RRC Group D Previous Year Paper 64 (Held On: 10 Oct 2018 Shift 3)

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

Take this paper as a timed mock test

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

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

CBT

Q1. The birth of _____ and his previous lives are described in the Jataka tales.

(a) Buddha
(b) Lord Vishnu
(c) Mahavir
(d) Lord Krishna

Q2. Jatin covers 7.5 km more if he walks 9 km per hour instead of 4 km. What is the actual distance covered by him in km?

(a) 7
(b) 5
(c) 8
(d) 6

Q3. Shankutala is facing east. She is playing chess with Radha in the standard chess sitting posture. Where is Radha facing now?

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

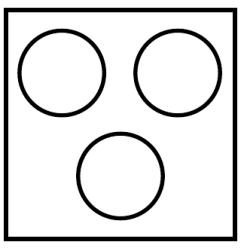
Q4. Which of the following tennis player has defeated Albert Ramos-Vinolas to win the Monte Carlo Masters title for the 10th time?

(a) Novak Djokovik
(b) Roger Federer
(c) Rafael Nadal
(d) Peter Aldrich

Q5. Choose the best suitable Venn diagram for the following three terms.

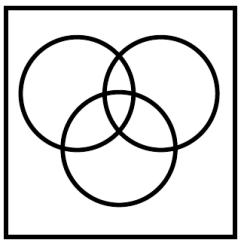
Bus, Car, Bicycle

(a)

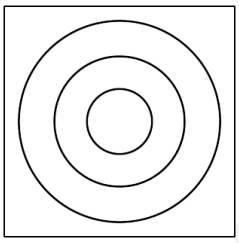


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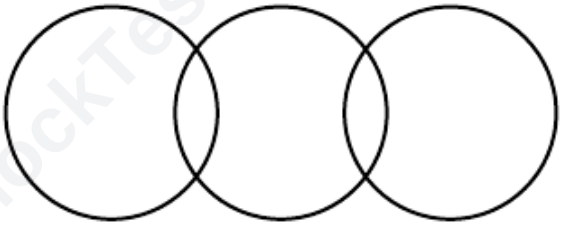
(b)



(c)



(d)



Q6. What will be the amount of Rs 5,000 after 2 years when the interest is compounded annually at the rate of about 9% per annum?

(a) Rs. 5,940
(b) Rs. 9,950
(c) Rs. 5,970
(d) Rs. 5,936

Q7. If α and β are zeroes of the polynomial $x^2 - 5x + 6$, then find the value of $(\alpha^2 + \beta^2)/(\alpha^{(-2)} + \beta^{(-2)})$.

(a) 63
(b) 62
(c) 36
(d) 26

Q8. The odd days in a normal year (non-leap year) are:

(a) 3
(b) 2
(c) 5
(d) 1

Q9. Which Indian leader was popularly known as 'Punjab Kesari'?

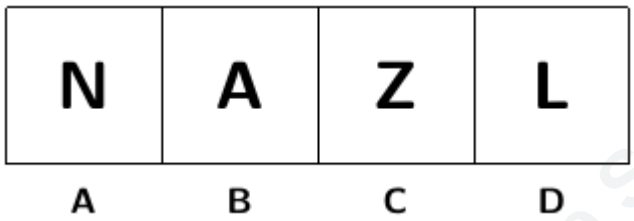
(a) Lala Lajpat Rai
(b) Maulana Azad
(c) Rabindranath tagore
(d) Sardar Vallabhai Patel

Q10. 0.034545... written as a vulgar fraction in its simplest form is equal to?

(a) 9/275
(b) 19/550
(c) 38/1111
(d) 19/555

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Q11. Select the odd image-



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

Q12. Which political party came to power in Tripura elections in 2018?

(a) BJP
(b) CPM
(c) BSP
(d) CPI

Q13. According to Newlands' octet law, iron, which resembles _____ and _____ in properties, is placed far away from these elements.

(a) Co and Ni
(b) Ni and Mn
(c) Co and Cu
(d) Cu and Ni

Q14. _____ are present in all atoms except neutrons.

(a) Cr
(b) H
(c) C
(d) Mg

Q15. The director of the 1928 film Devdas was _____.

(a) Naresh Mitra
(b) Dilip Kumar
(c) Prithviraj Kapoor
(d) Guru Dutt

Q16. _____ is added to hydrocarbons in a more rapid reaction in the presence of sunlight.

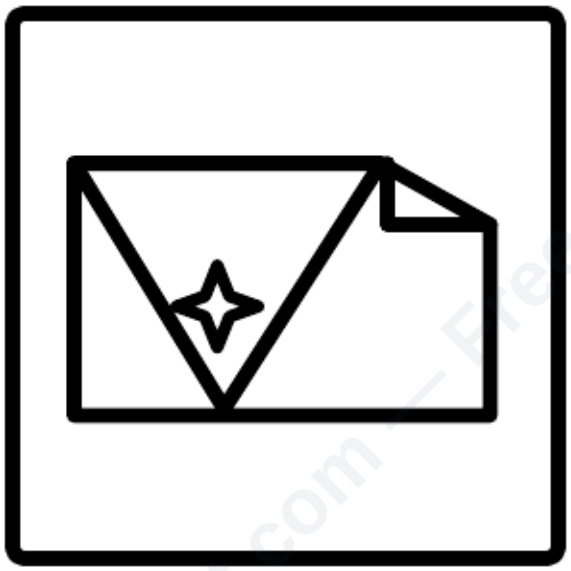
(a) O2
(b) N2
(c) H2
(d) Cl2

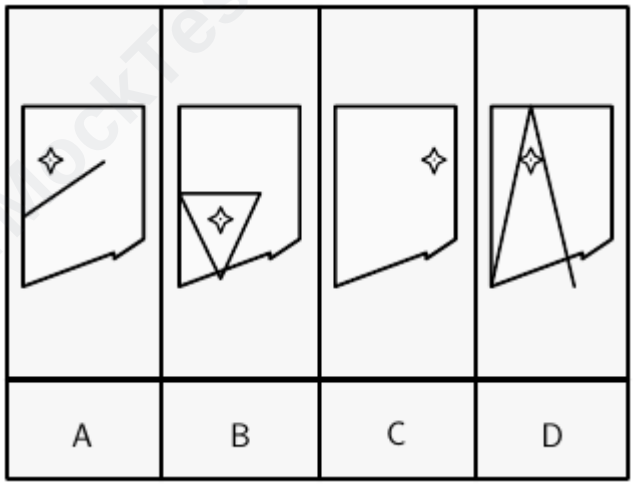
Q17. By selling 12 watches a shopkeeper makes a profit equal to the selling price of 2 watches. Find his profit in percentage.

(a) 16.67%
(b) 22%
(c) 20%
(d) 25%

Q18. Which of the following option images shows the closest resemblance to the question figures?

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

Q19. What is the full form of HIV?

(a) Human Immunodeficiency Victoria
(b) Humanity Immunodeficiency Virus
(c) Human Immunodeficiency Virtua
(d) Human Immunodeficiency Virus

Q20. If $2x = secA$ and is $(2/x) = tanA$, then find the value of $2(x^2 - 1/(x^2)) =$.

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

Q21. Which of the following numbers are divisible by 12?

(a) 43460
(b) 33460
(c) 63460
(d) 53460

Q22. Who founded 'Humanity Hospital', who worked as a vegetable vendor, domestic helper and laborer throughout his life?

(a) Shila Mazumdar
(b) Subhashini Mistry
(c) Anu Mondal
(d) Suja Dutta

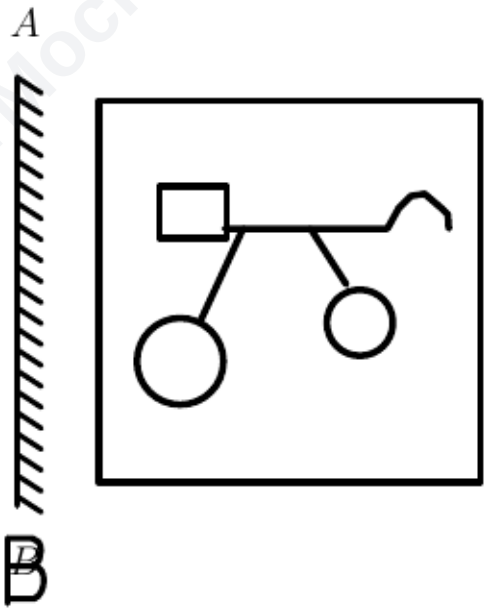
Q23. A can do a piece of work in 5 days, while B takes 10 days to do the same work. They start the work together but A has to leave the work 4 days before the end of the work. For how many days did A work?

(a) 1
(b) 1.5
(c) 2
(d) 2.5

Q24. Who is the present Chief Minister of Uttar Pradesh?

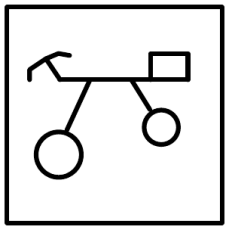
(a) Yogi Adityanath
(b) Rajnath Singh
(c) Mulayam Singh Yadav
(d) Akhilesh Yadav

Q25.

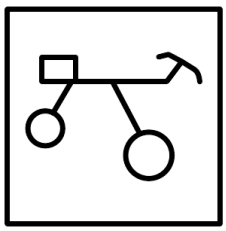


According to the line AB, the mirror image of the above figure will be-

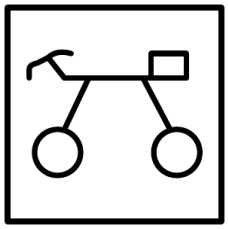
(a)



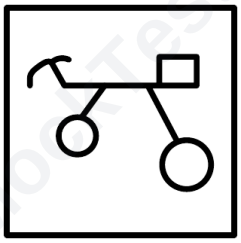
(b)



(c)



(d)



Q26. Find the next number in the following series.

5, 18, 44, 83, ?

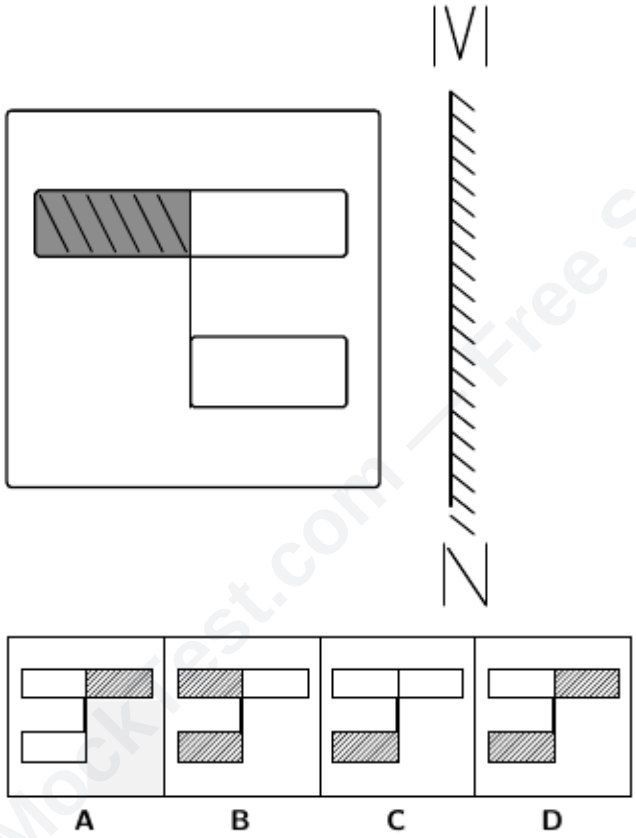
(a) 135
(b) 137
(c) 127
(d) 117

Q27. Vimal lent a loan of Rs. 5000 to Kamal for 2 years and Rs. 3,000 to Sumal for 4 years at simple interest at the same rate of interest and received Rs. 2,200 as interest from both. Calculate the interest rate per annum.

(a) 13%
(b) 15%
(c) 23%
(d) 10%

Q28. Select the mirror image of the figure given below.

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

Q29. A samosa seller discusses his business situation with his friend. He says, between last year and this year, he has tripled his income. He sells each samosa for Rs. 20. He made a income of Rs. 1,20,000 in the previous year. This year, on an average, how many samosas did he sell per month?

(a) 1000
(b) 1500
(c) 1250
(d) 1300

Q30. Nikhil and Dibu can complete a work in 30 and 40 days respectively when they work alone. If both of them work together for 8 days then how much work will be left to complete the same work?

(a) 7/15
(b) 8/15
(c) 5/14
(d) 6/13

Q31. A star appears twinkling in the sky due to _____.

(a) Diffraction of light by the atmosphere
(b) Reflection of light by the atmosphere
(c) Scattering of light by the atmosphere
(d) Refraction of light by the atmosphere

Q32. Which instrument is used to determine the density of milk?

(a) Hydrometer
(b) Lactometer
(c) Barometer
(d) Thermometer

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Q33. If x = 50% of y, then y% of 25 will be equal to?

(a) 15% of x
(b) 50% of x
(c) 12.5% of x
(d) 20% of x

Q34. 0.6 of 35 + half of 75 will be-

(a) 58.5
(b) 59.5
(c) 23.5
(d) 60.5

Q35. Which of the following instruments is used to measure the distance traveled in an automobile?

(a) Speedometer
(b) Odometer
(c) Tachometer
(d) Pedometer

Q36. Which of the following two quantities belong to the same SI unit?

(a) Velocity and Displacement
(b) Speed and Velocity
(c) Speed and Distance
(d) Speed and Displacement

Q37. If + means ×, - means ÷, × means - and ÷ means +, then find the value of 18 + 32 - 4 × 8 ÷ 3.

(a) 140
(b) 150
(c) 139
(d) 143

Q38. By what percentage has the central government reduced the interest rates on the small savings scheme?

(a) 1.1%
(b) 1.5%
(c) 1%
(d) 0.5%

Q39. What type of fruit is Alphonso?

(a) Banana
(b) Mango
(c) Apple
(d) Grapes

Q40. Ravi had Rs. 713.39 in his bank account. He deposited Rs. 450.75 in his bank account and withdrawn money to pay for five shirts, each costing 123.79. What is the balance in his account?

(a) 1,040.35
(b) 554.91
(c) 534.19
(d) 545.19

Q41. Which of the following animals have very simple eyes, in fact the only eye point that detects light?

(a) Tape worms
(b) Planaria
(c) Roundworm
(d) Ascaris

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Q42. Which of the following is the largest fraction?

3/15, 5/20, 8/64, 25/1000

(a) 5/20
(b) 8/64
(c) 3/15
(d) 25/1000

Q43. The following statement is followed by Assumptions I and II given below. You have to consider the statement followed by the assumptions and decide which of the assumptions are implicit in the statement.

Statement:

A job advertisement depicts, “The candidate must have excellent communication skills and a two-wheeler.”

Assumptions:

I. This job will require a lot of travel.

II. English and local languages are mandatory for this job.

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

Q44. Who is the director of the recent film 'Sanju'?

(a) Karan Johar
(b) Sanjay Leela Bhansali
(c) Madhur Bhandarkar
(d) Raj Kumar Hirani

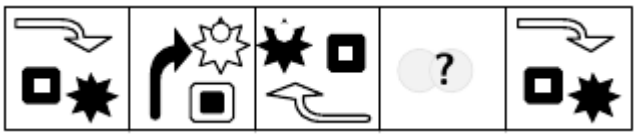
Q45. In 2016, which Indian golfer won the Bank BRI-JCB Indonesia Open for the second time in his career?

(a) Shiv Kapoor
(b) Gaganjeet Bhullar
(c) Jeev Milkha Singh
(d) Gaurav Ghai

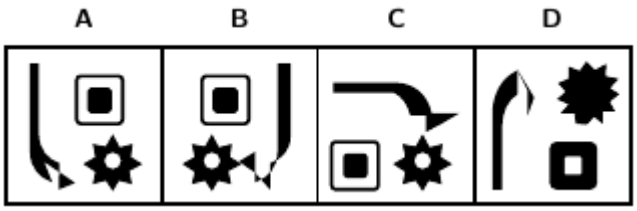
Q46. If + means ×, × means -, ÷ means + and - means ÷, then what will be the value of 45 - 5 ÷ 6 + 10 × 2?

(a) 70
(b) 68
(c) 67
(d) 65

Q47.



The missing image of the above sequence is:



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

Q48. In a code language, LOW is written as KJC and STAG as BXEN. How to write SLAT in that code language?

(a) BHKC
(b) KBHZ
(c) BKEX
(d) BKXY

Q49. What is India's position in the 2018 FDI Confidence Index?

(a) 10
(b) 11
(c) 1
(d) 6

Q50. _____ is also called a diverging mirror.

(a) Concave Mirror
(b) Convex Mirror
(c) Plane-Convex Mirror
(d) Plane Mirror

Q51. Read the given statement and conclusions carefully and choose which of the conclusions logically follows from the statement.

Statement:

I. No pen is pencil.

II. Some pencils are black.

Conclusion:

1. Some black are pens.

2. Some pencils are pens.

(a) neither 1 nor 2 follows
(b) Only conclusion 2 follows
(c) both 1 and 2 follow
(d) Only conclusion 1 follows

Q52. In the question below there is a statement and two arguments numbered I and II. You have to decide which argument is contained in the statement.

Statement:

The principal told the students, "The way we eat, bathe, etc. In the same way, maintaining cleanliness should be part of the routine work."

Argument:

I. Personal hygiene, environmental cleanliness are different areas where cleanliness is adopted.

II. Cleanliness is next to godliness.

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

Q53. Kerthana introduces a man as the son of the only daughter of his paternal uncle's father. The person is Kerthana's-

(a) Brother
(b) Son-in-law
(c) Aunt
(d) Son

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Q54. Pyongyang is the capital of which of the following countries?

(a) Cambodia
(b) North Korea
(c) South Korea
(d) Vietnam

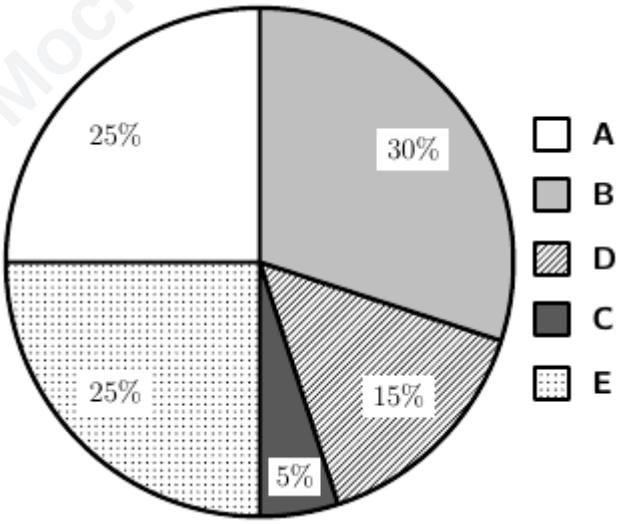
Q55. A car travels a distance of 100 m with a constant force of 50 N. Then the work done by the car is-

(a) 50 J
(b) 500 J
(c) 5000 J
(d) 50000 J

Q56. Select the option from the following which does not belong to the above group-

(a) Leopard
(b) Bear
(c) Bustard
(d) Deer

Q57. The pie chart given below shows the information on production data of tires across various companies in India during the year 2017. If the total number of tires produced by different companies in India in the year 2017 was 1,80,000 units, then how many units of tires were produced by company 'C'?



(a) 36000
(b) 9000
(c) 27000
(d) 18000

Q58. Who among the following was honored with "Hridaynath Mangeshkar Award 2017"?

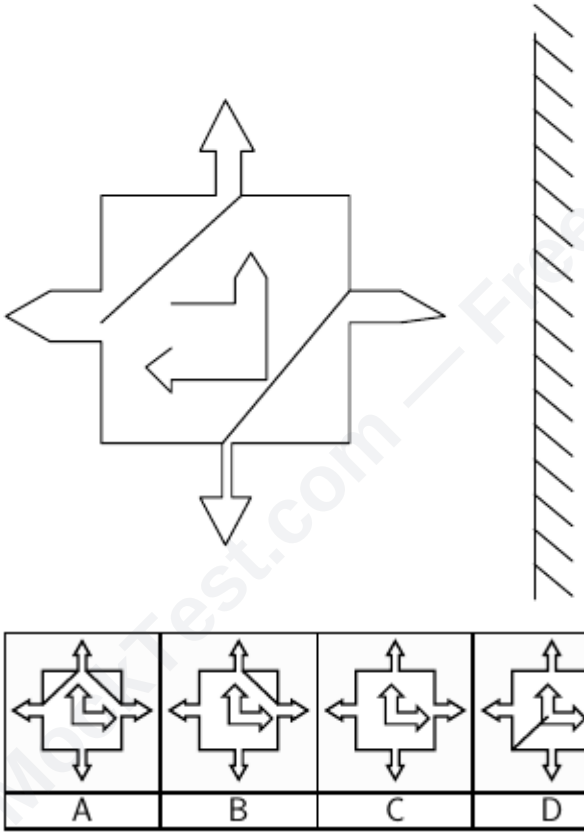
(a) K. S. Chitra
(b) S.P. Balasubramaniam
(c) Gulzar
(d) Javed Akhtar

Q59. An object of mass 12 kg is moving with a uniform velocity of 5 ms^(–1). What is the kinetic energy possessed by the object?

(a) 187.5 J
(b) 150 J
(c) 150 ms
(d) 17.5 J

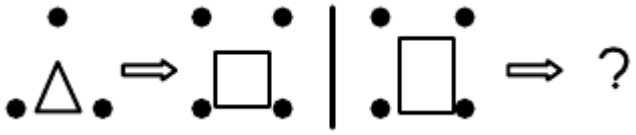
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Q60. Which pattern bears the closest resemblance to the following pattern-

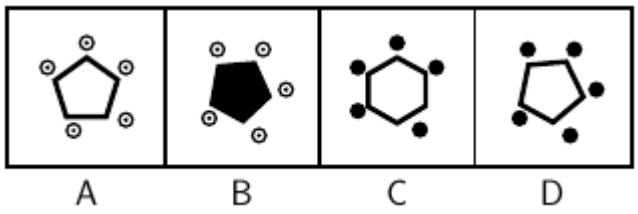


(a) A
(b) C
(c) B
(d) D

Q61.



The correct figure which replaces the question mark is

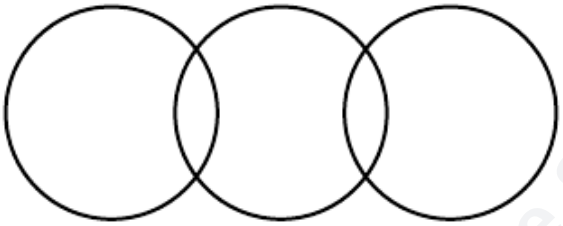


(a) D
(b) B
(c) A
(d) C

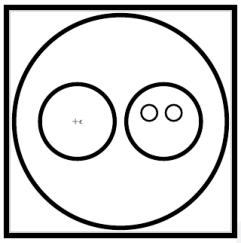
Q62. Select the most appropriate Venn diagram for the given words.

"Earth, Jupiter, Solar System"

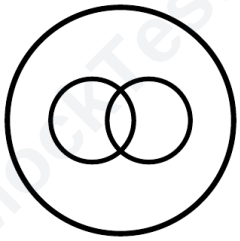
(a)



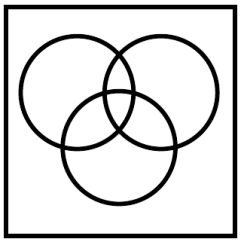
(b)



(c)



(d)



Q63. Identify the element having electronic configuration 2, 6-

(a) Nitrogen
(b) Oxygen
(c) Chlorine
(d) Bromine

Q64. Find out LCM of 20, 40, 25 and 30.

(a) 800
(b) 500
(c) 600
(d) 400

Q65. Which of the following awards was given by the Union Ministry of Agriculture and Farmers Welfare to Tamil Nadu, Himachal Pradesh and Tripura for record production of food grains during 2015-16?

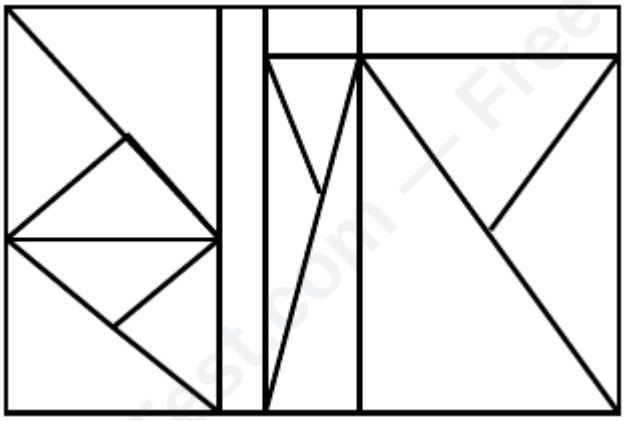
(a) Agricultural work
(b) Agricultural development
(c) Agricultural award
(d) Farmer award

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Q66. Which of the following is a exothermic?

(a) Dissolving washing soda in water
(b) Dissolving bleaching powder in water
(c) Dissolving sulfuric acid in water
(d) Dissolving copper sulphate in water

Q67. How many triangles are there in the following figure?



(a) 17
(b) 15
(c) 16
(d) 14

Q68. Corrosion of _____ is a serious problem of-

(a) Au
(b) Pt
(c) Al
(d) Fe

Q69. A statement is followed by two arguments. Decide which of the arguments is/are stronger with respect to the statement.

Statement:

Should the tuition fee be increased for higher education?

Argument:

I. Yes, this will increase the seriousness of education among the students, which will also increase the quality.

II. No, many students will be unable to afford, resulting in a reduction in the number of well-educated people.

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

Q70. The number of moles present in 90 g of water is _____-

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

Q71. 108 percent of a number is 189. number is-

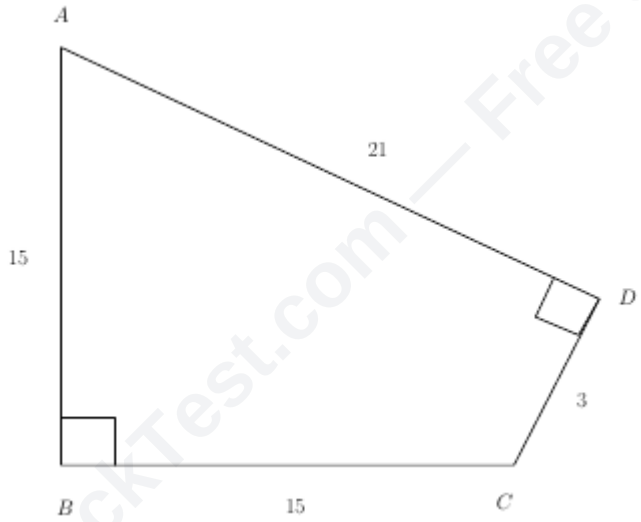
(a) 200
(b) 175
(c) 190
(d) 180

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Q72. If P are normal years over a period of 100 years (normal year = 365 days), then the value of P can be-

(a) 76
(b) 74
(c) 72
(d) 71

Q73. Find the area of the quadrilateral shown in the following figure (underlined not measured)



(a) 144
(b) 54
(c) 63
(d) 123

Q74. Sunayna is Suma's grandmother. How is Suma's brother Surya related to Sunayna?

(a) uncle
(b) niece
(c) grandson
(d) brother

Q75. Gravitational acceleration 'g' does not depend on _____.

(a) Mass of Earth M
(b) Mass of the falling object m
(c) Gravitational constant G
(d) Radius of the earth R

Q76. Which of the following is not true about the cerebrum?

(a) It forms the anterior, superior and lateral parts of the brain.
(b) It is the largest part of the brain, about 80%.
(c) It consists of three parts, two lateral cerebellar hemispheres and a central vermix.
(d) This is part of the forebrain.

Q77. Which Indian app has received the Best m-Government Service award at the World Government Summit 2018?

(a) Gujarat Gas
(b) UMANG
(c) iXiGO
(d) Paytm

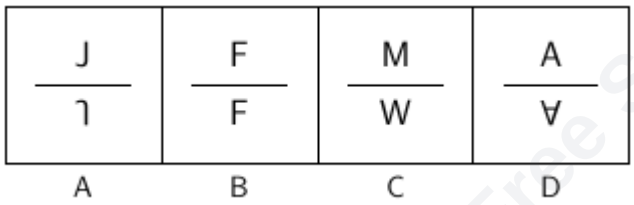
Q78. ISRO chairman A.S. Kiran Kumar was conferred with the 'SIES-Shri Chandrashekharendra Saraswati National Award for Prominence'?

(a) Social Thinking
(b) International Class

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(c) Public Leadership
(d) Science and Technology

Q79. Identify the odd one-



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

Q80. Suhashini made a fruit salad using melons, pineapples and bananas. The melons accounted for 1/5 part of the total fruit weight. Of the remaining weight, the 3/4 part was of bananas. What part of the total weight of the fruit was that of the pineapple?

(a) 1/8
(b) 1/4
(c) 1/5
(d) 1/6

Q81. If in a triangle angle B = 90° and angle A = 60° then $Sin^2A - Cos^2A + Tan^2A$ = ?

(a) 7/2
(b) 2/5
(c) 2/3
(d) 6/5

Q82. Which of the following statement(s) is/are true?

A. Shape: According to the type of matter, the shape changes depending on the location of the particles. For example, solids have a definite shape, whereas liquids acquire the shape of their vessel and, seen, gases have no shape.

B. Filling a vessel of water: It is a property of matter, which decreases in volume under high pressure, and gas shows this property.

(a) Both A and B are true
(b) Only B is true
(c) Both A and B are false
(d) Only A is true

Q83. The High Court of India delivered an important judgment in January 2017, according to which political parties and politicians cannot do which of the following?

(a) Calling the police in case of unrest or riots
(b) Soliciting votes on the basis of caste, community, religion or language
(c) Get votes by obstructing traffic
(d) Display of voter marks

Q84. Cavalier-Smith classified the organisms into _____ kingdom.

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

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Q85. Pipe A can fill a tank in 8 hours, pipe B in P hours and pipe C in 24 hours, if all the pipes are open, then it takes 2.4 hours to fill the tank. Then find the value of P?

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

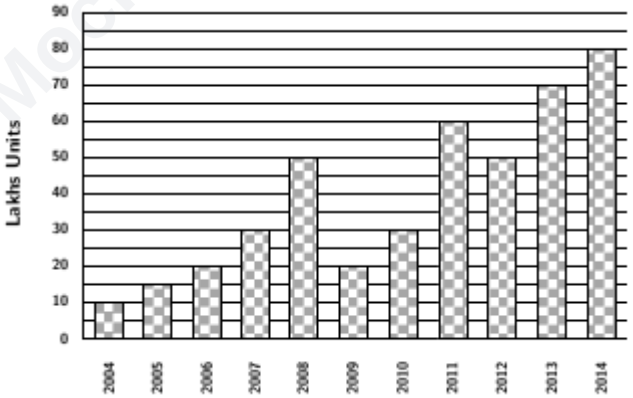
Q86. If x is an integer 0.70000 up to 5 decimal places, then the interval of x will be?

(a) $0.6995 \leq x < 0.70005$
(b) $0.699995 \leq x < 0.700005$
(c) $0.699905 \leq x < 0.700005$
(d) $0.69995 < x \leq 0.70005$

Q87. A bullet fired from a gun goes deep inside the target because it contains _____.

(a) heat energy
(b) potential energy
(c) chemical energy
(d) kinetic energy

Q88. The bar graph below shows the information on Personal Computers sold by the company "XYZ" over the past 10 years.



How many units of personal computers (in lakhs) were sold by company XYZ in the year 2010?

(a) 10
(b) 25
(c) 30
(d) 20

Q89. There are two taps in a tank, the first one fills the tank with water and the second one removes water from the tank. The tank is filled in 4 hours when only the first tap is open and in 12 hours when both the taps are open. How long does it take to empty the full tank when only the second tap is open?

(a) 10 hours
(b) 4 hours
(c) 6 hours
(d) 8 hours

Q90. The total cost of 5 apples and 9 oranges is Rs. 57, and the total cost of 9 apples and 5 oranges is Rs 69. How much will 3 apples and 2 oranges cost?

(a) Rs. 28
(b) Rs. 35
(c) Rs. 30
(d) Rs. 24

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Q91. Read the given statements and conclusions carefully and choose which of the statements logically follows from the conclusions.

Statements:

The chairman of the cricket board said "The people who will be interviewed are former wicket-keepers and they are suitable for the position of coach,".

Conclusion:

I. The head of the board believes that former wicket-keepers are a good option for the coach.

II. It is possible that more than one cricketer will be interviewed.

(a) Only conclusion I follows
(b) both conclusions follow
(c) none of the conclusions follow
(d) Only conclusion II follows

Q92. According to Ohm's law, _____ is constant.

(a) VQ
(b) I/V
(c) IT
(d) V/I

Q93. A cobbler made three new pairs of women's shoes. He invested 30% of the selling price in raw materials, 35% went to wages and the remaining amount was his profit. If the selling price of the shoes was Rs. 1,500, then what was the profit amount?

(a) 750
(b) 550
(c) 525
(d) 950

Q94. What is another name for shifting agriculture?

(a) Harvesting
(b) Transfer
(c) Jhoom
(d) Transplant

Q95. A man is 9 times as old as his son. After two years, the father will be 6 times as old as his son by 1 year. Find their present age-

(a) 27 years and 3 years
(b) 30 years and 6 years
(c) 26 years and 10 years
(d) 36 years and 12 years

Q96. On heating ethanol at 443K with more concentrated H_2SO_4, in the dehydration of ethanol _____ is released.

(a) methane
(b) methene
(c) ethane
(d) ethene

Q97. "Saket Sai Myneni" is related to which of the following sports?

(a) Badminton
(b) Athletics
(c) kabaddi
(d) Tennis

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Q98. Akhil meets a child in the park. The child identifies Akhil as his mother's younger brother. The child is Akhil's _____.

(a) Nephew
(b) Daughter
(c) Son
(d) Niece

Q99. Which of the following is based on the heating effect of electric current?

(a) micro wave
(b) electric heater
(c) electric fan
(d) electric bell

Q100. Carl Linnaeus is known as-

(a) father of taxonomy
(b) father of plant
(c) father of atom
(d) father of animal science

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) Buddha

The correct answer is Buddha.

Key Points

• The birth of Buddha and his previous lives are described in the Jataka tales.

• Birth tales or Jatakas

• - The previous lives of Gautama Buddha – the historical Buddha – are the subject of a collection of Birth Tales or Jatakas.

• There are 547 such stories, but more were created in the region of Northern Thailand and Laos at a later time and are known as Pannasa Jatakas.

• The Jatakas are an important part of Buddhist art and literature.

• They describe the previous existences or births of the Buddha (the Enlightened One) when he appeared as Bodhisattvas (beings who are yet to attain enlightenment or moksha), in both human and non-human forms.

Additional Information

• Lord Maha Vishnu is the Supreme Godhead of Vaishnavism (Para Brahman or Nirguna Brahman) in Puranas.

• He is called Swambhagwan in the Ramayana and Mahabharata.

• Vishnu is one of the three main Gods in Hinduism and is the Absolute Supreme being in the Vaishnava tradition.

• Vishnu is one of the members in the Trimurti in Hinduism.

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• Mahavira, also known as Vardhamana, was the 24th Tirthankara of Jainism.

• He was the spiritual successor of the 23rd Tirthankara Parshvanatha.

• Mahavira was born in the early part of the 6th century BCE into a royal Jain family in Bihar, India.

• His mother's name was Trishala and his father's name was Siddhartha.

• Krishna, one of the most widely revered and most popular of all Indian divinities, is worshipped as the eighth incarnation (avatar, or avatara) of the Hindu god Vishnu and also as a supreme god in his own right.

Q2. Answer: (d) 6

Shortcut Trick

Speed ratio = 4 : 9

Since time is constant, Distance ratio = Speed ratio = 4 : 9

Difference in distance ratio = 9 − 4 = 5 units

5 units = 7.5 km => 1 unit = 1.5 km

Actual distance (at 4 kmph) = 4 × 1.5 = 6 km

Therefore The correct answer is 6 km.

Alternate Method

Given: Initial speed = 4 kmph, Final speed = 9 kmph, Extra distance = 7.5 km.

Formula: Distance = Speed × Time

Let the time taken by Jatin be 't' hours.

=> Actual distance (D1) = 4 × t

=> Increased distance (D2) = 9 × t

=> Difference (D2 − D1) = 9t − 4t = 5t

=> 5t = 7.5

=> t = 7.5 ÷ 5 = 1.5 hours

=> Actual distance = 4 × 1.5 = 6 km

Therefore The correct answer is 6 km.

Additional Information

Direct Proportionality of Distance

When time is constant, the distance covered is directly proportional to the speed (D1/D2 = S1/S2).

Average Speed Formula

If a person covers two equal distances at speeds x and y, then the Average Speed = 2xy ÷ (x + y).

Relative Speed

When two objects move in the same direction, relative speed is the difference of their speeds; in opposite directions, it is the sum.

Q3. Answer: (c) West

• In the standard chess sitting posture, Shankutala will be facing Radha.

• Thus, Radha is facing west.

Hence, "option 3" is the correct answer.

Q4. Answer: (c) Rafael Nadal

The correct answer is Rafael Nadal.

Key Points

• Rafael Nadal has defeated Albert Ramos-Vinolas to win the Monte Carlo Masters title for the 10th time.

• Nadal Wins Historic 10th Monte-Carlo Title.

• Rafael Nadal captured an incredible 10th Monte-Carlo Rolex Masters crown on Sunday in beating fellow Spaniard Albert Ramos-Vinolas 6-1, 6-3 in the 76-minute final.

• Rafael "Rafa" Nadal Parera is a Spanish professional tennis player.

• He is ranked world No. 6 by the Association of Tennis Professionals, has been ranked No. 1 in the ATP rankings for 209 weeks, and has finished as the year-end No. 1 five times.

Additional Information

• Roger Federer is a Swiss professional tennis player.

• He is ranked No. 16 in the world by the Association of Tennis Professionals.

• He has won 20 Grand Slam men's singles titles, an all-time record shared with Rafael Nadal and Novak Djokovic.

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• Novak Djokovic is a Serbian professional tennis player.
• He is currently ranked as world No. 1 by the Association of Tennis Professionals.
• Djokovic has been No. 1 for a record total of 354 weeks, and has finished as ATP Year-End No. 1 on a record seven occasions.

Q5. Answer: (a) [figure]

• Bus, car and bicycle are three different types of vehicles.
The best suitable Venn diagram is as follows:
Hence, "option 1" is the correct answer.

Q6. Answer: (a) Rs. 5,940

Shortcut Trick
Effective rate of CI for 2 years = R + R + (R × R) ÷ 100.
=> Effective rate = 9 + 9 + (9 × 9) ÷ 100 = 18.81%.
Total Amount = (100% + 18.81%) of Principal = 118.81% of Rs. 5000.
=> Amount = (118.81 × 5000) ÷ 100 = Rs. 5940.5.
=> Approximating to the nearest whole number, Amount ≈ Rs. 5940.
Therefore The correct answer is Rs. 5,940.
Alternate Method
Given:
Principal (P) = Rs. 5,000
Rate of Interest (R) = 9% per annum
Time period (n) = 2 years
Formula Used:
Amount (A) = $P \times (1 + R/100)^n$
Calculations:
=> $A = 5000 \times (1 + 9/100)^2$
=> $A = 5000 \times (109/100) \times (109/100)$
=> $A = 5000 \times 1.09 \times 1.09$
=> $A = 5000 \times 1.1881$
=> $A = 5940.5$
=> Rounding off to the nearest integer, Amount ≈ Rs. 5940.
Therefore The correct answer is Rs. 5,940.
Additional Information
Compound Interest (CI)
When interest is compounded annually, the accumulated amount is calculated as $A = P \times (1 + R/100)^n$ and CI = A − P.
Effective Rate Method
For 2 years, the combined effective compound interest rate is directly calculated as $(2R + R^2 \div 100)\%$.
Difference Between CI and SI
For a period of 2 years, the difference between Compound Interest and Simple Interest on a given Principal is $D = P \times (R/100)^2$.

Q7. Answer: (c) 36

Shortcut Trick
The given expression $(\alpha^2 + \beta^2) \div (\alpha^{(-2)} + \beta^{(-2)})$ simplifies to $(\alpha^2 + \beta^2) \div (1/\alpha^2 + 1/\beta^2)$.
On further simplification: $(\alpha^2 + \beta^2) \div [(\alpha^2 + \beta^2) \div (\alpha\beta)^2] = (\alpha\beta)^2$.
For the polynomial $x^2 - 5x + 6$, the product of zeroes ($\alpha\beta$) = constant ÷ coeff. of x^2 = 6/1 = 6.
Required value = $(\alpha\beta)^2 = 6^2 = 36$.
Therefore The correct answer is 36.
Alternate Method
Given: Polynomial $p(x) = x^2 - 5x + 6$.
Method: Find the roots using factorisation.
=> $x^2 - 3x - 2x + 6 = 0$ => $x(x - 3) - 2(x - 3) = 0$ => $(x - 3)(x - 2) = 0$ => x = 3 or x = 2
Therefore, the zeroes are α = 3 and β = 2.
Now, calculate the values for the expression:

=> $\alpha^2 + \beta^2 = 3^2 + 2^2 = 9 + 4 = 13$ => $\alpha^{(-2)} + \beta^{(-2)} = 1/\alpha^2 + 1/\beta^2 = 1/9 + 1/4$ => $\alpha^{(-2)} + \beta^{(-2)} = (4 + 9) \div 36 = 13/36$ => Result = $(\alpha^2 + \beta^2) \div (\alpha^{(-2)} + \beta^{(-2)}) = 13 \div (13/36)$ => Result = $13 \times (36 \div 13) = 36$

Therefore The correct answer is 36.

Additional Information

Relation between Zeroes and Coefficients

For a quadratic polynomial $ax^2 + bx + c$, the sum of zeroes $\alpha + \beta = -b/a$ and the product of zeroes $\alpha\beta = c/a$.

Symmetric Functions of Zeroes

Functions like $\alpha^2 + \beta^2$ that do not change when α and β are swapped are symmetric. Note: $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$.

Nature of Roots

The discriminant $D = b^2 - 4ac$ determines the root type: $D > 0$ (real and distinct), $D = 0$ (real and equal), $D < 0$ (imaginary).

Q8. Answer: (d) 1

• Total number of days in a normal year (Non-leap year) = 365

• Total number of odd days = 365/7 = 1 odd day

• Hence, "option 4" is the correct answer.

Q9. Answer: (a) Lala Lajpat Rai

The correct answer is Lala Lajpat Rai.

Key Points

• Lala Lajpat Rai was popularly known as 'Punjab Kesari'.

• Lala Lajpat Rai (28 January 1865 — 17 November 1928) was an Indian independence activist.

• He played a pivotal role in the Indian Independence movement.

• He was popularly known as Punjab Kesari.

• Kesari is a Marathi newspaper founded on 4 January 1881.

• It was founded by Lokmanya Bal Gangadhar Tilak.

Additional Information

• Abul Kalam Azad, original name Abul Kalam Ghulam Muhiyuddin, also called Maulana Abul Kalam Azad or Maulana Azad, (born November 11, 1888, Mecca [now in Saudi Arabia]—died February 22, 1958, New Delhi, India), Islamic theologian who was one of the leaders of the Indian independence movement against British rule in India.

• Rabindranath Tagore was a poet, philosopher, musician, writer, and educationist. Rabindranath Tagore became the first Asian to become Nobel laureate when he won Nobel Prize for his collection of poems, Gitanjali, in 1913.

• He was popularly called Gurudev and his songs were popularly known as Rabindrasangeet.

• Sardar Vallabhbhai Patel, popularly known as the Iron Man of India, passed away on December 15, in the year 1950.

• He was the first Deputy Prime Minister and Home Minister of India.

Q10. Answer: (b) 19/550

Shortcut Trick

To convert a mixed recurring decimal to a fraction:

Numerator = (Whole number formed by digits) − (Non-recurring part)

Denominator = (Write 9 for every recurring digit) followed by (0 for every non-recurring digit after decimal)

Value = (345 − 3) ÷ 9900 = 342 ÷ 9900

Simplifying by dividing both by 18 => 19 ÷ 550

Therefore The correct answer is 19/550.

Alternate Method

Given: x = 0.03454545...

Formula Used: Algebraic manipulation of recurring decimals.

=> x = 0.03454545... (Equation 1)

Multiply Equation 1 by 100 to move decimal before the bar:

=> 100x = 3.454545... (Equation 2)

Multiply Equation 2 by 100 to move decimal after one period of bar:

=> 10000x = 345.454545... (Equation 3)

Subtract Equation 2 from Equation 3:

=> 10000x − 100x = 345.454545... − 3.454545...

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=> 9900x = 342

=> x = 342 ÷ 9900

=> x = 171 ÷ 4950 (Dividing by 2)

=> x = 19 ÷ 550 (Dividing by 9)

Therefore The correct answer is 19/550.

Additional Information

Pure Recurring Decimal

A decimal in which all digits after the decimal point are repeated. Example: 0.333... = 3/9 = 1/3.

Mixed Recurring Decimal

A decimal in which some digits do not repeat and some digits repeat. Example: 0.1222... = (12−1)/90 = 11/90.

Vulgar Fraction

A fraction where both the numerator and denominator are integers, expressed as a/b.

Q11. Answer: (b) D

The logic followed here is:-

• Three lines are used to draw figures A, B, and C.

• Figure D can be drawn using 2 lines.

Hence, "option 2" is the correct answer.

Q12. Answer: (a) BJP

The correct answer is BJP.

Key Points

• BJP came to power in the Tripura elections in 2018.

• The 2018 Tripura Legislative Assembly election was held on 18 February for 59 of the state's 60 constituencies.

• The counting of votes took place on 3 March 2018.

• With 43% of the vote, the BJP secured a majority of seats (36) and subsequently formed the government with Biplab Kumar Deb as Chief Minister.

• Current Chief Minister: Manik Saha

• Current Governor: Satyadev Narayan Arya

Additional Information

• The Bharatiya Janata Party is one of two major political parties in India, along with the Indian National Congress.

• It has been the ruling political party of the Republic of India since 2014.

• The BJP is a right-wing party, and its policy has historically reflected Hindu nationalist positions.

• The Communist Party of India (Marxist) (abbreviated as CPI(M)/CPIM/CPM) is a communist political party in India.

• It is one of the national parties of India.

• The party emerged from a split from the Communist Party of India (CPI) on 7 November 1964.

• 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 Communist Party of India is the oldest communist party in India and one of the eight national parties in the country.

• The CPI was founded in Kanpur on 26 December 1925.

Q13. Answer: (a) Co and Ni

The correct answer is Co and Ni.

Key Points

• According to Newlands' octet law, iron, which resembles Co and Ni in properties, is placed far away from these elements.

• The major limitations of Newlands' law of octaves were :

• It was applicable to only lighter elements having atomic masses up to 40 u, i.e., up to calcium.

• After calcium, the first and the eighth element did not have similar properties.

• For example, chromium (Cr) and yttrium (Y) are the first and the eighth element placed in the same column but they have entirely different properties.

• It was assumed that only 63 elements existed in nature and no new elements would be discovered in the future.

• But later on, several new elements were discovered whose properties did not fit into the law of octaves.

• Some similar elements have been separated from one another while some dissimilar elements have been placed in the same

column.

• For example, iron (Fe) resembles cobalt (Co) and nickel (Ni) but has been placed far away from these elements.

• Similarly, cobalt and nickel do not resemble halogens (F, Cl, Br) but have been placed in the same column.

• When noble gases were discovered, the properties of the eighth element were no longer similar to the first one.

• Actually, now it was the first and the ninth element which has similar properties.

Q14. Answer: (b) H

The correct answer is H.

Key Points

• H is present in all atoms except neutrons.

• The available hydrogen state H^1.

• It is made of 1 electron, 1 proton, and no neutrons.

• All other elements including isotopes of Hydrogen have neutrons.

• Neutrons are present in the nucleus of all atoms, except hydrogen.

• All elements have atoms with neutrons except for one.

• The normal hydrogen (H) atom does not have any neutrons in its tiny nucleus.

• That tiny little atom (the tiniest of all) has only one electron and one proton.

• Deuterium is a hydrogen atom with an extra neutron and tritium has two extra.

Additional Information

• Avogadro's number is an absolute number: there are 6.023×1023 elementary entities in 1 mole.

• This can also be written as 6.023×1023 mol-1.

• The mass of one mole of a substance is equal to that substance's molecular weight.

• For example, the mean molecular weight of water is 18.015 atomic mass units (amu), so one mole of water weighs 18.015 grams.

• Mole:

• The amount of substance of a system that contains as many elementary entities as there are atoms in 12 g of carbon-12.

• The mole allows scientists to calculate the number of elementary entities (usually atoms or molecules) in a certain mass of a given substance.

Q15. Answer: (a) Naresh Mitra

The correct answer is Naresh Mitra.

Key Points

• The director of the 1928 film Devdas was Naresh Mitra.

• Devdas is a 1928 silent film based on the Sharat Chandra Chattopadhyay novel, Devdas.

• It was the first film adaptation of the novel.

• It was directed by Naresh Mitra who not only acted in the film but was the cinematographer.

• The film was shot in erstwhile Calcutta in British India.

Additional Information

• Mohammed Yusuf Khan, better known by his stage name Dilip Kumar, was an Indian actor and film producer who worked in Hindi cinema.

• Prithviraj Kapoor was an Indian actor, film producer, writer, and film director, who is also considered to be one of the founding figures of Hindi cinema.

• He was associated with IPTA as one of its founding members and established the Prithvi Theatres in 1944 as a traveling theatre company based in Bombay.

• Vasanth Kumar Shivashankar Padukone, better known as Guru Dutt, was an Indian film director, producer, actor, choreographer, and writer.

• He was included among CNN's "Top 25 Asian Actors" in 2012.

Q16. Answer: (d) Cl2

The correct answer is Cl2_.

Key Points

• Cl2 is added to hydrocarbons in a more rapid reaction in the presence of sunlight.

• In the presence of sunlight, chlorine reacts with saturated hydrocarbons and the process is called halogenation of hydrocarbons.

• In this reaction, the hydrogen atoms in the hydrocarbon are substituted by the chlorine atoms.

Additional Information

• Hydrocarbons are the simplest organic compounds, but they have interesting physiological effects.

• These effects depend on the size of the hydrocarbon molecules and where on or in the body they are applied.

• Alkanes of low molar mass—those with from 1 to approximately 10 or so carbon atoms—are gases or light liquids that act as anaesthetics.

Q17. Answer: (c) 20%

Shortcut Trick

Let the Selling Price (SP) of 1 watch be 1 unit.

Total SP for 12 watches = 12 units.

Profit = SP of 2 watches = 2 units.

Cost Price (CP) = SP − Profit = 12 − 2 = 10 units.

Profit % = (Profit ÷ CP) × 100 = (2 ÷ 10) × 100 = 20%.

Therefore The correct answer is 20%.

Alternate Method

Given: Number of watches sold = 12, Profit = SP of 2 watches.

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

=> Let SP of 1 watch be 'S' and CP of 1 watch be 'C'.

=> Total Profit = 12S − 12C.

=> According to the question: 2S = 12S − 12C.

=> 12C = 10S => S/C = 12/10.

=> Profit % = [(12 − 10) ÷ 10] × 100 = (2 ÷ 10) × 100 = 20%.

Therefore The correct answer is 20%.

Additional Information

Profit and Loss on Selling Price

When profit is expressed in terms of Selling Price, always convert it to a Cost Price basis to find the actual Profit Percentage.

Key Relationship

If Profit = SP of 'n' articles on selling 'm' articles, then CP = SP of (m − n) articles.

Q18. Answer: (b) D

The water image of the question figure is given below:-

Hence, "option 2" is the correct answer.

Q19. Answer: (d) Human Immunodeficiency Virus

The correct answer is Human Immunodeficiency Virus.

Key Points

• The full form of HIV is Human Immunodeficiency Virus.

• The human immunodeficiency viruses are two species of Lentivirus that infect humans.

• Over time, they cause acquired immunodeficiency syndrome, a condition in which progressive failure of the immune system allows life-threatening opportunistic infections and cancers to thrive.

Additional Information

• HIV (human immunodeficiency virus) is a virus that attacks the immune system, the body's natural defence system.

• Without a strong immune system, the body has trouble fighting off disease.

• Both the virus and the infection it causes are called HIV. White blood cells are an important part of the immune system.

Column - A	Column - B
(a) Bacteria	Pertussis
(b) Fungi	Ring worm
(c) Helminthes	Elephantiasis
(d) Protozoa	Amoebiasis
(e) Virus	Hydrophobia

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Q20. Answer: (b) 1/2

Shortcut Trick

Use the identity $\sec^2A - \tan^2A = 1$.

Substitute $(2x)$ for secA and $(2/x)$ for tanA: $(2x)^2 - (2/x)^2 = 1$.

$\Rightarrow 4x^2 - 4/x^2 = 1 \Rightarrow 4(x^2 - 1/x^2) = 1$.

Divide both sides by 2 to get $2(x^2 - 1/x^2) = 1/2$.

Therefore The correct answer is 1/2.

Alternate Method

Given: $2x = \sec A$ and $2/x = \tan A$

Formula Used: $\sec^2A - \tan^2A = 1$

$\Rightarrow (2x)^2 - (2/x)^2 = 1$

$\Rightarrow 4x^2 - 4/x^2 = 1$

$\Rightarrow 4(x^2 - 1/x^2) = 1$

$\Rightarrow 2 \times 2(x^2 - 1/x^2) = 1$

$\Rightarrow 2(x^2 - 1/x^2) = 1/2$

Therefore The correct answer is 1/2.

Additional Information

Trigonometric Identities

Standard Pythagorean identities: $\sin^2\theta + \cos^2\theta = 1$, $1 + \tan^2\theta = \sec^2\theta$, and $1 + \cot^2\theta = \text{cosec}^2\theta$.

Reciprocal Relations

$\sec\theta = 1/\cos\theta$ and $\tan\theta = \sin\theta/\cos\theta$. Use these to convert complex terms into basic sine and cosine forms.

Q21. Answer: (d) 53460

Shortcut Trick

A number is divisible by 12 if it is divisible by both 3 and 4.

Checking divisibility by 4: Last two digits of 53460 are 60 ($60 \div 4 = 15$), so it is divisible by 4.

Checking divisibility by 3: Sum of digits of 53460 = 5 + 3 + 4 + 6 + 0 = 18 ($18 \div 3 = 6$), so it is divisible by 3.

Since 53460 is divisible by both 3 and 4, it is divisible by 12.

Therefore The correct answer is 53460.

Alternate Method

Given: Numbers 43460, 33460, 63460, 53460

Divisibility Rule of 12: Number must satisfy divisibility of 3 (Sum of digits) and 4 (Last two digits).

$\Rightarrow$ All options end in 60, so all are divisible by 4.

$\Rightarrow$ Sum of digits for (1) 43460: 4+3+4+6+0 = 17 (Not divisible by 3)

$\Rightarrow$ Sum of digits for (2) 33460: 3+3+4+6+0 = 16 (Not divisible by 3)

$\Rightarrow$ Sum of digits for (3) 63460: 6+3+4+6+0 = 19 (Not divisible by 3)

$\Rightarrow$ Sum of digits for (4) 53460: 5+3+4+6+0 = 18 (Divisible by 3)

Therefore The correct answer is 53460.

Additional Information

Divisibility by 3

A number is divisible by 3 if the sum of its digits is a multiple of 3.

Divisibility by 4

A number is divisible by 4 if the last two digits of the number are divisible by 4 or are 00.

Composite Divisibility

For a number to be divisible by a composite number n, it must be divisible by its co-prime factors (e.g., for 12, factors are 3 and 4).

Q22. Answer: (b) Subhashini Mistry

The correct answer is Subhasini Mistry.

Key Points

• Subhasini Mistry founded 'Humanity Hospital', who worked as a vegetable vendor, domestic helper and laborer throughout his life.

• Subhasini Mistry (born 1943) is an Indian social worker.

• She became a widow at the age of 23 and was left with four children.
• She struggled in life working as a house maid, selling vegetables and worked as a manual labourer.
• She went on to build a charitable hospital called "Humanity Hospital" for the poor.

Additional Information

• Sreela Majumdar
• Sreela Majumdar (also credited as Srila Mazumdar) is an actress in the Bengali language film industry of India.
• She has done voice dubbing for Aishwarya Rai in the film Chokher Bali (2003).
• In 1980, she debuted in the film Parasuram directed by Mrinal Sen.

Q23. Answer: (c) 2

Shortcut Trick

Let the total work be 10 units (LCM of 5 and 10).

Efficiency of A = 2 units/day, Efficiency of B = 1 unit/day.

Since A leaves 4 days before completion, B works alone for the last 4 days.

Work done by B in 4 days = 4 × 1 = 4 units. Remaining work = 10 − 4 = 6 units done by both together.

Number of days A worked = 6 ÷ (2 + 1) = 2 days.

Therefore The correct answer is 2 days.

Alternate Method

Given:

Time taken by A = 5 days

Time taken by B = 10 days

A leaves 4 days before the completion of the work.

Person	Days	Total Work	Efficiency
A	5	10	2
B	10	1	

Let the total time taken to complete the work be x days.

Since A leaves 4 days before the end, A works for (x − 4) days, and B works for x days.

=> Work done by A + Work done by B = Total Work

=> 2 × (x − 4) + 1 × x = 10

=> 2x − 8 + x = 10

=> 3x = 18

=> x = 6 days

Number of days A worked = x − 4 = 6 − 4 = 2 days.

Therefore The correct answer is 2 days.

Additional Information

LCM Method for Time and Work

Total work is assumed as the LCM of individual times. Individual efficiency is calculated as Total Work ÷ Individual Time.

Leaving Before Completion Trick

If a person leaves 'n' days before completion, we can alternatively add their potential 'n' days of work to the total work and divide by the combined efficiency: Total Days = (Total Work + Leaver's Efficiency × n) ÷ Combined Efficiency.

Q24. Answer: (a) Yogi Adityanath

The correct answer is Yogi Adityanath.

Key Points

• Yogi Adityanath is the present Chief Minister of Uttar Pradesh.
• Yogi Adityanath (born Ajay Mohan Bisht; 5 June 1972) is an Indian Hindu monk and politician serving as the 22nd and current Chief Minister of Uttar Pradesh, in office since 19 March 2017.
• The Yogi Adityanath ministry is the council of ministers in the 17th Uttar Pradesh Legislative Assembly headed by Chief Minister Yogi Adityanath since 19 March 2017.
• As per the Constitution of India, the Uttar Pradesh Council of Ministers, including the Chief Minister, can have a maximum of 60 members.

Additional Information

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• Rajnath Singh is an Indian politician serving as the Defence Minister of India.
• He is currently the Deputy Leader of the House Lok Sabha.
• He is the former President of the Bharatiya Janata Party.
• He has previously served as the Chief Minister of Uttar Pradesh and as a Cabinet Minister in the Vajpayee Government.
• Mulayam Singh Yadav is an Indian politician and the founder-patron of the Samajwadi Party.
• He served for three non-consecutive terms as the Chief Minister of Uttar Pradesh, and also served as the Minister of Defence, Government of India.
• Akhilesh Yadav is an Indian politician and national president of the Samajwadi Party who served as the 20th Chief Minister of Uttar Pradesh from 2012 to 2017.
• Having assumed office on 15 March 2012 at the age of 38, he is the youngest person to have held the office.

Q25. Answer: (d) [figure]

The mirror image of the question figure is given below:-

Hence, "option 4" is the correct answer.

Q26. Answer: (a) 135

The logic followed here is:-

Hence, "option 1" is the correct answer.

Q27. Answer: (d) 10%

Shortcut Trick

Use the Effective Principal method where Rate (R) = (Total SI × 100) ÷ ∑(P × T).

Sum of (P × T) = (5000 × 2) + (3000 × 4) = 10,000 + 12,000 = 22,000.

Rate (R) = (2200 × 100) ÷ 22,000 = 10%.

Therefore The correct answer is 10%.

Alternate Method

Given:

Principal for Kamal (P1) = Rs. 5000, Time (T1) = 2 years

Principal for Sumal (P2) = Rs. 3000, Time (T2) = 4 years

Total Interest (SI) = Rs. 2200, Rate of Interest = R%

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

Calculations:

=> Total SI = SI_(Kamal) + SI_(Sumal)

=> 2200 = (5000 × R × 2 ÷ 100) + (3000 × R × 4 ÷ 100)

=> 2200 = (10000R ÷ 100) + (12000R ÷ 100)

=> 2200 = 100R + 120R

=> 2200 = 220R

=> R = 2200 ÷ 220

=> R = 10%

Therefore The correct answer is 10%.

Additional Information

Simple Interest (SI)

Interest calculated only on the initial principal amount: SI = (P × R × T) ÷ 100.

Effective Interest Rate

When multiple sums are lent at the same rate, the total interest is the product of the rate and the sum of (Principal × Time) products.

Amount in SI

The total sum returned after time T: Amount (A) = Principal (P) + Simple Interest (SI).

Q28. Answer: (d) A

The mirror image of the question figure is:-

Hence, "option 4" is the correct answer.

Q29. Answer: (b) 1500

Shortcut Trick

Total income this year = 3 × 1,20,000 = Rs. 3,60,000.

Monthly income = 3,60,000 ÷ 12 = Rs. 30,000.

Total samosas sold per month = 30,000 ÷ 20 = 1500.

Therefore The correct answer is 1500.

Alternate Method

Given:

Income in previous year = Rs. 1,20,000

Income in current year = 3 × Previous income

Price per samosa = Rs. 20

Formula Used:

Monthly sales = (Total Annual Income ÷ 12) ÷ Price per unit

Calculations:

=> Total annual income (current year) = 3 × 1,20,000 = Rs. 3,60,000

=> Monthly income = 3,60,000 ÷ 12 = Rs. 30,000

=> Number of samosas sold per month = 30,000 ÷ 20

=> Monthly sales = 1500 samosas

Therefore The correct answer is 1500.

Additional Information

Unitary Method

A basic concept where we find the value of a single unit (like price per samosa) and then use it to find the quantity or total cost.

Monthly Average

To find a monthly average from annual data, always divide the total yearly figure by 12, as there are 12 months in a standard year.

Tripled Value Calculation

When a value is tripled, it means the new value is 300% of the original value, representing a 200% increase.

Q30. Answer: (b) 8/15

Shortcut Trick

Combined efficiency of Nikhil and Dibu = (1/30 + 1/40) = 7/120 per day.

Work done in 8 days = 8 × (7/120) = 7/15.

Remaining work = 1 − 7/15 = 8/15.

Therefore The correct answer is 8/15.

Alternate Method

Given: Time taken by Nikhil = 30 days, Time taken by Dibu = 40 days, Combined working time = 8 days.

Person	Days	Total Work	Efficiency
Nikhil	30	120	4
Dibu	40	3	

Calculations:

=> Total efficiency of (Nikhil + Dibu) = 4 + 3 = 7 units/day

=> Work completed in 8 days = 8 × 7 = 56 units

=> Remaining work = Total work − Work completed

=> Remaining work = 120 − 56 = 64 units

=> Fraction of work left = 64 / 120

=> Simplified fraction = 8/15

Therefore The correct answer is 8/15.

Additional Information

Work and Efficiency Relationship

Efficiency is inversely proportional to the time taken to complete a work. If a person finishes work in 'n' days, their 1-day work (efficiency) is 1/n.

Combined Work Formula

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If A and B work together, the time taken to complete the work is (A × B) / (A + B) days.

Fractional Work Left

Remaining work = 1 − (Days worked / Total days required to finish work together).

Q31. Answer: (d) Refraction of light by the atmosphere

The correct answer is Refraction of light by the atmosphere.

Key Points

• A star appears twinkling in the sky due to the refraction of light by the atmosphere.

• The twinkling of a star is due to the atmospheric refraction of starlight.

• The starlight, on entering the earth's atmosphere, undergoes refraction continuously before it reaches the earth.

• The atmospheric refraction occurs in a medium of gradually changing refractive index.

Additional Information

• When a ray of light falls on any object (polished, smooth, shiny object), light from that object bounces back those rays of light to our eyes and this is known as “Reflection” or “Reflection of Light”.

• This phenomenon is what enables us to look at the world around us based.

• Diffraction refers to various phenomena that occur when a wave encounters an obstacle or opening.

• It is defined as the bending of waves around the corners of an obstacle or through an aperture into the region of geometrical shadow of the obstacle/aperture.

• For example, the closely spaced tracks on a CD or DVD act as a diffraction grating to form the familiar rainbow pattern we see when looking at a disk

• Light can be examined entirely from its source. When light passes from one medium to any other medium say air, a glass of water then a part of the light is absorbed by particles of the medium preceded by its subsequent radiation in a particular direction.

• This phenomenon is termed a scattering of light.

Q32. Answer: (b) Lactometer

The correct answer is Lactometer.

Key Points

• Lactometer is used to determine the density of milk.

• A lactometer is an instrument that is used to check for the purity of milk by measuring its density.

• - An instrument to find out the content of the water in the milk or to test the richness of the milk is thus termed as 'lactometers'.

• A hydrometer is an instrument used for measuring the relative density of liquids based on the concept of buoyancy.

• They are typically calibrated and graduated with one or more scales such as specific gravity.

• A barometer is a scientific instrument used to measure atmospheric pressure, also called barometric pressure.

• The atmosphere is the layers of air wrapped around the Earth.

• That air has a weight and presses against everything it touches as gravity pulls it to Earth.

• Barometers measure this pressure.

• A thermometer is a device that enables you to measure your temperature or temperature gradient.

Additional Information

• | Column 1 | Column 2 |

1. Galvanometer	**Measure electric currents**
2. Hygrometer	Measure humidity levels
3. Manometer	Pressure of gases
4. Tonometer	Measure the internal pressure of the eye

Q33. Answer: (b) 50% of x

Shortcut Trick

Given x = 50% of y => y = 2x.

We need to find y% of 25.

Substitute y = 2x: (2x)% of 25 = 2x/100 × 25 = x/2.

Since x/2 is the same as 50% of x.

Therefore The correct answer is 50% of x.

Alternate Method

Given:

=> x = 50% of y

=> x = (50/100) × y

=> x = y/2 or y = 2x

Calculations:

We need to find the value of y% of 25:

=> y% of 25 = (y/100) × 25

=> y% of 25 = y/4

Now, substitute y = 2x in the above expression:

=> y/4 = (2x)/4

=> y/4 = x/2

Expressing x/2 in terms of percentage of x:

=> (1/2) × x = (50/100) × x = 50% of x

Therefore The correct answer is 50% of x.

Additional Information

Commutative Property of Percentage

The property a% of b = b% of a is very useful in calculations. For example, 16% of 50 is the same as 50% of 16, which is 8.

Percentage Change Base

If x is r% more than y, then y is [r/(100+r)] × 100% less than x.

Fraction to Percentage Conversion

To convert a fraction to a percentage, multiply by 100. Key values: 1/2 = 50%, 1/4 = 25%, 1/8 = 12.5%.

Q34. Answer: (a) 58.5

Calculation:

According to the question

0.6 of 35 + half of 75

=> (6/10 × 35) + 75/2

=> 21 + 75/2

=> 21 + 37.5

=> 58.5

Therefore The required value is 58.5

Q35. Answer: (b) Odometer

The correct answer is Odometer.

Key Points

• An odometer is used to measure the distance travelled in an automobile.

• An odometer or odograph is an instrument used for measuring the distance travelled by a vehicle, such as a bicycle or a car.

• The device may be electronic, mechanical, or a combination of the two (electromechanical).

Additional Information

• A speedometer or a speed meter is a gauge that measures and displays the instantaneous speed of a vehicle.

• Now universally fitted to motor vehicles, they started to be available as options in the early 20th century, and as standard equipment from about 1910 onwards.

• A tachometer refers to any device that produces a signal proportional to the speed of rotation of a joint.

• There are many different types of tachometers, some based on measuring the frequency of, or the time between, pulses generated by the rotating shaft.

• Pedometers are designed to detect vertical movement at the hip and so measure the number of steps and provide an estimate of the distance walked.

• They cannot provide information on the temporal pattern of physical activity or the time spent in different activities at different intensities.

Q36. Answer: (b) Speed and Velocity

The correct answer is Speed and Velocity.

Key Points

• Speed and velocity belong to the same SI unit.
• Displacement is usually addressed in meters, and the time taken is depicted in seconds.
• Therefore, velocity is expressed in meters/second or m/s.
• The SI unit of velocity is meter per second (m/s).
• The S.I unit of speed is meter/second or meter per second.
• Hence speed and velocity belong to the same SI unit.
• SI unit of distance is a meter according to the International System of Units.

Additional Information

• The SI unit of force is the newton, symbol N.
• The base units relevant to force are:
• The meter, unit of length — symbol m.
• The SI unit of power is the watt (W), in honour of Scottish inventor James Watt (1736 - 1819).
• Watt's improvements to the steam engine helped to launch the Industrial Revolution.

Q37. Answer: (c) 139

Given that:-

18 + 32 - 4 × 8 ÷ 3

Symbol	•	•	×	÷
Meaning	×	÷	•	•

• After replacing the symbols with their meanings, we get

18 × 32 ÷ 4 - 8 + 3

= 18 × 8 - 8 + 3

= 144 - 8 + 3

= 144 + 3 - 8 (the positions of 8 and 3 are interchanged with their symbols)

= 147 - 8

= 139

Hence, "option 3" is the correct answer.

Q38. Answer: (a) 1.1%

The correct answer is 1.1%.

Key Points

• The central government reduced the interest rates on the small savings scheme by 1.1%.
• The finance ministry has withdrawn its decision to slash interest rates on small savings schemes like the Public Provident Fund and the National Savings Certificate (NSC), terming it an "oversight".
• The rates on such schemes will continue to remain as they were during the January-March quarter, reversing the cut on interest rates of up to 110 basis points or 1.1 percentage points announced a day earlier.

Additional Information

• The small savings schemes basket comprises 12 instruments including the National Saving Certificate (NSC), Public Provident Fund (PPF), Kisan Vikas Patra (KVP), and Sukanya Samridihi Scheme.
• The government resets the interest rate at the beginning of every quarter.
• Sukanya Samriddhi Account provides a higher rate of interest than other Savings Plans that offer financial security for the girl child.
• Each financial year, the government declares the applicable interest rate for that year, while the interest on your investments is compounded yearly.

Q39. Answer: (b) Mango

The correct answer is Mango.

Key Points

• The Mango type of fruit is Alphonso.
• Throughout the world, Devgad Alphonso Mango is well recognized due to its unique taste, aroma, and superior quality.
• The size of these mangoes is about 4-6 inches and is even in shape.
• Its skin is inedible, and the colour of ripened Alphonso mangoes is golden yellow.

Additional Information

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• Types of Bananas
• Cavendish Banana
• Pisang Raja
• Red Banana
• Lady Finger Banana.
• Blue Java Banana.
• Plantain.
• Manzano Banana.
• Burro Banana.
• Types of Apples
• Jonagold Appl
• Cameo Apple.
• Empire Apple.
• McIntosh Apple.
• Golden Delicious Apple.
• Fuji Apple.
• Cortland Apple.
• Red Delicious Apple.
• Types of grapes
• Concord
• Cotton Candy.
• Moon Drops.
• Flame Seedless.
• Dominga.
• Red Globe.
• Crimson.
• Black Muscat

Q40. Answer: (d) 545.19

Shortcut Trick
Initial Balance + Deposit − (5 × Cost per shirt) = Final Balance
713.39 + 450.75 − (5 × 123.79)
1164.14 − 618.95 = 545.19
Therefore The correct answer is 545.19.
Alternate Method
Given:
Initial amount in bank = Rs. 713.39
Amount deposited = Rs. 450.75
Number of shirts = 5
Cost of each shirt = Rs. 123.79
Calculations:
=> Total amount before withdrawal = 713.39 + 450.75
=> Total amount = 1164.14
=> Total cost of 5 shirts = 5 × 123.79
=> Total cost = 618.95
=> Current Balance = 1164.14 − 618.95
=> Current Balance = 545.19
Therefore The correct answer is 545.19.
Additional Information
BODMAS Rule
Always perform Multiplication before Addition or Subtraction in combined numerical expressions to maintain accuracy.
Bank Balance Concept

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A Deposit increases the account balance while a Withdrawal or expenditure decreases the account balance.

Decimal Calculations

When subtracting decimals, ensure decimal points are aligned vertically to prevent errors in digit positioning.

Q41. Answer: (b) Planaria

The correct answer is Planaria.

Key Points

• Planaria

• It is a flatworm with very simple 'eyes' that are really just eye spots that detect light.

• Flatworms are also called planarians.

Additional Information

• Pork tapeworms in the eye can cause blindness.

• The worm's eggs can also infect the brain, where they grow into cysts. (A person does not need to have an eye infection with the parasite for it to infect the brain; it can infect the brain from elsewhere in the body.)

• The Centers for Disease Control and Prevention (CDC) has identified them as Thelazia gulosa, a parasitic roundworm that typically grows between the outer membrane of the eyeball and the eyelid of a cow's eye.

• These worms are incredibly small, no bigger than the very tip of your finger

Q42. Answer: (a) 5/20

Calculation:

=> 3/15 = 0.2

=> 5/20 = 0.25

=> 8/64 = 0.125

=> 25/1000 = 0.025

Therefore The largest fraction is 5/20

Q43. Answer: (b) Only assumption I is implicit

The advertisement lists communication skills and a two-wheeler as a necessary selection criterion.

• That directly implies that the job will require a lot of travel, so assumption I is implicit.

• It has only given communication skills as a necessity, but it has not elaborated on which languages are required. So, assumption II is not implicit.

Hence the correct answer is option 2.

Q44. Answer: (d) Raj Kumar Hirani

The correct answer is Raj Kumar Hirani.

Key Points

• Raj Kumar Hirani is the director of the recent film 'Sanju'.

• Sanju is a 2018 Indian Hindi-language biographical comedy-drama film directed by Rajkumar Hirani and written by Hirani and Abhijat Joshi.

• It was jointly produced by Hirani and Vidhu Vinod Chopra under the banners Rajkumar Hirani Films and Vinod Chopra Films respectively.

Additional Information

• Karan Kumar Johar, often informally referred to as KJo, is an Indian filmmaker and television personality, who primarily works in Hindi Cinema.

• He has launched the careers of several successful actors under his own Dharma Productions.

• Sanjay Leela Bhansali is an Indian director, producer, screenwriter, and music director who is known for his work in Hindi cinema.

• He is the recipient of several awards, including five National Film Awards, ten Filmfare Awards, and a BAFTA nomination.

• Madhur Bhandarkar is an Indian film director, scriptwriter, and producer.

• He made his directorial debut with Trishakti and went on to direct several critically and commercially successful films.

• The drama film Chandni Bar, won him the National Film Award for Best Film on Social Issues.

Q45. Answer: (b) Gaganjeet Bhullar

The correct answer is Gaganjeet Bhullar.

Key Points

• Gangajeet Bhullar won the Bank BRI-JCB Indonesia Open for the second time in his career.

• Gaganjeet Singh Bhullar, an Indian professional golfer, has won the $300,000 BANK BRI-JCB Indonesia Open for the 2nd time in his career after closing with a four-under-par 68 at Pantai Indah Kapuk in Jakarta.

• With this win, Bhullar has become the 5th player after Thaworn Wiratchant of Thailand, Frank Nobilo of New Zealand, Frankie Minoza of the Philippines, and Lu His-chuen of Chinese Taipei to win the event twice.

Additional Information

• Shiv Kapur is an Indian professional golfer.

• He turned professional in 2004 and made a considerable impact in his second season on the Asian Tour by winning the season-ending Volvo Masters of Asia and finishing the year fourth on the Asian Tour Order of Merit. Kapur works with instructor Peter Murphy out of Dallas, Texas.

• He joined the European Tour in 2007, having earned enough as an affiliate member in 2006 to merit a tour card.

• Jeev Milkha Singh (born 15 December 1971) is an Indian professional golfer who became the first player from India to join the European Tour in 1998.

Q46. Answer: (c) 67

Given that:-

45 - 5 ÷ 6 + 10 × 2

Symbol	•	×	÷	•
Meaning	×	•	•	÷

• After replacing the symbols with their meanings, we get

45 ÷ 5 + 6 × 10 - 2

= 9 + 6 × 10 - 2

= 9 + 60 - 2

= 69 - 2

= 67

Hence, "option 3" is the correct answer.

Q47. Answer: (d) B

The logic followed here is:-

• All the elements are moving anticlockwise simultaneously.

• The arrow is moving anticlockwise along the sides of the square in the following order: up → left → bottom → right → up and so on. Also, the arrow is shaded in alternate figures.

• Thus, we need a shaded arrow that is placed towards the right side of the square. This is only possible in figure B.

Hence, "option 4" is the correct answer.

Q48. Answer: (c) BKEX

The logic followed here is:-

And,

Similarly,

Hence, "option 3" is the correct answer.

Q49. Answer: (b) 11

The correct answer is 11.

Key Points

• India's position in the 2018 FDI Confidence Index is 11.

• Global consultant AT Kearney on May 3, 2018, released the Foreign Direct Investment (FDI) Confidence Index 2018.

• The index ranked India at the 11th spot, three places down from the previous year.

• India retained its position as the second highest-ranked emerging market on the Index.

Additional Information

• India had ranked 112th among 153 countries in the Global Gender Gap Index 2020.

• India has slipped 28 places to rank 140th among 156 countries in the World Economic Forum's Global Gender Gap Report 2021, becoming the third-worst performer in South Asia.

• The WEF published its first gender gap index in 2006.

• India secured 168 rank in the 12th edition of the biennial Environment Performance Index (EPI Index 2020)

• It measured the environmental performance of 180 countries and was released by Yale University on June 4, 2020.

• India’s rank was 177 (with a score of 30.57 out of 100) in 2018.

Q50. Answer: (b) Convex Mirror

The correct answer is Convex Mirror.

Key Points

• A convex mirror is sometimes referred to as a diverging mirror due to the fact that incident light originating from the same point and will reflect off the mirror surface and diverge.

• After reflection, the light rays diverge; subsequently they will never intersect on the object side of the mirror.

Additional Information

• Concave mirror is called as converging mirror because it converges the Ray of light incident parallel to the mirror into a point called focus.

• A plane mirror is a mirror with a flat reflective surface.

• For light rays striking a plane mirror, the angle of reflection equals the angle of incidence.

• The angle of the incidence is the angle between the incident ray and the surface normal.

• The image formed by a plane mirror is always virtual and erect.

• The image formed by the plane mirror is virtual and erect i.e. image cannot be projected or focused on a screen.

• The distance of the image 'behind' the mirror is the same as the distance of the object in front of the mirror.

• The size of the image formed is the same as the size of the object.

Q51. Answer: (a) neither 1 nor 2 follows

The Venn diagram is given below:-

Conclusion:

1. Some black are pens. → False (it is possible but not definite.)

2. Some pencils are pens. → False (No pen is pencil, so this is not possible.)

Hence, "option 1" is the correct answer.

Additional Information

Q52. Answer: (a) Neither I nor II is implicit

The principal is suggesting the students to maintain cleanliness in routine work.

• From the statement, argument I can be clearly implied. So it follows.

• 'Cleanliness is next to godliness' is a phrase or idiom that relates cleanliness to spiritual and religious purity. It goes out of context, so it does not follow the statement.

Hence the correct answer is option 2.

Additional Information

• Argument I does not follow:

The principal's statement only stresses making cleanliness a daily habit or a routine work (like eating or bathing). The statement does not mention or divide cleanliness into specific categories like "environmental cleanliness." Introducing new terms or areas not mentioned in the statement makes the argument invalid.

• Argument II does not follow:

While "Cleanliness is next to godliness" is a universally known proverb, it relates cleanliness to spiritual or moral purity. The principal is speaking strictly about practical daily routines. In logical reasoning, universal sayings that change the context of the statement cannot be considered strong arguments.

Thus, Neither I nor II is implicit

Hence, the correct answer is "Option 1".

Q53. Answer: (a) Brother

The family tree is given below:-

• Man is the cousin of Kerthana or the son of Kerthana's aunt.

• Among the given options, the most suitable answer will be "brother".

Hence, "option 1" is the correct answer.

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Q54. Answer: (b) North Korea

The correct answer is North Korea.

Key Points

• Pyongyang is the capital of North Korea.

• Pyongyang is the capital and largest city of North Korea, where it is known as the "Capital of the Revolution".

• Pyongyang is located on the Taedong River about 109 km upstream from its mouth on the Yellow Sea.

• According to the 2008 population census, it has a population of 3,255,288.

Additional Information

• Phnom Penh, Cambodia's busy capital, sits at the junction of the Mekong and Tonlé Sap rivers.

• It was a hub for both the Khmer Empire and French colonialists.

• Seoul, the capital of South Korea, is a huge metropolis where modern skyscrapers, high-tech subways, and pop culture meet Buddhist temples, palaces and street markets.

• Hanoi, the capital of Vietnam, is known for its centuries-old architecture and a rich culture with Southeast Asian, Chinese and French influences.

Q55. Answer: (c) 5000 J

The correct answer is 5000 N.

Key Points Given that

Distance travelled by car (d) = 100 m

Force (f) = 50 N

Work done by car (W) = f * d

= 100 * 50

= 5000 N

So the work done by the car is 5000 N.

Q56. Answer: (c) Bustard

The logic followed here is,

• Leopard, Bear, and Deer are different types of animals.

• Bustard is a bird

Hence, "option 3" is the correct answer.

Q57. Answer: (b) 9000

Calculation:

Total number of tires produced in 2017 = 1,80,000

Number of tires produced by company C = 5%

According to the question

=> (1,80,000 × 5/100)

=> (1,800 × 5)

=> 9000

Therefore Required units of tires produced by company C is 9000

Q58. Answer: (d) Javed Akhtar

The correct answer is Javed Akhtar.

Key Points

• Veteran writer-lyricist Javed Akhtar has been honoured with the 2017 Hridaynath Mangeshkar Award at an event in Mumbai which marked the 28th anniversary of Hridayesh Arts and the 80th birthday of veteran music composer Hridaynath Mangeshkar.

• Hridaynath Mangeshkar is an Indian music director.

• He is the only son of musician Deenanath Mangeshkar and the younger brother of Lata Mangeshkar and Asha Bhosle.

• He is popularly known as Balasaheb in the music and film industry.

Additional Information

• Krishnan Nair Shantakumari Chithra credited as K. S. Chithra or Chithra, is an Indian playback singer and Carnatic musician.

• In a career spanning over four decades, she has recorded over 25,000 songs in various Indian languages including Malayalam, Telugu, Tamil, Kannada, Hindi, Odia, Bengali, Punjabi, Gujarati, Tulu, Rajasthani, Urdu, Sanskrit, Badaga, Marathi Language as well as foreign languages such as Malay, Latin, Arabic, Sinhalese, English, and French.

• Sripathi Panditaradhyula Balasubrahmanyam, also known as SPB or Balu, was an Indian playback singer, television presenter, music director, actor, and film producer who worked predominantly in Telugu, Tamil, Kannada, Hindi, and Malayalam films.

• Sampooran Singh Kalra, known professionally as Gulzar or Gulzar Saab, is an Indian lyricist, poet, author, screenwriter, and film director.

• He started his career with music director S.D.

Q59. Answer: (b) 150 J

The correct answer is 150 J.

Key Points

• Given that

• Mass of the object (m) = 12 kg

• Velocity of the object (v) = 5 m/s

• Hence,

• Kinetic Energy (KE) = 1/2 * m * $(v)^2$

• Kinetic Energy (KE) = 1/2 * 12 * $(5)^2$

• KE = 150 J

• So the Kinetic Energy possessed by the body is 150 J.

Q60. Answer: (d) D

• The pattern that bears the closest resemblance to the question figure is figure D.

• The mirror image of the question figure is figure D.

Hence, "option 4" is the correct answer.

Q61. Answer: (a) D

The logic followed here is:-

• A triangle is given in the first figure and three dots are given at its 3 corners

• The next figure is a square and the dots are given at its four corners.

• Similarly, in the third figure, a square is given and the dots are at the four corners of the square.

• In the fourth figure, we will have a pentagon with dots at its five corners.

Hence, "option 1" is the correct answer.

Q62. Answer: (b) [figure]

Given: Solar System, Earth, Jupiter

• Earth and Jupiter both are planets of the Solar System.

• There is no relation between Earth and Jupiter but both come under the Solar System.

• Venn diagram according to the given information:-

Hence, "option 2" is the correct answer.

Q63. Answer: (b) Oxygen

The correct answer is Oxygen.

Key Points

• 2, 6 is the electronic configuration of the Oxygen.

• The atomic number of oxygen is 8, so it has a total of 8 electrons.

• The first two electrons occupy the K shell.

• The remaining six electrons will go to the L shell.

• Therefore, the Oxygen electron configuration will be 2,6.

Additional Information

• The electron configuration of an element describes how electrons are distributed in their atomic orbitals.

• Electron configurations of atoms follow a standard notation in which all electron-containing atomic subshells (with the number of electrons they hold written in superscript) are placed in a sequence.

• The atomic number or proton number (symbol Z) of a chemical element is the number of protons found in the nucleus of every atom of that element.

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Q64. Answer: (c) 600

Shortcut Trick

Pick the largest number 40 and check its multiples.

Multiples of 40: 40, 80, 120, 160, 200, 240, 280, 320, 360, 400, 440, 480, 520, 560, 600.

Check divisibility: 600 is divisible by 20, 40, 25, and 30.

Therefore The correct answer is 600.

Alternate Method

Given: Numbers 20, 40, 25, 30

Formula Used: Prime Factorization Method

=> Prime factors of 20 = $2 \times 2 \times 5 = 2^2 \times 5^1$

=> Prime factors of 40 = $2 \times 2 \times 2 \times 5 = 2^3 \times 5^1$

=> Prime factors of 25 = $5 \times 5 = 5^2$

=> Prime factors of 30 = $2 \times 3 \times 5 = 2^1 \times 3^1 \times 5^1$

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

=> LCM = $8 \times 3 \times 25 = 600$

Therefore The correct answer is 600.

Additional Information

Definition of LCM

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

Relationship between HCF and LCM

For two numbers a and b, the product of the numbers is equal to the product of their HCF and LCM: $a \times b = HCF(a, b) \times LCM(a, b)$.

LCM of Fractions

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

Q65. Answer: (a) Agricultural work

The correct answer is Agricultural work.

Key Points

• Agricultural work awards were given by the Union Ministry of Agriculture and Farmers Welfare to Tamil Nadu, Himachal Pradesh and Tripura for record production of food grains during 2015-16.

• The Union Ministry of Agriculture and Farmers Welfare has selected Tamil Nadu, Himachal Pradesh, and Tripura for the Krishi Karman awards for their record performance in the production of food grains during 2015-16.

• Apart from these states, Meghalaya would get a commendation prize for total food grain production and would be given a cash award of Rs 1 crore.

Additional Information

• Krishi Karman awards were instituted in 2010-11 by the Union Ministry of Agriculture and Farmers Welfare to reward the best performing States in the production of foodgrains and individual crops of Rice, Wheat, Pulses, and Coarse Cereals.

• Totally, eight awards are given, including three for the States with the highest foodgrains production in three identified categories-large, medium and small, and five awards are given for highest production under each of the crops Rice, Wheat, Pulses, Coarse Cereals, and Oilseeds.

• Tamil Nadu had produced 130 lakh tonnes of foodgrains in 2015-16, which is the highest in the last five years. In terms of yield in foodgrains, the state managed to get a yield of 3.38 tonnes per hectare as against the all-India average of 2.028 tonnes per hectare, which is 67% more than the national average.

• Tripura has been selected for the Krishi Karman Award 2015-16 for a commendable increase in food grain production in small category states.

• The state produced 825,000 tonnes of food grain in 2016. The state would also receive a cash award of Rs five crore.

• Tripura gets this national award for the second time.

• The state targets to produce 935,000 tonnes of food grain in 2017.

Q66. Answer: (c) Dissolving sulfuric acid in water

The correct answer is Dissolving sulfuric acid in water.

Key Points

• The hydration reaction of sulfuric acid is highly exothermic.

• If water is added to concentrated sulfuric acid, it can boil and spit dangerously.

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• One should always add the acid to the water rather than the water to the acid.

Additional Information

• An exothermic reaction is defined as a reaction that releases heat and has a net negative standard enthalpy change.

• Exothermic reactions are reactions that release energy into the environment in the form of heat.

• Examples include any combustion process, rusting of iron, and freezing of water.

• Endothermic Reaction

• A reaction that the system absorbs energy from its surrounding in the form of heat.

• The energy is absorbed from the surrounding into the reaction

• Melting ice, evaporation, cooking, gas molecules, photosynthesis are a few examples

Q67. Answer: (a) 17

The triangles are as follows:

The total number of triangles is 17.

Hence, "option 1" is the correct answer.

Q68. Answer: (d) Fe

The correct answer is Fe.

Key Points

• Corrosion is defined as the degradation of metals due to an electrochemical process.

• Corrosion is a natural process that converts a refined metal into a more chemically stable form such as oxide, hydroxide, carbonate, or sulfide.

• It is the gradual destruction of materials (usually a metal) by chemical and/or electrochemical reactions with their environment.

• Examples of corrosion: Rusting of iron(Fe).

• Crevice corrosion in aluminium alloys and stainless steel.

Additional Information

• Gold (Au) corrosion is the deterioration of gold as a result of a chemical reaction between gold and another substance.

• Gold corrosion is very difficult to induce because gold does not react easily with other substances - including oxygen - which makes gold corrosion very rare.

• Platinum is a silver-white metal — it was once known as "white gold."

• It is extremely resistant to tarnishing and corrosion (which makes it known as a "noble metal") and is very soft and malleable.

• Aluminium corrosion is the gradual decay of aluminium molecules into their oxides that degrades their physical and chemical properties.

• By nature, aluminium is a reactive metal but it is also a passive metal.

Q69. Answer: (a) Both I and II are strong.

The statement asks whether the tuition fee for higher education be increased or not.

• Argument agrees with increasing the fees, justifying that if people pay more, they will be more serious and that will help in improving the quality of the students. Thus, it is logically strong.

• Argument II suggests that the fees should not be increased since people may not be able to afford to pay for it and that would result in a decrease in the number of educated people. Thus, it also makes a strong point.

Hence the correct answer is option 1.

Additional Information

1. The agreement which is the reconstruing part of the statement is a strong agreement.
2. The argument should not be imagined.
3. The relationship of the agreement should be direct from the statement.
4. The argument should be simple and clear.
5. The agreement should be based on scientific facts.
6. The statement in the argument should receive a logical answer.

Q70. Answer: (b) 5

The correct answer is 5.

Key Points

• The number of moles present in 90 g of water is 5.

• Given,

• Mass(m) = 90 gm
• The molecular mass of H2O = (1×2)+(1×16)
• Molecular mass of H20 = 18
• No. of moles = given mass in gram/molecular mass
• No of moles = 90over18
• No of moles = 5
• Hence 90 g of H20 contains 5 moles.

Q71. Answer: (b) 175

Shortcut Trick
Given that 108% → 189
To find the Original Number (100%):
Value = (189 ÷ 108) × 100
Value = 1.75 × 100 = 175
Therefore The correct answer is 175.
Alternate Method
Given:
Percentage value = 108%
Resulting value = 189
Formula Used:
Number = (Value ÷ Percentage) × 100
Calculations:
=> Let the number be x.
=> 108% of x = 189
=> (108 ÷ 100) × x = 189
=> 1.08x = 189
=> x = 189 ÷ 1.08
=> x = 175
Therefore The correct answer is 175.
Additional Information
Percentage Change
Percentage change = [(New Value − Original Value) ÷ Original Value] × 100.
Fraction to Percentage
To convert a fraction to a percentage, multiply the fraction by 100 and add the % symbol.
Base Change Rule
If A is x% more than B, then B is [x ÷ (100 + x)] × 100% less than A.

Q72. Answer: (a) 76

Shortcut Trick
In a period of 100 years, the number of leap years is either 24 or 25.
If the 100^(th) year is not a leap year (like 1900), there are 24 leap years.
Number of normal years (P) = Total years − Leap years
P = 100 − 24 = 76
Therefore The correct answer is 76.
Alternate Method
Given: Total years = 100, Normal years = P.
=> A year is a leap year if it is divisible by 4, but century years must be divisible by 400.
=> In any 100-year block (e.g., 1 to 100), the multiples of 4 are: 4, 8, ..., 96, 100.
=> Total multiples of 4 = 100 ÷ 4 = 25.
=> If the year 100 is not divisible by 400, it is a normal year.
=> Number of leap years = 25 − 1 = 24.
=> Number of normal years (P) = 100 − 24 = 76.

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Therefore The correct answer is 76.

Additional Information

Leap Year Calculation

A normal year has 365 days, while a leap year has 366 days (February has 29 days).

Century Year Rule

A century year (ending in 00) is a leap year only if it is perfectly divisible by 400 (e.g., 1600, 2000).

Odd Days

A normal year has 1 odd day (365 ÷ 7 leaves remainder 1) and a leap year has 2 odd days.

Q73. Answer: (a) 144

Shortcut Trick

The Area of a Quadrilateral when a diagonal and perpendiculars (offsets) from opposite vertices are given is:

Area = 1/2 × Diagonal × (Sum of Perpendiculars)

=> Area = 1/2 × 12 × (9 + 15)

=> Area = 6 × 24 = 144

Therefore The correct answer is 144.

Alternate Method

Given:

Length of the diagonal (AC) = 12 units

Length of perpendicular 1 (h1) = 9 units

Length of perpendicular 2 (h2) = 15 units

Formula Used:

Area of Quadrilateral = Area of triangle ABC + Area of triangle ADC

Area = (1/2 × AC × h1) + (1/2 × AC × h2) = 1/2 × AC × (h1 + h2)

Calculations:

=> Area of triangle ABC = 1/2 × 12 × 9 = 54 sq. units

=> Area of triangle ADC = 1/2 × 12 × 15 = 90 sq. units

=> Total Area = 54 + 90

=> Total Area = 144 sq. units

Therefore The correct answer is 144.

Additional Information

Area of a Triangle

The basic formula for the area of any triangle is 1/2 × base × height, where the height is the perpendicular distance from the base to the opposite vertex.

Heron's Formula

For a triangle with sides a, b, and c, the area is √(s(s−a)(s−b)(s−c)), where s is the semi-perimeter (a+b+c)/2.

Area of Special Quadrilaterals

For a Rhombus, Area = 1/2 × d1 × d2. For a Trapezium, Area = 1/2 × (sum of parallel sides) × height.

Q74. Answer: (c) grandson

The family tree is given below:-

Suma's brother Surya is the grandson of Sunayna.

Hence, "option 3" is the correct answer.

Q75. Answer: (b) Mass of the falling object m

The correct answer is Mass of the falling object m.

Key Points

• The value of g doesn't depend on the mass of the falling body or object because it is not constant.

• It has both magnitudes as well as direction.

• Acceleration due to gravity is a constant quantity.

Additional Information

• The value of g is independent of the mass of the object and only dependent upon location - the planet the object is on and the distance from the center of that planet.

• g = GMoverR², where G is the universal gravitational constant, M is the mass of the planet, and R is the distance of the point under consideration from the center of the planet.

• Since G is a constant g depends on the mass of the planet and the location.

Q76. Answer: (c) It consists of three parts, two lateral cerebellar hemispheres and a central vermix.

The correct answer is It consists of three parts, two lateral cerebellar hemispheres and a central vermix.

Key Points

• The brain has three main parts: the cerebrum, cerebellum, and brainstem.

• The cerebrum is the largest part of the brain and is composed of the right and left hemispheres.

• The cerebellum is located under the cerebrum.

• The brainstem acts as a relay centre connecting the cerebrum and cerebellum to the spinal cord.

Additional Information

• The brain works as a single organ but is divided into areas of special expertise and function.

• The forebrain, midbrain, and hindbrain make up the three major parts of the brain.

• The hindbrain also referred to as the brainstem, is made of the medulla, pons, cranial nerves, and back part of the brain called the cerebellum.

• The cerebrum (front of brain) comprises gray matter (the cerebral cortex) and white matter at its centre.

The largest part of the brain, the cerebrum initiates and coordinates movement and regulates temperature.

Q77. Answer: (b) UMANG

The correct answer is UMANG.

Key Points

• India’s Umang App has won the Best M-Government Service award in the Accessible Government category while Aadhaar won the best emerging technology award at the recently concluded 6th edition of the World Government Summit 2018 in Dubai, where India had the status of ‘Guest of Honour’ country.

• The summit acknowledged technology pioneers for providing global solutions to global challenges.

• The mobile application “Umang App” provides users with a unified platform that combines government departments and services, facilitating transactions for citizens.

• The award acknowledged the Government of India’s efforts to provide convenient services to its citizens.

Additional Information

• Gujarat Gas Limited is an Indian natural gas distribution company, owned by Gujarat State Petroleum Corporation. Established in 1980, and headquartered in Ahmedabad, the company operates primarily in Gujarat.

• It is India's largest city gas distribution company.

• Iixigo is an Indian AI-based online travel portal, launched in 2007.

• Headquartered in Gurgaon, ixigo aggregates and compares real-time travel information, prices, and availability for flights, trains, buses, and hotels, and allows ticket booking through its associate websites and apps.

• Paytm is an Indian multinational technology company that specializes in digital payment systems, e-commerce and financial services, based in Noida.

Q78. Answer: (d) Science and Technology

The correct answer is Science and Technology.

Key Points

• ISRO chairman A.S. Kiran Kumar was conferred with the 'SIES-Shri Chandrashekharendra Saraswati National Award for Prominence' in Science and Technology.

• As Kiran Kumar, the former chairperson of the Indian Space Research Organisation was conferred France’s highest civilian award – Chevalier of Order of the Legion of Honour – for his contribution to India-France space cooperation.

• The Indian Space Research Organisation is the national space agency of India, headquartered in Bengaluru.

• It operates under the Department of Space which is directly overseen by the Prime Minister of India, while the Chairman of ISRO acts as the executive of DOS as well.

Additional Information

• Vikram Sarabhai was the first chairman of ISRO.

• ISRO was formed by Vikram Sarabhai in the year 1969.

• Vikram Ambalal Sarabhai was an Indian physicist and astronomer who initiated space research and helped develop nuclear power in India.

• He was honoured with Padma Bhushan in 1966 and the Padma Vibhushan in 1972.

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• He is internationally regarded as the Father of the Indian Space Program.

• India decided to go to space when Indian National Committee for Space Research (INCOSPAR) was set up by the Government of India in 1962.

• ISRO created history by launching 104 satellites in a single flight in Feb 2017.

• Indian Space Research Organisation's workhorse rocket PSLV launched 104 satellites in a single mission from the space centre at Sriharikota, Andhra Pradesh.

Q79. Answer: (d) B

The logic followed here is:-

• Figure A - J and its water image

• Figure B - F and its mirror image-

• Figure C - M and its water image

• Figure D - A and its water image

• Thus, figure B is different from others.

Hence, "option 4" is the correct answer.

Q80. Answer: (c) 1/5

Given:

Number of melons accounted of the total fruit = 1/5

Number of banana of the remaining weight = 3/4

Calculation:

LCM of 5 and 4 is 20

Efficiency of melons = (1/5 × 20) = 4

Remaining fruits = (20 – 4) = 16

Efficiency of banana on remaining fruits = (3/4 × 16) = 12

Remaining fruits of pineapple = (16 – 12) = 4

Total weight of the fruit was that of pineapple = (4/20)

=> 1/5

Therefore Required part is 1/5

Q81. Answer: (a) 7/2

Shortcut Trick

Given angle A = 60°, directly substitute trigonometric values.

sin 60° = √3/2, cos 60° = 1/2, tan 60° = √3

Expression = $(\sin 60°)^2 - (\cos 60°)^2 + (\tan 60°)^2$

=> (3/4) − (1/4) + 3 = 2/4 + 3 = 1/2 + 3 = 7/2

Therefore The correct answer is 7/2.

Alternate Method

Given: angle B = 90° and angle A = 60° in a triangle.

Formula Used: $\sin^2\theta - \cos^2\theta + \tan^2\theta$

=> Substitute angle A = 60° in the given expression:

=> $\sin^2 60° - \cos^2 60° + \tan^2 60°$

=> $(\sqrt{3}/2)^2 - (1/2)^2 + (\sqrt{3})^2$

=> 3/4 − 1/4 + 3

=> (3 − 1)/4 + 3

=> 2/4 + 3

=> 0.5 + 3 = 3.5

=> 7/2

Therefore The correct answer is 7/2.

Additional Information

Trigonometric Identities

Fundamental identities include $\sin^2\theta + \cos^2\theta = 1$ and $1 + \tan^2\theta = \sec^2\theta$.

Values of 60°

sin 60° = √3/2; cos 60° = 1/2; tan 60° = √3; sec 60° = 2.

Angle Sum Property

The sum of all internal angles in a triangle is always 180°. Here, angle C = 180° − (90° + 60°) = 30°.

Q82. Answer: (a) Both A and B are true

The correct answer is Both A and B are true.

Key Points

• Solid is the state in which matter maintains a fixed volume and shape.

• The liquid is the state in which matter adapts to the shape of its container but varies only slightly in volume, and gas is the state in which matter expands to occupy the volume and shape of its container.

• So A is true.

• Filling a vessel of water:

• It is a property of matter, which decreases in volume under high pressure (compressibility), and Gas shows this property.

• So B is true.

Additional Information

• Matter can be classified as solid, liquid, and gas on the basis of interparticle forces and the arrangement of particles.

• These three forms of matter are interconvertible by increasing or decreasing pressure and temperature.

• For example, ice can be converted from a solid to a liquid by increasing the temperature.

Q83. Answer: (b) Soliciting votes on the basis of caste, community, religion or language

The correct answer is Soliciting votes on the basis of caste, community, religion or language.

Key Points

• The High Court of India delivered an important judgment in January 2017, according to which political parties and politicians cannot do soliciting votes on the basis of caste, community, religion, or language.

• The Supreme Court reaffirmed the secular character of the Indian state, ruling that election candidates cannot seek votes on the grounds of the religion, caste, creed, community, or language of voters.

Additional Information

• “The Constitution forbids the state from mixing religion with politics," ruled a seven-judge constitution bench headed by Chief Justice T.S. Thakur after a split verdict.

• “The state being secular in character will not identify itself with any one of the religions or religious denominations.

• This necessarily implies that religion will not play any role in the governance of the country which must at all times be secular in nature.

• The election is a secular exercise just as the functions of the elected representatives must be secular in both outlook and practice,

Q84. Answer: (d) 6

The correct answer is 6.

Key Points

• By 1998, Cavalier-Smith had reduced the total number of kingdoms from eight to six: Animalia, Protozoa, Fungi, Plantae (including red and green algae), Chromista, and Bacteria.

• Eukaryotes are divided into two major groups: Unikont and Bikont.

• In 1998 British zoologist Thomas Cavalier-Smith presented yet another classification scheme, the six-kingdom system, which contained kingdom Bacteria with two subdivisions, Eubacteria and Archaebacteria.

Additional Information

• The phylogenetic system of classification is based on evolutionary and genetic relationships of the plants which enable us to find out ancestral and derived characters of any taxon.

• The system of classification was put forward by Engler and Prantl.

• The ancestor and the related organisms were studied for the classification of the organism.

Q85. Answer: (d) 4 hours

Shortcut Trick

Combined efficiency of A + B + C = 1/2.4 = 10/24 = 5/12 units/hr.

Combined efficiency of A + C = 1/8 + 1/24 = (3 + 1)/24 = 4/24 = 1/6 units/hr.

Efficiency of B = (A + B + C) − (A + C) = 5/12 − 1/6 = (5 − 2)/12 = 3/12 = 1/4 units/hr.

Time taken by B (P) = 1 ÷ (1/4) = 4 hours.

Therefore The correct answer is 4 hr.

Alternate Method

Person/Pipe	Days/Hours	Total Work	Efficiency
Pipe A	8	24	24 ÷ 8 = 3
Pipe C	24	24 ÷ 24 = 1	
A + B + C	2.4	24 ÷ 2.4 = 10	

Given: Time taken by A = 8 hr, C = 24 hr, and (A+B+C) = 2.4 hr.

Formula Used: Total Work = Efficiency × Time

=> Efficiency of (A + B + C) = 10

=> Efficiency of A + Efficiency of B + Efficiency of C = 10

=> 3 + Efficiency of B + 1 = 10

=> Efficiency of B = 10 − 4 = 6

=> P (Time for Pipe B) = Total Work ÷ Efficiency of B

=> P = 24 ÷ 6 = 4 hours.

Therefore The correct answer is 4 hr.

Additional Information

Pipes and Cisterns Logic

If an inlet pipe fills a tank in x hours and an outlet pipe empties it in y hours, the net work done in 1 hour is (1/x − 1/y).

Total Work Assumption

Total work is always assumed to be the LCM of the individual times taken by the pipes to make calculations easier.

Q86. Answer: (b) 0.699995 ≤ x < 0.700005

Given:

x is rounded off to 5 decimal places in 0.70000

Concept used:

Decimal numbers - A number whose whole number part and fractional part are separated by a decimal point.

Calculation:

x is rounded off to 5 decimal places in 0.70000

Hence if digit is 6th decimal place was 5 or more

Then, digit at decimal place was increase by 1

Hence interval start from 0.699995 and goes upto 0.700005

Hence upto 0.700005 where 0.700005 is not included

Hence interval = 0.699995 ≤ x < 0.700005

Therefore The required value of x is 0.699995 ≤ x < 0.700005

Q87. Answer: (d) kinetic energy

The correct answer is Kinetic energy.

Key Points

• A bullet fired from a gun goes deep inside the target because it contains Kinetic energy.

• A bullet fired from a gun possesses very high kinetic energy because of its high velocity.

• This kinetic energy of the bullet does work on the object that it hits or strikes.

• Therefore, the bullet pierces its target because of the high kinetic energy possessed by virtue of its motion.

Additional Information

• Heat energy is the result of the movement of tiny particles called atoms, molecules, or ions in solids, liquids, and gases.

• Heat energy can be transferred from one object to another.

• The transfer of flow due to the difference in temperature between the two objects is called heat.

• Potential energy, stored energy that depends upon the relative position of various parts of a system.

• Spring has more potential energy when it is compressed or stretched.

• A steel ball has more potential energy raised above the ground than it has after falling to Earth.

• 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.

Q88. Answer: (c) 30

Calculation:

The units of personal computers were sold by company XYZ in the year 2010 = 30 lakhs

Therefore The required personal computers sold is 30

Q89. Answer: (c) 6 hours

Shortcut Trick

Net Rate = Filling Rate − Emptying Rate

1/12 = 1/4 − 1/T_(empty)

1/T_(empty) = 1/4 − 1/12 = (3 − 1)/12 = 2/12 = 1/6

Therefore The correct answer is 6 hr.

Alternate Method

Tap	Time (hr)	Total Work (LCM)	Efficiency
Tap 1 (Fill)	4	12 units	+3
Tap 1 + Tap 2	12	+1	

Given: Filling time = 4 hr, Combined time = 12 hr.

Formula Used: Efficiency = Total Work ÷ Time

=> Efficiency of Tap 1 = +3 units/hr

=> Efficiency of Tap 1 + Tap 2 = +1 unit/hr

=> Efficiency of Tap 2 (Emptying) = (Tap 1 + Tap 2) − Tap 1

=> Efficiency of Tap 2 = 1 − 3 = −2 units/hr

=> Time for Tap 2 to empty = Total Work ÷ Efficiency

=> Time = 12 ÷ 2 = 6 hr

Therefore The correct answer is 6 hr.

Additional Information

Pipes and Cisterns Rule

If an inlet pipe fills a tank in 'x' hours and an outlet pipe empties it in 'y' hours, then the net work in 1 hour is (1/x − 1/y).

Negative Efficiency

In tank problems, outlet pipes or leaks are always assigned negative efficiency as they perform work in the opposite direction of the filling pipes.

Q90. Answer: (d) Rs. 24

Shortcut Trick

Sum: 14 Apples + 14 Oranges = 57 + 69 = 126 => 1 Apple + 1 Orange = 9

Diff: 4 Apples − 4 Oranges = 69 − 57 = 12 => 1 Apple − 1 Orange = 3

Cost of 1 Apple = (9 + 3) ÷ 2 = 6; Cost of 1 Orange = (9 − 3) ÷ 2 = 3

Required cost = (3 × 6) + (2 × 3) = 18 + 6 = 24

Therefore The correct answer is Rs. 24.

Alternate Method

Given:

Cost of 5 Apples + 9 Oranges = Rs. 57

Cost of 9 Apples + 5 Oranges = Rs. 69

Formula Used:

Linear Equations in two variables: ax + by = c and bx + ay = d

Calculations:

Let the cost of one Apple be 'A' and one Orange be 'O'.

=> 5A + 9O = 57 --- (i)

=> 9A + 5O = 69 --- (ii)

Adding (i) and (ii):

=> 14A + 14O = 126

=> A + O = 9 --- (iii)

Subtracting (i) from (ii):

=> 4A − 4O = 12

=> A − O = 3 --- (iv)

Adding (iii) and (iv):

=> 2A = 12 => A = 6

Substituting A = 6 in (iii):

=> 6 + O = 9 => O = 3

Required Cost = 3A + 2O

=> Required Cost = (3 × 6) + (2 × 3) = 18 + 6 = 24

Therefore The correct answer is Rs. 24.

Additional Information

Sum and Difference Method

When coefficients are interchanged (ax + by = m and bx + ay = n), always find (x + y) and (x − y) first to simplify calculations.

Substitution Method

Express one variable in terms of another from one equation and substitute it into the second equation to find the values.

Cross-Multiplication Rule

For a1x + b1y + c1 = 0, the value of x is (b1c2 − b2c1) ÷ (a1b2 − a2b1).

Q91. Answer: (b) both conclusions follow

• In the statement, the chairman of the cricket board declares that they will be interviewing those who were former wicket-keepers for the coaching position.

• Thus, conclusion I clearly follows.

• Since the word "people" is used in the question statement, the possibility of more than one person being interviewed does exist. Thus, conclusion II also follows.

Hence the correct answer is option 2.

Q92. Answer: (d) V/I

The correct answer is V/I.

Key Points

• According to Ohm's law, VoverI is constant.

• According to Ohm’s Law, Current Increases when Voltage increases (I=V/R), but Current decreases when Voltage increases according to the (P = VI) formula.

• According to Ohm’s Law: I prop. to V (Current directly proportional to the Voltage, I = V/R)

• According to Power Formula: I prop. to 1/V (Current is inversely proportional to the Voltage. I=PoverV)

• In short, according to Ohm’s Law (V = IR or I=VoverR) which shows that Current is directly proportional to the Voltage, but according to P=VI or I=PoverV

• It shows that the current is inversely proportional to the Voltage.

Additional Information

• 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.

Q93. Answer: (c) 525

Shortcut Trick

Assume Selling Price (SP) is 100%.

Raw materials = 30%, Wages = 35%.

Profit percentage = 100% − (30% + 35%) = 35%.

Profit amount = 35% of Rs. 1,500.

Profit = 35 × 15 = Rs. 525.

Therefore The correct answer is Rs. 525.

Alternate Method

Given: Selling Price = Rs. 1,500 | Raw material = 30% of SP | Wages = 35% of SP.

Formulas: Total Cost = Raw Materials + Wages | Profit = Selling Price − Total Cost.

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=> Cost of Raw Materials = 30% of 1,500 = (30 ÷ 100) × 1,500 = Rs. 450.

=> Cost of Wages = 35% of 1,500 = (35 ÷ 100) × 1,500 = Rs. 525.

=> Total Expenditure = 450 + 525 = Rs. 975.

=> Profit Amount = 1,500 − 975 = Rs. 525.

Therefore The correct answer is Rs. 525.

Additional Information

Profit Calculation on SP

Generally, profit is calculated on Cost Price (CP), but in this specific problem, the investment percentages are explicitly linked to the Selling Price (SP).

Percentage Breakdown

When components are given as percentages of the same base (SP), they can be added directly: Total % = %A + %B + %C.

Q94. Answer: (c) Jhoom

The correct answer is Jhoom.

Key Points

• Shifting cultivation is a form of agricultural practice in which farmers clear an area of land by slashing vegetation and burning forests for agricultural purposes.

• This practice is also known as slash-and-burn agriculture or slash-and-burn cultivation.

• Jhum or Jhoom cultivation is also known as shifting cultivation or cultivation or slash and burn cultivation.

• Jhum cultivation was practised in Central Highland.

Additional Information

• Swidden agriculture, also known as shifting cultivation, refers to a technique of rotational farming in which land is cleared for cultivation (normally by fire) and then left to regenerate after a few years.

• This technique is often used in LEDCs (Less Economically Developed Countries) or LICs (Low-Income Countries). In some areas, cultivators use a practice of slash-and-burn as one element of their farming cycle.

• Others employ land clearing without any burning, and some cultivators are purely migratory and do not use any cyclical method on a given plot.

Q95. Answer: (a) 27 years and 3 years

Shortcut Trick

Check options for the 9 times relationship: 27 = 9 × 3 (True), 30 ≠ 9 × 6 (False).

Verify after 2 years: Father = 27 + 2 = 29 years, Son = 3 + 2 = 5 years.

Condition check: (6 × Son's age) + 1 = (6 × 5) + 1 = 31 ≠ 29 (Wait, let's re-read the condition).

Condition is: Father = 6 × Son + 1 → 29 ≠ 31. Let's re-verify the wording '6 times as old as his son by 1 year' which usually means Father = 6S − 1 or 6S + 1. If Father is 29 and Son is 5, then 29 is 1 less than 6 × 5.

Therefore The correct answer is 27 years and 3 years.

Alternate Method

Given: Present age ratio is 9:1. After 2 years, Father is 1 year less than 6 times Son's age.

=> Let the present age of the son be x years.

=> Then, the present age of the man = 9x years.

=> After 2 years: Man = 9x + 2, Son = x + 2.

=> According to the condition: 9x + 2 = 6(x + 2) − 1

=> 9x + 2 = 6x + 12 − 1

=> 9x − 6x = 11 − 2

=> 3x = 9 => x = 3.

=> Present ages: Son = 3 years, Father = 9 × 3 = 27 years.

Therefore The correct answer is 27 years and 3 years.

Additional Information

Ratio of Ages

If the ratio of ages is a:b, we assume ages as ax and bx to form linear equations based on time shifts.

Age Difference

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

Linear Equations in Ages

Problems involving 'n years ago' require subtracting n from present ages, while 'n years hence' require adding n.

Q96. Answer: (d) ethene

The correct answer is ethene.

Key Points

• On heating ethanol at 443K with more concentrated H2SO4, in the dehydration of ethanol, ethene is released.

• The dehydration of ethanol to give ethene.

• Ethanol is heated with an excess of concentrated sulphuric acid (act as a catalyst) at a temperature of 170C.

• The gases produced are passed through sodium hydroxide solution to remove the carbon dioxide and sulphur dioxide produced from side reactions.

• The ethene is collected over water.

• CH3−CH2−OH + H_(2)SO4→ CH2=CH2 + H2O

Additional Information

• The acid catalysts normally used in alcohol dehydration are either concentrated sulfuric acid or concentrated phosphoric(V) acid, H3PO4.

• Concentrated sulfuric acid produces messy results.

• Because sulfuric acid is also a strong oxidizing agent, it oxidizes some of the alcohol to carbon dioxide and is simultaneously reduced itself to sulfur dioxide.

• Both of these gases must be removed from the alkene. Sulfuric acid also reacts with alcohol to produce a mass of carbon.

• There are other side reactions as well.

Q97. Answer: (d) Tennis

The correct answer is Tennis.

Key Points

• Sumit Prakash Gupta and Saket Sai Myneni, who won the boys double's title of the DSCL National Tennis Championship.

• Tennis is a racket sport that can be played individually against a single opponent or between two teams of two players each.

• Each player uses a tennis racket that is strung with a cord to strike a hollow rubber ball covered with felt over or around a net and into the opponent's court.

Additional Information

• Badminton is a racquet sport played using racquets to hit a shuttlecock across a net.

• Although it may be played with larger teams, the most common forms of the game are "singles" and "doubles".

• Athletics is the most common type of athletics competition are track and field, road running, cross country running, and racewalking.

• Organized athletics are traced back to the Ancient Olympic Games from 776 BC.

• Kabaddi is a contact team sport.

• It was introduced about 4000 years ago in Tamil Nadu, India.

• Played between two teams of seven players, the objective of the game is for a single player on offence.

Q98. Answer: (a) Nephew

The family tree is given below:-

In the question, given "The child identifies Akhil as his mother's younger brother".

Here, the word "HIS" is denote that child is a male.

Therefore, the child is Akhil's nephew.

Hence, "option 1" is the correct answer.

Q99. Answer: (b) electric heater

The correct answer is electric heater.

Key Points

• When the electric current passes through the wire in the electric heater it becomes hot.

• This effect is known as the heating effect of the electric current.

• An electric heater is based on the heating effect of electric current.

• A fuse is a piece of wire of a material with a very low melting point.

• The electric fuse works on the principle of the heating effect of electric current.

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Additional Information

• Microwave ovens work on the principle of conversion of electromagnetic energy into thermal energy.

• Electromagnetic (EM) energy refers to the radiation (waves) comprising an electrical field and magnetic field oscillating perpendicular to each other.

• The electric fan works on the principle of electromagnetic induction; the electric fan works by the use of the electric motor.

• The coil of wires wounded on the metallic core is attached with the electric motor, and then in this arrangement of the wires, the current is passed.

• A bell works with the principle of working of electromagnetism. When the switch is pushed on, the circuit gets completed and the current starts flowing through the U-shaped electromagnet which creates a magnetic field in the core.

Q100. Answer: (a) father of taxonomy

The correct answer is father of taxonomy.

Key Points

• Carl Linnaeus is known as the father of taxonomy.

• Carl Linnaeus (1707 - 1778) was a Swedish botanist who devised the binomial classification system, a two-part naming system to identify, classify and name organisms from bacteria to the elephant.

Additional Information

• The ancient Greek Theophrastus (371–286 B.C.E.) is known as the father, or founder, of botany.

• He wrote two large books, On the History of Plants and On the Causes of Plants.

• Robert Oppenheimer (1904-1967) was an American theoretical physicist. During the Manhattan Project, Oppenheimer was director of the Los Alamos Laboratory and responsible for the research and design of an atomic bomb.

• He is often known as the “father of the atomic bomb."

• Aristotle is considered the father of zoology because of his major contributions to zoology which include a huge amount of information regarding the variety, structure, behaviour of animals, the analysis of the different parts of living organisms, and the beginnings of the science of taxonomy.

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