preceded by means immediately before or to come just before.

Immediately followed by means immediately after or to come just after.

**Q77. Answer: (d) [figure]**

There is no relation among Mat, Bat, and Van.

The Venn diagram is given below:-

Hence, "option 4" is the correct answer.

**Q78. Answer: (a) Ni, Cr, Mn and Fe**

The correct answer is Ni, Cr, Mn and Fe.

Key Points

• Nichrome is an alloy of Ni, Cr, Mn, and Fe.
• Nichrome (also known as NiCr, nickel-chromium or chromium-nickel) is a family of alloys of nickel, chromium, and often iron (and possibly other elements) commonly used as resistance wire, heating elements in things like toasters and space heaters, in some dental restorations (fillings) and in a few other applications.

Additional Information

• Some Commonly Used Alloys and their composition:
• Brass
• Composition- zinc 30%, copper 70%
• uses- In the making of utensils, pipes and radiator statues, etc.
• Yellow Brass
• Composition – Cu 67%, Zn 33%
• uses – Hardware items
• Bronze
• Composition – Copper 90%, Tin 10%
• uses – In the making of coins, ornaments, utensils and statues.
• Stainless steel
• Composition – Fe 82%,(Ni + Cr) 18
• uses – In the making of surgical instruments, watches and utensils etc.
• Magnalium
• Composition- Al 95% ,Mg 5%
• uses – In making light articles and physical balance etc.

**Q79. Answer: (a) Budget Presentation**

The correct answer is Budget Presentation.

Key Points

• Breaking a century-old tradition, the budget presentation has been extended for a month till February 1, 2017.
• The Union Budget of India also referred to as the Annual Financial Statement in Article 112 of the Constitution of India, is the

annual budget of the Republic of India.

• The Government presents it on the first day of February so that it could be materialized before the beginning of the new financial year in April.

• Until 2016 it was presented on the last working day of February by the Finance Minister in Parliament.

• The budget, which is presented by means of the Finance Bill and the Appropriation bill has to be passed by Lok Sabha before it can come into effect on 1 April, the start of India's financial year.

Additional Information

• A government budget refers to an annual financial statement that denotes its anticipated expenditure and expected revenue generation in a fiscal year.

• It is presented by the government in Lok Sabha at the beginning of every fiscal year, to give an estimate of its expenditure and receipts for the upcoming year.

• The term “Annual Financial Statement” of a nation is often used to define government budget.

**Q80. Answer: (c) Jawaharlal Nehru**

The correct answer is Jawaharlal Nehru.

Key Points

• During the making of the Indian Constitution, the objective resolution was presented by Jawaharlal Nehru.

• “The Objectives Resolution, 1946” was introduced by Jawaharlal Nehru in the very first session of the Constitution Assembly.

• Basically, these resolutions were the aspirations of people who were making the Constitution.

• It can be considered as the preamble of the vast dream, which the constitution-makers sought to achieve after the independence in the form of a new India.

• And these resolutions were framed as the Preamble of the Indian Constitution.

Additional Information

• The drafting committee was set up on 29 August 1947 under the chairmanship of Dr. B R Ambedkar.

• While deliberating upon the draft Constitution, the Assembly moved, discussed, and disposed of as many as 2,473 amendments out of a total of 7,635 tabled.

• The constitution had got ready on 26th November 1949 and some provisions relating to Citizenship, Elections, provisional parliament, temporary & transitional provisions were given immediate effect.

• The Drafting Committee had seven members:

• Alladi Krishnaswami Ayyar

• N. Gopalaswami

• B.R. Ambedkar

• K.M Munshi

• Mohammad Saadulla

• B.L. Mitter

• D.P. Khaitan

**Q81. Answer: (c) 0.001**

Given:

Number = 0.0006697

Concept used:

Rounding off to 10

Calculation:

After 3 decimal places, 6697 is there in the number. We will see 6 as it is more than 5 and will be rounded off to 10.

Therefore The required number will be 0.001

**Q82. Answer: (a) 2861**

Shortcut Trick

Required number = LCM(36, 64, 90) − 19

LCM calculation: 36 = $2^2 \times 3^2$, 64 = 2^6, 90 = $2 \times 3^2 \times 5$

LCM = $2^6 \times 3^2 \times 5 = 64 \times 9 \times 5 = 2880$

Required number = 2880 − 19 = 2861

Therefore The correct answer is 2861.

Alternate Method

Given: Divisors are 36, 64, and 90. Number added is 19.

Formula: Least number = LCM(divisors) − added number

=> Prime Factorization of 36 = 2 × 2 × 3 × 3

=> Prime Factorization of 64 = 2 × 2 × 2 × 2 × 2 × 2

=> Prime Factorization of 90 = 2 × 3 × 3 × 5

=> LCM = 2^6 × 3² × 5 = 64 × 9 × 5 = 2880

=> Least number (N) + 19 = 2880

=> N = 2880 − 19 = 2861

Therefore The correct answer is 2861.

Additional Information

LCM (Least Common Multiple)

The smallest positive integer that is divisible by each of the given numbers. Calculation methods include prime factorization or division method.

LCM and Remainder Case 1

Smallest number which when divided by x, y, z leaves a remainder R in each case is LCM(x, y, z) + R.

LCM and Remainder Case 2

Smallest number which when increased by K is divisible by x, y, z is LCM(x, y, z) − K.

**Q83. Answer: (c) 38.8% Profit**

Shortcut Trick

To find profit or loss percentage, equate the number of items bought and sold.

CP of 20 pieces = Rs. 80 => CP of 1 piece = 80 ÷ 20 = Rs. 4.

SP of 9 pieces = Rs. 50 => SP of 1 piece = 50 ÷ 9 ≈ Rs. 5.555.

Profit per piece = 5.555 − 4 = 1.555.

Profit% = (1.555 ÷ 4) × 100 = 0.38875 × 100 = 38.875% ≈ 38.8% Profit.

Therefore The correct answer is 38.8% Profit.

Alternate Method

Given: Cost Price (CP) rate = 20 pieces for Rs. 80, Selling Price (SP) rate = 9 pieces for Rs. 50.

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

=> Let the number of pieces be the LCM of 20 and 9 = 180 pieces.

=> Total CP = (80 ÷ 20) × 180 = 4 × 180 = Rs. 720.

=> Total SP = (50 ÷ 9) × 180 = 50 × 20 = Rs. 1000.

=> Profit = 1000 − 720 = Rs. 280.

=> Profit Percentage = (280 ÷ 720) × 100 = (7 ÷ 18) × 100 = 38.88...%.

Therefore The correct answer is 38.8% Profit.

Additional Information

Unitary Method in Profit and Loss

It is always easier to compare the Cost Price and Selling Price of a single unit or a common multiple of units to determine the gain or loss.

Profit and Loss Percentage

Profit% and Loss% are always calculated on the Cost Price (CP) unless stated otherwise in the question.

**Q84. Answer: (b) Daughter**

Given that:-

Abhimanyu introduced a girl to his friend as "the only daughter of the only son of his father".

The family tree is given below:-

The girl is the daughter of Abhimanyu.

Hence, "option 2" is the correct answer.

**Q85. Answer: (b) 3 1/3 hours**

Shortcut Trick

Combined Efficiency method: Let total capacity be LCM(12, 15) = 60 units.

Efficiency of Pipe 1 = 60 ÷ 12 = 5 units/hr.

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Efficiency of Pipe 2 = 60 ÷ 15 = 4 units/hr.

Total efficiency = 5 + 4 = 9 units/hr.

Half tank capacity = 60 ÷ 2 = 30 units.

Time taken = 30 ÷ 9 = 10/3 = 3 1/3 hours.

Therefore The correct answer is 3 1/3 hr.

Alternate Method

Given: Pipe A fills in 12 hours, Pipe B fills in 15 hours.

| Person | Days | Total Work | Efficiency |
|---|---|---|---|
| Pipe A | 12 | 60 | 5 |
| Pipe B | 15 | 4 | |

Calculations:

=> Total capacity of the cistern = LCM of 12 and 15 = 60 units.

=> Efficiency of Pipe A = 60 ÷ 12 = 5 units/hr.

=> Efficiency of Pipe B = 60 ÷ 15 = 4 units/hr.

=> Total efficiency when both pipes are open = 5 + 4 = 9 units/hr.

=> Capacity of half the cistern = 60 ÷ 2 = 30 units.

=> Time taken to fill half the tank = Half Capacity ÷ Total Efficiency

=> Time = 30 ÷ 9 = 10/3 = 3 1/3 hours.

Therefore The correct answer is 3 1/3 hr.

Additional Information

Time and Work Formula

If two pipes can fill a tank in x and y hours, the time taken to fill the full tank together is (x × y) ÷ (x + y).

Pipes and Cisterns Negative Work

If an outlet pipe (leak) is present, its efficiency is treated as negative in the total efficiency calculation.

Partial Filling

Time taken to fill 'k' fraction of a tank is k × (Total Capacity ÷ Total Efficiency).

**Q86. Answer: (d) Jawahar Lal Nehru University (JNU)**

The correct answer is Jawahar Lal Nehru University (JNU).

Key Points

• Jawaharlal Nehru University (JNU) has won the annual Visitor's Award for the 'Best University, 2017.

• The 'Best University will receive a Citation and Trophy while winners of Visitor's Award for 'Innovation' and 'Research' will receive a Citation and cash award of Rs 1 lakh.

Additional Information

• Asad Ullah Khan from Aligarh Muslim University and Dr. Partima from Jawaharlal Nehru University were jointly awarded the Visitor's Award for best University in 2019 - for Research in Biological Sciences.

• Dr. Shaon Ray Chaudhuri from Tripura University was presented with The Visitor's Award- for Technology Development.

• Jawaharlal Nehru University is a public central major research university located in New Delhi, India.

• It was established in 1969 and named after Jawaharlal Nehru, India's first Prime Minister.

• The university is known for leading faculties and research emphasis on liberal arts and applied sciences.

• Visva-Bharati is a public central university and an Institution of National Importance located in Shantiniketan, West Bengal, India.

• It was founded by Rabindranath Tagore who called it Visva-Bharati, which means the communion of the world with India.

• Until independence, it was a college.

• The University of Delhi, informally known as Delhi University, is a collegiate public central university located in New Delhi, India.

• It was founded in 1922 by an Act of the Central Legislative Assembly and is recognized as an Institute of Eminence by the University Grants Commission.

• Aligarh Muslim University is a public central university in Aligarh, Uttar Pradesh, India, which was originally established by Sir Syed Ahmad Khan as the Muhammadan Anglo-Oriental College in 1875.

• Muhammadan Anglo-Oriental College became Aligarh Muslim University in 1920, following the Aligarh Muslim University Act.

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**Q87. Answer: (c) 62.5 m**

The correct answer is 62.5 m.

Key Points

• Given,

• time (t) = 5 sec

• initial velocity (u) = 12 m/s

• g = 9.8 ms-2 (As the motion is against the gravity so we have to take it as negative)

By equation of motion:-

• $s= ut +1/2gt^2$

• $s= 12 \times 5 +1/2 \times (-9.8) \times 52$

• s = - 62.5 m

• But height is always positive.

• Hence, the height of the tower is 62.5 m.

**Q88. Answer: (c) D**

The logic followed here is:

• The second figure is formed by combining the two figures of the first figure.

Similarly,

• The fourth figure is formed by combining the two figures of the third figure.

Final figure:

Hence, "option 3" is the correct answer.

**Q89. Answer: (d) Haryana**

The correct answer is Haryana.

Key Points

• The state of Haryana was ranked first in the medal tally of 'Khelo India School Games' held for the first time in 2018.

• Haryana stayed on top despite not adding any more to their overnight tally of 20 gold medals, though Delhi narrowed the gap to just two at the first Khelo India School Games.

• Maharashtra picked up three gold medals to move into second place, even as Haryana, who had won two on Tuesday stayed in the top spot of the medals tally in the first Khelo India School Games.

• Maharashtra's two gold medals came from weightlifting through Trupti Mane in girls 58 kg and boys 62 kg through Jeremy Lalrinnunga, a Mizoram youngster, who is in the Army Institute in Pune.

• Their third gold came courtesy judoka, Snehal Khaware in 48 kg for Girls.

Additional Information

• Khelo India School Games is a part of the revamped National Programme for the development of sports, Khelo India.

• It aims at strengthening the ecosystem by promoting the twin objectives of mass participation and promotion of excellence in sports.

• The Khelo India School Games will act as an avenue for the identification of budding sports talent in specific disciplines.

• Khelo India School Games will be annual competition held in collaboration with the School Games Federation of India (SGFI) and the National Sports Federations (NSFs).

• The SGFI and NSFs will draw up and conduct an annual calendar of competitions at the lower level in the run-up to the Khelo India School Games at the National level.

**Q90. Answer: (d) Both conclusions are logical**

• The coach is stating that the team has a lot of good, talented players. Thus, it can be easily concluded that the coach can judge the potential of the players. So, conclusion I is logical.

• Since the coach is saying that the talent is 'high-class', it can be safely concluded the coach is acknowledging the talent of his team. So, Conclusion II follows.

Alternate Method

• "Saying that the players are high-talent" is a type of judgement of the abilities of the players - so conclusion 1 is logical.

• The word "high-talent" is a type of praise or acknowledgement of the players' talent. - so conclusion 2 is logical.

Hence the correct answer is option 4.

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**Q91. Answer: (d) The radius of curvature is twice the focal length**

The correct answer is The radius of curvature is twice the focal length.

Key Points

• The radius of curvature is twice the focal length.

• The reflecting surface of a spherical mirror may be curved inwards or outwards.

• The focal length of a lens is represented as f.

• The radius of curvature is represented as r and is defined as the radius of the lens that forms a complete sphere.

•

• The radius of curvature is observed to be equal to twice the focal length for spherical mirrors with small apertures.

• Hence R = 2f.

Additional Information

• Laws of Reflection of light

• The angle of incidence is equal to the angle of reflection, and

• The incident ray, the reflected ray and the normal to the mirror at the point of incidence all lie in the same plane.

• Reflection from Plane Mirror

• If an object moves towards a plane mirror with speed v, relative to the object the moves towards it with a speed 2v.

• To see his full image in a plane mirror, a person required a mirror of at least half of his height.

• Refraction of Light

• The phenomenon of deviation of light rays from its path when it travels from one transparent medium to another medium is called refraction of light.

• The cause of refraction is due to the different speed of light in a different medium.

• When a ray of light enters from one medium to another medium, its frequency and phase do not change, but wavelength and velocity change.

• Due to refraction from Earth's atmosphere, the stars appear to twinkle.

**Q92. Answer: (b) 60 km/hr and 55 km/hr respectively**

Shortcut Trick

Total distance reduced in 2 hours = 440 − 210 = 230 km.

Relative speed (Sum of speeds) = 230 ÷ 2 = 115 km/hr.

The speed difference is 5 km/hr. Let speeds be x and (x − 5).

x + (x − 5) = 115 => 2x = 120 => x = 60 km/hr and 55 km/hr.

Therefore The correct answer is 60 km/hr and 55 km/hr.

Alternate Method

Given: Initial distance = 440 km, Final distance = 210 km, Time = 2 hours.

Formula Used: Distance = Relative Speed × Time

=> Let the speed of the slower train be x km/hr.

=> Speed of the faster train = (x + 5) km/hr.

=> Total distance covered in 2 hours = 440 − 210 = 230 km.

=> 2 × (x + x + 5) = 230

=> 2x + 5 = 115

=> 2x = 110

=> x = 55 km/hr

=> Faster train speed = 55 + 5 = 60 km/hr.

Therefore The correct answer is 60 km/hr and 55 km/hr.

Additional Information

Relative Speed in Opposite Direction

When two objects move towards each other, their relative speed is the sum of their individual speeds (S1 + S2).

Relative Speed in Same Direction

When two objects move in the same direction, their relative speed is the difference between their speeds (|S1 − S2|).

Distance Formula

Distance = Speed × Time. For two moving objects, Distance Covered = Relative Speed × Time.

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**Q93. Answer: (b) Glucose**

The correct answer is Glucose.

Key Points

• Glucose combines with O2 present in the cells of our body to provide energy.

• In the process of respiration, glucose reacts with oxygen in the cells of our body to produce carbon dioxide and water.

• Large amounts of energy are released during this process.

• Respiration is an exothermic process.

Additional Information

• Breathing involves the exchange of gases in the lungs, a process that occurs by diffusion.

• The oxygen is then transported throughout the body.

• Carbon dioxide is the waste gas produced by respiration.

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

**Q94. Answer: (a) Only argument I is strong**

• Argument I agrees that hunting should be banned and justifies it with the reason that hunting has caused some species to become extinct. So it is strong.

• Argument II disagrees with the statement, saying that hunting is done for entertainment, but it does not justify as to why it should not be banned. Only being a source of entertainment doesn't justify not banning the act of hunting. Thus, Argument II is not strong.

Hence the correct answer is option 1.

**Q95. Answer: (b) cotyledon, radicle and ovule**

The correct answer is cotyledon, radicle and ovule.

Key Points

• Cotyledon, radicle and ovule are the three parts of the seed.

• The radicle is the embryonic root of the plant, and grows downward in the soil (the shoot emerges from the plumule).

• Above the radicle is the embryonic stem or hypocotyl, supporting the cotyledon(s).

• It is the embryonic root inside the seed.

Additional Information

• A seed has three parts:

• Seed Coat

• Endosperm

• Embryo

• A seed coat protects the internal parts of a seed.

• The seed coat has two layers.

• The outer layer is thick and known as the testa.

• The inner layer is thin and known as tegme.

• The endosperm contains the nutrients stored in it.

• It provides nutrients to the seed in the form of starch, carbohydrates and proteins to support the embryo during germination.

• It is located below the seed coat.

• An embryo comprises the following parts:

• Epicotyl

• Hypocotyl

• Radicle

• Cotyledons

**Q96. Answer: (c) Statements 1, 2, and 3 all together are sufficient.**

J, K, N and O are standing in a row. If we rank them in order from tallest to smallest.

1. J is taller than K.

J > K

• Here, there is no information given about N and O. Therefore, statement 1 alone is not sufficient.

2. N is the smallest among them.

• No information is given about J, K, and O. Therefore, statement 2 alone is not sufficient.

3. K is taller than O.

K > O

• Here, there is no information given about J and N. Therefore, statement 3 alone is not sufficient.

From statements 1, 2, and 3 together then:-

So, J stands first in the above row.

Hence, "option 3" is the correct answer.

**Q97. Answer: (a) perikaryon, Cell**

The correct answer is perikaryon, Cell.

Key Points

• A cyton is called perikaryon, Cell.

• Cyton is also called a cell body or perikaryon.

• It has a central nucleus with abundant cytoplasm called neuroplasm.

• The cytoplasm has a large granular body called Nissl's granules and other cell organelles like mitochondria, ribosomes, lysosomes, and endoplasmic reticulum.

• Neurons do not have the ability to divide.

Additional Information

• Several neurofibrils are present in the cytoplasm that help in the transmission of nerve impulses to and from the cell body.

• Cyton is a large part of the fiber of a nerve, or neuron. It is concerned with the regulation of a neuron’s maximum metabolism.

• In other words, the cyton is responsible for regulating a neuron’s metabolism.

• Cyton projections are called dendrons, which separate further and are known as dendrites.

-

**Q98. Answer: (b) Cousin**

Manu's father's sister's son is Raju.

The family tree is given below:-

Here gender of Manu is not mentioned so Manu is male or female.

Manu is the cousin of Raju.

Hence, "option 2" is the correct answer.

**Q99. Answer: (a) [figure]**

The logic followed here is:

In options 2, 3, and 4 there are two lines connected at 90^0 inside the circle but in option 1 two lines connected at 180^0 inside the circle.

Option 1 is different from others.

Hence, "option 1" is the correct answer.

**Q100. Answer: (a) 10083**

Shortcut Trick

Find the LCM of 4, 5, and 7 → 4 × 5 × 7 = 140.

The least 5-digit number is 10000.

10000 ÷ 140 leaves a remainder of 60.

Number divisible by 140 = 10000 + (140 − 60) = 10080.

Required number = 10080 + remainder 3 = 10083.

Therefore The correct answer is 10083.

Alternate Method

Given: Divisors are 4, 5, 7 and the remainder is 3.

Formula: Required Number = (k × LCM) + Remainder

=> LCM(4, 5, 7) = 140

=> 10000 ÷ 140 => Quotient = 71, Remainder = 60

=> Smallest 5-digit multiple of 140 = 10000 + (140 − 60) = 10080

=> Required number = 10080 + 3 = 10083

Therefore The correct answer is 10083.

Additional Information

LCM and Remainder Theorem

When a number leaves the same remainder 'r' for different divisors, it is of the form (LCM × k) + r.

Least n-digit number

To find the least n-digit number divisible by x: 10^(n-1) + (x − remainder of 10^(n-1)/x).

Divisibility Rule of 4 and 5

A number is divisible by 4 if the last two digits are divisible by 4, and by 5 if the last digit is 0 or 5.

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