RRC Group D Previous Year Paper 5 (Held On: 23 Sep 2018 Shift 1)

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

Take this paper as a timed mock test

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

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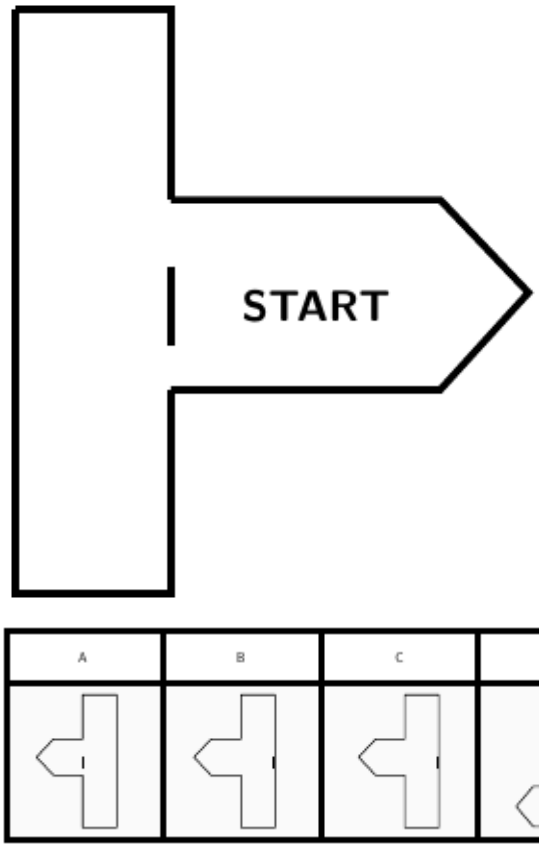
Q1. X is the son of Y, Y is the wife of Z. W is the father of Z. Then Y will be the _____ of W.

(a) sister-in-law
(b) father-in-law
(c) brother-in-law
(d) daughter-in-law

Q2. Choose the term that does NOT belong to the following group.

(a) Krypton
(b) Argon
(c) Neon
(d) Platinum

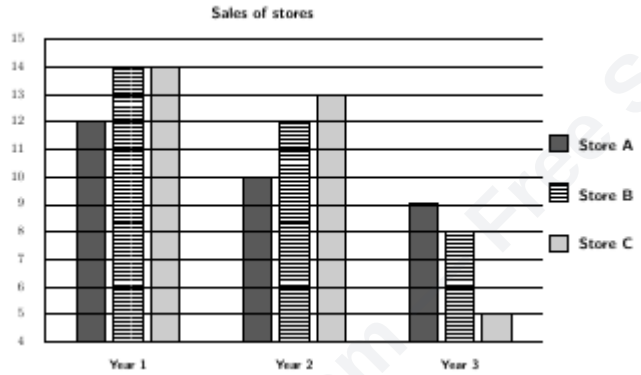
Q3. In the following question, which pattern will the given sheet resemble when it is folded at the dotted line? (Sheet is)



(a) D
(b) A

(c) B
(d) C

Q4. As per the following chart, in which year were the sales of store B more than 13 lakh Rs.?



Note: The sales figures are in lakh Rs.

(a) Year 3
(b) Year 2
(c) Year 1
(d) Year 1 and Year 2

Q5. Body A having a mass of 2 kg and body B having a mass of 3 kg moving towards each other with velocities 4 m/s and 2 m/s, respectively, will collide and _____ in an elastic collision.

(a) move in the direction of B
(b) move in opposite direction
(c) move in the direction of A
(d) move perpendicular to the line of motion of both bodies

Q6. Prime Minister Narendra Modi and his Israeli counterpart Benjamin Netanyahu inaugurated the iCreate centre in January 2018 in:

(a) Rajkot
(b) Vadodara
(c) Ahmedabad
(d) Surat

Q7. Which of the following is a cation?

(a) Nitrate
(b) Hydroxide
(c) Ammonium
(d) Carbonate

Q8. If F and Z are sons of C and Z is married to Y, then how is Y related to F?

(a) Son-in-law
(b) Brother-in-law
(c) Mother-in-law
(d) Sister-in-law

Q9. Who will be the host of the 2018 edition of the Women's World T20?

(a) Australia
(b) West Indies
(c) England
(d) Dubai

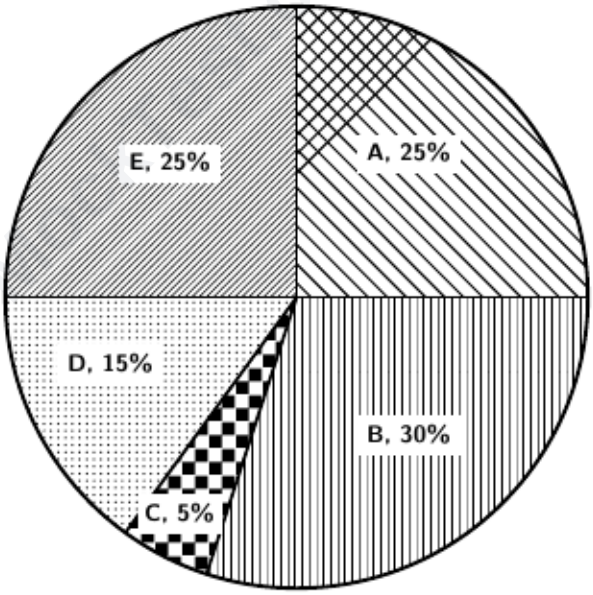
Q10. The Rana Pratap Sagar Dam is built on the river _____.

(a) Ganga
(b) Jhelum
(c) Beas
(d) Chambal

Q11. Two circles touch each other externally at point X. PQ is a simple common tangent to both the circles touching the circles at point P and point Q. If the radii of the circles are R and r, then find PQ^2.

(a) $3\pi Rr/2$
(b) $4Rr$
(c) $2\pi Rr$
(d) $2Rr$

Q12. The following pie diagram shows information on tyre manufacturing by various companies in India during 2017. If the total number of tyres produced in India during 2017 was 1,80,000 units, how many units of tyres were produced by company E?



(a) 30,000
(b) 35,000
(c) 45,000
(d) 15,000

Q13. In the following question, some statements are given followed by some conclusions. Taking the given statements to be true even if they seem to be at variance from commonly known facts, read all the conclusions and then decide which of the given conclusions logically follows the given statements.

Statement:

All mats are coirs.

All coirs are Jute.

Conclusions:

I.. All Jute are coirs.

II. All mats are Jute.

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

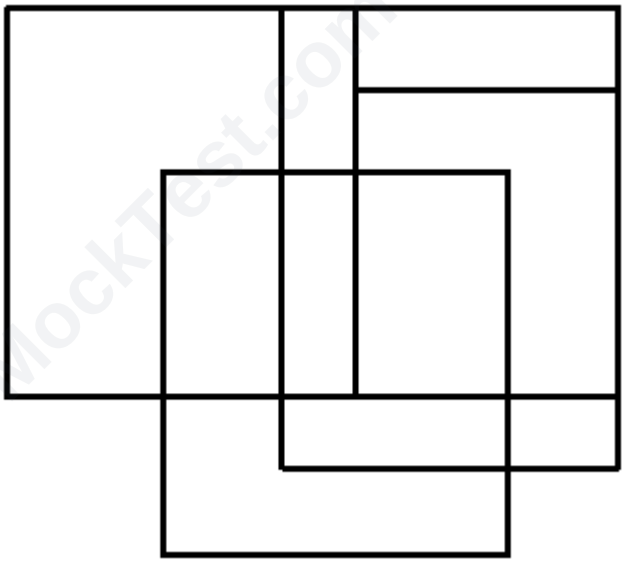
Q14. Which of the following flowers is unisexual?

(a) Papaya
(b) Sunflower
(c) Hibiscus
(d) Mustard

Q15. A person bought an item for Rs. 1975 and sold it at a profit of 12%. What was the selling price of the item?

(a) Rs. 2192
(b) Rs. 2202
(c) Rs. 2212
(d) Rs. 2222

Q16. How many closed rectangular boxes are there in the following figure?



(a) 15
(b) 16
(c) 17
(d) 20

Q17. Vibrations in the ear are amplified by the three bones, namely the _____ in the middle ear.

(a) hammer, anvil and stirrup
(b) hammer, cochlea and stirrup
(c) hammer, anvil and pinna
(d) auditory bone, anvil and stirrup

Q18. You are given a question and two statements. Identify which of the statements is/are necessary/sufficient to answer the question.

Find the total age of the sisters 10 years from now.

Statements:

1. Nina is 10 years old now

2. Nina’s sister’s age is 1/5^(th) of the age of Nina

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

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Q19. Which of the following Venn diagrams correctly represents the relationship between the given classes?

A. Vessel

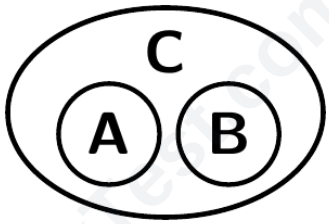
B. Trinket

C. Silver

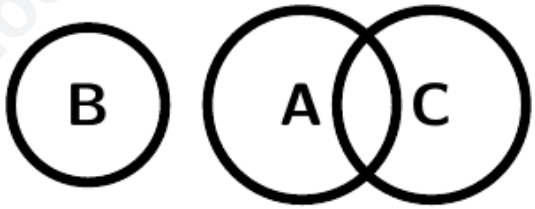
(a)



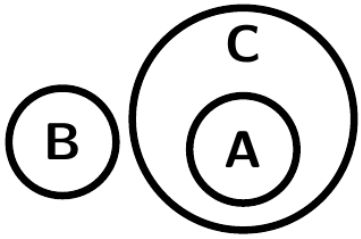
(b)



(c)



(d)



Q20. The sum of values of x satisfying x^(2/3) + x^(1/3) = 2 is:

(a) -3

(b) 7

(c) -7

(d) 3

Q21. Select the most appropriate option.

0°C = _____F.

(a) 32

(b) 180

(c) 23

(d) 273

Q22. P and Q can complete a task together in 6 days. Q alone can complete the task in 10 days. In how many days can P alone complete the task?

(a) 11 days

(b) 15 days

(c) 12 days
(d) 14 days

Q23. Name the Bollywood actor who received Kala Ratan Award in March 2017?

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

Q24. A 2,000 kg truck moving at 10 m/s strikes a car waiting at a traffic light. After the collision, the two move together at 8 m/s. The mass of the car is _____ if total energy before and after collision remain conserved.

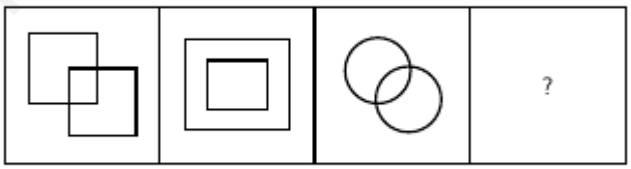
(a) 250 kg
(b) 500 kg
(c) 750 kg
(d) 1,000 kg

Q25. In January 2018, who took charge as the Managing Director of India Infrastructure Finance Company Ltd?

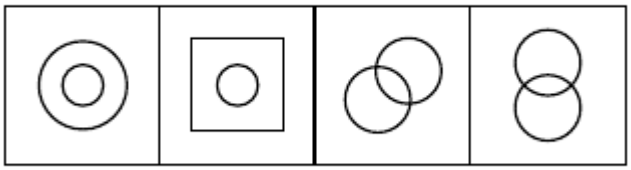
(a) Prasanth Nair
(b) Pankaj Jain
(c) Saurabh Kumar
(d) Mir Mohammed Ali

Q26. Identify the figure that will replace the question mark in the given series:

Problem figures:



Answer figures:



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

Q27. Which of the following is NOT a characteristic of dicotyledonous plants?

(a) Tap root
(b) Reticulate venation
(c) Two cotyledons
(d) Fibrous roots

Q28. As of August 2018, who is the chief minister of Delhi?

(a) Kiran Bedi
(b) Sushma Swaraj
(c) Sheila Dikshit
(d) Arvind Kejriwal

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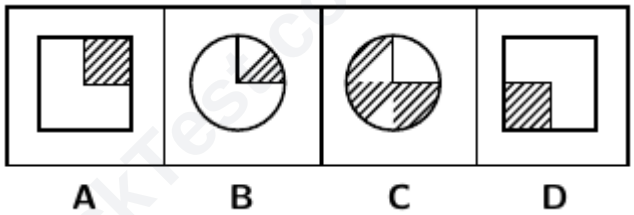
Q29. What amount will Jatin get at the end of 3 years if he has invested Rs. 5000 and the rate of interest is 4% for the first year, 3% for the second year and 2% for the third year?

(a) Rs. 5460
(b) Rs. 5403.12
(c) Rs. 5463.12
(d) Rs. 5460.12

Q30. An electric washing machine of 750 W is used for 4 hours per day. The energy consumed by the machine in one day will be _____.

(a) 30 units
(b) 3 units
(c) 3,000 units
(d) 300 units

Q31. Find the odd one out.



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

Q32. Based on the numerical analogy given, choose the correct answer from the options given below 35 : 7 ? 125 : ?

(a) 10
(b) 25
(c) 15
(d) 5

Q33. Pipe A can fill an empty cistern in 14 hours. Together with Pipe B it can fill up the empty cistern in 12 hours. Therefore, Pipe B can fill the empty cistern alone in _____ hours.

(a) 75
(b) 77
(c) 78
(d) 84

Q34. A tank can be filled by a pipe P in 32 minutes and by pipe Q in 36 minutes. When it is full, it can be emptied by a pipe R in 20 minutes. If all the three pipes are opened simultaneously, half of the tank will be filled in _____.

(a) 553/5 minutes
(b) 5513/3 minutes
(c) 555/13 minutes
(d) 552/5 minutes

Q35. Consider the given statement and decide which of the given assumption(s) is/are implicit in the statement.

Statement:

"Can I borrow your bike in the evening," asks Milan to his teammate.

Assumptions:

I. Milan's teammate has a bike.

II. Milan needs a bike in the evening.

(a) Neither I nor II is implicit
(b) Both I and II are implicit

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(c) Only II is implicit
(d) Only I is implicit

Q36. Sodium metal is stored in _____.
(a) Kerosene
(b) Water
(c) Ether
(d) Alcohol

Q37. Which of the following glands is also known as 'master gland'?
(a) Pituitary
(b) Adrenal
(c) Pancreas
(d) Hypothalamus

Q38. If COCK is written as D4P6D4L2, then how would HENCE be written?
(a) I9F6O6D3F6
(b) I9F6O5D4F6
(c) I9F6O65D4F6
(d) I9F5O5D4F5

Q39. The hierarchy of animal classification is:
(a) Phylum, Class, Family, Order, Species, Genus
(b) Phylum, Class, Family, Order, Genus, Species
(c) Phylum, Class, Order, Family, Genus, Species
(d) Phylum, Order, Family, Class, Genus, Species

Q40. If BIRBAL is coded as RIBLAB, how is DIESEL written in that code?
(a) ESETN
(b) EIDLES
(c) EIDCGT
(d) DIESLT

Q41. 63 - (- 3)(- 2 - 8 - 4) ÷ [3 {5 + (- 2)(- 1)}] = ?
(a) 65
(b) 60
(c) -60
(d) 61

Q42. Which does not belong to this group?
A. Lemon
B. Tamarind
C. Raw Mango
D. Sugar
(a) C
(b) A
(c) D
(d) B

Q43. The second equation of motion gives the relation between _____.
(a) position-time
(b) velocity-momentum
(c) position-velocity
(d) velocity-time

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Q44. For which sector did the union government launch the “SAMPADA Scheme”?

(a) Women empowerment
(b) Health
(c) Food processing
(d) Girl child

Q45. The non-metal _____ is liquid at room temperature.

(a) Bromine
(b) Sulphur
(c) Mercury
(d) Calcium

Q46. If tanθ = 4/3, what is the value of sin θ + cos θ?

(a) 4/3
(b) 1
(c) 7/3
(d) 7/5

Q47. Sunil Bharti Mittal is an Indian billionaire entrepreneur, philanthropist and the Founder and Chairman of _____.

(a) Bharti Enterprises
(b) ArcelorMittal
(c) HCL Technologies
(d) Wipro Limited

Q48. Indian Railways earn the maximum revenue from _____.

(a) Monthly season tickets
(b) AC Train travellers
(c) freight
(d) fine on ticketless travellers

Q49. When light is incident on a polished surface, _____ reflection takes place.

(a) regular
(b) irregular
(c) normal
(d) diffused

Q50. 0.3/1000 is equal to:

(a) 3 × 10^(-4)
(b) 3 × 10^(-6)
(c) 3 × 10^5
(d) 3 × 10^(-5)

Q51. What is common among Lithium, Sodium and Potassium?

(a) These have one electron in their outermost shell
(b) There are alkaline earth metals
(c) These cannot form oxides
(d) These are inert elements

Q52. Which country is hosting the 2018 Men’s Hockey World Cup?

(a) China
(b) India
(c) Korea
(d) England

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Q53. If P = sum of 3/5 and 2/7, Q = 15/31 then find P × Q.

(a) 3/4
(b) 7/4
(c) 2/7
(d) 3/7

Q54. The power plant at Manikaran, based on geothermal energy, is in _____.

(a) Punjab
(b) Assam
(c) Himachal Pradesh
(d) Uttar Pradesh

Q55. Who won the Golden Ball Award at the 2018 FIFA World Cup?

(a) Brad Jones
(b) Luka Modric
(c) Pedro Geromel
(d) Franco Armani

Q56. With reference to international money transactions, what is the full form of IMF?

(a) Indian Monetary Form
(b) International Money Form
(c) International Monetary Fund
(d) International Monitoring Fund

Q57. Read the given statement followed by the two assumptions numbered I and II. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement.

Statement: “I will catch the flight to reach on time,” says Ram to Shyam.

Assumptions:

I. Travelling by plane is the fastest way to reach a destination.

II. Train and bus are other modes of transport.

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

Q58. 18 years ago, Cyrus was 2.5 times as old as Nikhil. The sum of their present ages is 92 years. How old is Nikhil now?

(a) 31 years
(b) 33 years
(c) 34 years
(d) 32 years

Q59. What is the measure of the smaller of the two angles formed between the hour hand and the minute hand of a clock when it is 6:45 pm

(a) 62^o
(b) 83^o
(c) 84^o
(d) 67.50.

Q60. Vikram Singh, the 1997 batch officer of the Indian Railway Traffic Service (IRTS), is/was appointed as Private Secretary to which of the following Presidents?

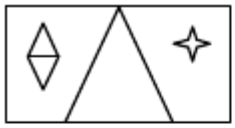
(a) Mrs. Pratibha Patil
(b) Dr. APJ Abdul Kalam
(c) Mr. Pranab Mukhergee
(d) Mr. Ram Nath Kovind

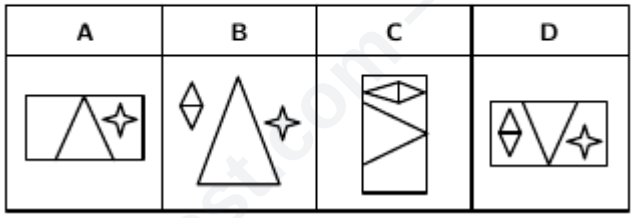
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Q61. On which dates India organized the Cultural Festival in Egypt to mark the 156^(th) birth anniversary of Rabindranath Tagore?

(a) May 8^(th) - 12^(th), 2017
(b) June 8^(th) - 12^(th), 2017
(c) June 6^(th) - 10^(th), 2017
(d) May 6^(th) - 10^(th), 2017

Q62. Which of the options bears the closest resemblance to the following figure?





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

Q63. From the below-given elements which one _____ is smallest in size.

(a) All of these options
(b) Mg^(2+)
(c) Al^(3+)
(d) Na^+

Q64. _____ a 106-year-old woman from Chhattisgarh was chosen as the mascot for the 'Swachh Bharat Abhiyan'. She died on 23^(rd) February 2018. She had shot to fame in 2016 when the story of her selling goats to build a toilet at home got nationwide publicity.

(a) Kunwar Bai Patel
(b) Kunwar Bai Yadav
(c) Kunwar Bai Mishra
(d) Kunwar Bai Gupta

Q65. 4 skilled workers can dig a pond in 8 days, whereas it takes 8 unskilled workers 12 days to dig it. How many days will it take 3 skilled and 15 unskilled workers to dig such a pond?

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

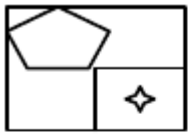
Q66. The speed of a boat in still water is 20 km/hr. If the boat goes upstream for a distance of 20 km in 4 hours, find the speed of the stream.

(a) 20 km/hr
(b) 15 km/hr
(c) 30 km/hr
(d) 25 km/hr

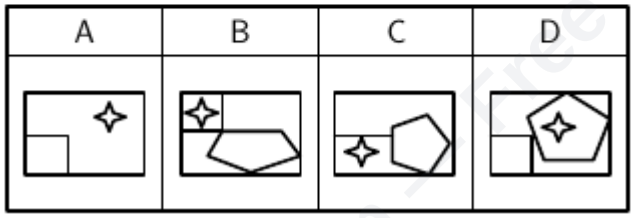
Q67. Which of the option figures bears the closest resemblance to the question figure?

Question figure:

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Options Figures:



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

Q68. What comes next in the given series:
9D, 8E, 7F, 6G, 5H, ?
(a) 12C
(b) 4I
(c) 10V
(d) 6J

Q69. Which hormone is released from the testes?
(a) Thyroxin
(b) Adrenaline
(c) Insulin
(d) Testosterone

Q70. Arrange the following compounds in the increasing order of their carbon bond length:
Ethene, Ethyne, Ethane.
(a) Ethene, Ethyne, Ethane
(b) Ethyne, Ethene, Ethane
(c) Ethane, Ethene, Ethyne
(d) Ethane, Ethyne, Ethene

Q71. The union government has constituted a ministerial panel headed by _____ to oversee the merger proposals of state-owned banks.
(a) Manmohan Singh
(b) P. Chidambaram
(c) Arun Jaitley
(d) Pranab Mukherjee

Q72. Which of the following laws states the relationship between the current flowing through a metallic wire and the potential difference across its terminals?
(a) Law of charges
(b) Radiation law
(c) Ohm's law
(d) Joule's law

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Q73. Who among the following has compiled the ancient treatise 'Natyashastra' of India?

(a) Agasthya
(b) Manu
(c) Bharatamuni
(d) Vedavya

Q74. Read the following question and decide which of the statements is/are sufficient to answer the question.

Find the average size of the balls.

Statements:

1. There are 6 balls with radius 3 cm, 4 cm, 7 cm, 5 cm, 4 cm and 6 cm.
2. The balls are red in colour.

(a) Only statement 2 is sufficient
(b) Both statements 1 and 2 are sufficient
(c) Only statement 1 is sufficient
(d) Either statement 1 or 2 is sufficient

Q75. How many water molecules are present in one molecule of washing soda?

(a) 8
(b) 7
(c) 9
(d) 10

Q76. In ΔABC, D and E are points on AB and AC respectively such that DE is parallel to BC. If AD = 1 cm, DB = 3 cm, then ar(ΔADE) : ar(ΔABC) is:

(a) 1 : 16
(b) 1 : 3
(c) 1 : 9
(d) 1 : 4

Q77. Sita celebrated her Birthday on one of the Wednesday in the month of December 2017, On which date can it be.

(a) 16
(b) 22
(c) 13
(d) 9

Q78. Which assumptions are implied from the below statement?

Statement:

"In peak hours it is better to travel by two-wheeler" Y said to Z

Assumptions:

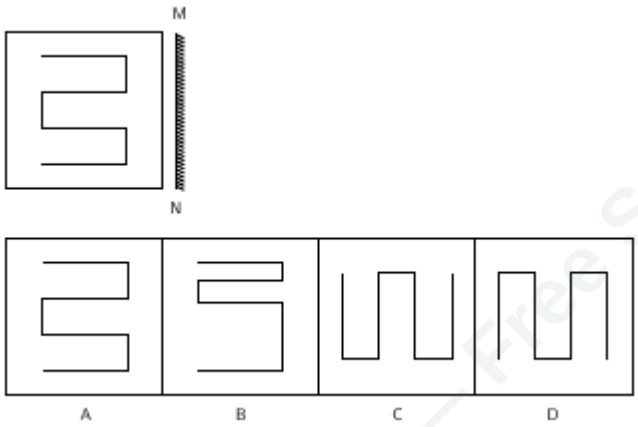
I. Two-wheeler is easier to navigate in the traffic.

II. There is separate lane for two wheelers.

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

Q79. Choose the mirror image for the following figure.

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

Q80. The rate of change of displacement is called _____.

(a) distance
(b) Velocity
(c) Acceleration
(d) Force

Q81. Which of the numbers is NOT composite?

(a) 943
(b) 323
(c) 713
(d) 409

Q82. How many molecules of water are present in one molecule of copper sulphate?

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

Q83. Sunder walks for 4km towards the East. He then turns right and walks for 3km. Again turns right and continues walking. In which direction is he walking now?

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

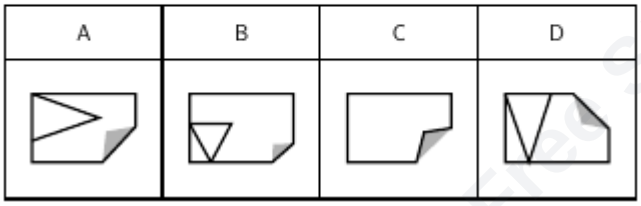
Q84. A boy of mass 50 kg runs up a staircase of 45 steps in 9s, the height of each step is 15 cm, find his power. (Take g = 10 m/s^2):

(a) 375 W
(b) 325 W
(c) 275 W
(d) 475 W

Q85. Which of the options bears the closest resemblance to the following figure?

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

Q86. If the equations 14x + 8y + 5 = 0 and 21x - ky - 7 = 0 have no solution, then the value of k is:

(a) 12
(b) -12
(c) 8
(d) -16

Q87. Chatrapati Shivaji was born in which of these forts?

(a) Panhala
(b) Shivneri
(c) Pratapgad
(d) Raigad

Q88. How many possible two-digit numbers can be formed by using the digits 3, 5 and 7 (repetition of digits is allowed)?

(a) 10
(b) 9
(c) 7
(d) 8

Q89. If a bulb of 50 W consumes the energy of 1000 J, then in how much time the bulb will glow?

(a) 20 s
(b) 1 s
(c) 100 s
(d) 10 s

Q90. What should come in place of '?' in the following question?

[{21/3 - (5 + (2 - 3))} + 31/2] = ?

(a) 11/2
(b) 2
(c) 11/6
(d) 13/6

Q91. Find HCF of 16, 48 and 104.

(a) 12
(b) 16
(c) 4
(d) 8

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Q92. The ratio of the number of blue and red balls in a bag is constant. When there were 68 red balls, the number of blue balls was 36. If the number of blue balls was 63, how many red balls should be there in the bag?

(a) 98
(b) 119
(c) 102
(d) 110

Q93. If '+' becomes '-' and '×' becomes '÷' then what will be the value of ((175 + 160) × 50) × 10?

(a) 0.03
(b) 0.3
(c) 0
(d) -0.3

Q94. A ball thrown up vertically returns to the ground after 12.5 seconds. Find the velocity with which it was thrown up.

(a) 61 m/s
(b) 51 m/s
(c) 65 m/s
(d) 40 m/s

Q95. Find the point at which the line segment joined by the points (- 1, 0) and (2, 6) is divided internally in the ratio 2 : 1.

(a) (0, 5)
(b) (1, 4)
(c) (1, 3)
(d) (0, 4)

Q96. Read the given statement and Identify which of the conclusion logically follow/s from the statement.

Statement: 100 people work at Ravi's own company.

Conclusions:

I. Ravi is an entrepreneur.

II. Ravi is a good man.

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

Q97. Find the next letter in the given series:

Z, X, V, T, R, P, ?

(a) E
(b) N
(c) L
(d) C

Q98. The First War of Indian Independence was fought in the year _____.

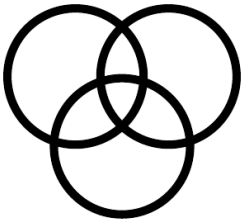
(a) 1787
(b) 1587
(c) 1857
(d) 1875

Q99. Choose the best suitable Venn diagram for the following classes:

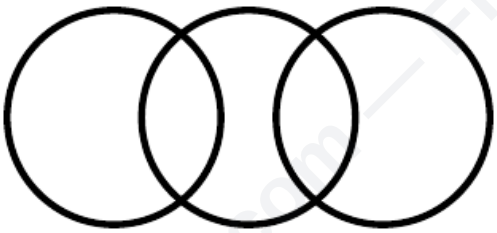
Camera, Table, Furniture

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(a)



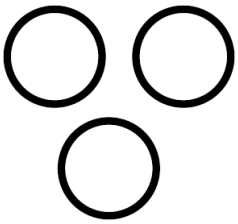
(b)



(c)



(d)



Q100. A shirt was marked at Rs. 1600. During a Diwali festival offer, 10% discount was allowed on it. What will be the selling price of the shirt?

(a) Rs. 1540
(b) Rs. 1400
(c) Rs. 1440
(d) Rs. 1240

ANSWER KEY

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

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

SOLUTIONS

Q1. Answer: (d) daughter-in-law

From the given information we can draw a following family tree,

Clearly, Y will be the daughter-in-law of W.

Hence, “daughter-in-law” is the correct answer.

Q2. Answer: (d) Platinum

• Platinum (Pt) does not belong in the given group.

• Except for Platinum, all the above elements Krypton (Kr), Argon (Ar), Neon (Ne) are inert/noble gases and they belong to Group 18 in Periodic Table.

• Platinum is a group 10 element and belongs in transition metals.

Q3. Answer: (d) C

Important Points

• The sheet is.

• Therefore, the left side of the rectangle will be visible after folding.

The pattern that will appear after folding is as follows,

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

Q4. Answer: (c) Year 1

=> Based on given data, the sales of store B and C was more than 13 lakhs in Year 1.

Q5. Answer: (b) move in opposite direction

Concept:

Collison’s are generally classified into two types elastic and inelastic collisions

Based on this law of conservation this classification is made, and the laws of collision states

• Momentum is conserved in all collisions.

• In an elastic collision, kinetic energy is also conserved.

• In an inelastic collision, kinetic energy is not conserved. In a perfectly inelastic collision, objects stick together after the collision.

Perfectly elastic collision

If the law of conservation of momentum and that of kinetic energy hold good during the collision.

i.e., initial momentum = final momentum

Inelastic collision

If the law of conservation of momentum holds good during a collision while that of kinetic energy is not.

But inelastic Collison obeys the law of conservation of linear momentum

Coefficient of restitution (e)

e = (Relative velocity after collision)/(Relative velocity before collision) = (v2 - v1)/(u1 - u2)

• For perfectly elastic collision, e = 1

• For inelastic collision, e < 1

• For a perfectly inelastic collision, e = 0

Calculation:

Given that,

mass of body A, $m_A = 2$ kg

Speed of block A, $u_A = 4$ m/s

mass of body B, $m_B = 3$ kg

Speed of block B, $u_B = -2$ m/s

Now according to the law of conservation of momentum

$m_Au_A + m_Bu_B = m_Av_A + m_Bv_B$

$2 \times 4 - 3 \times 2 = 2 \times v_A + 3 \times v_B$

$2 \times v_A + 3 \times v_B = 2$ -----(1)

Now coefficient of restitution for an inelastic collision is always one and can be expressed as

e=1=(v_B-v_A)/(u_A-u_B)=(v_B-v_A)/(4+2)=> v_B-v_A=6 ----- (2)

Thus by comparing both the quadratic equation we get values of both velocity of body A and B as

v_B=14/5m/s

And now by substituting this value in eq (2) we get, v_A=-16/5m/s

Hence from this, we can see that body A will be moving in the opposite direction compared to B

Thus in this case body, A and body B will move in opposite directions in an elastic collision

Q6. Answer: (c) Ahmedabad

• Prime Minister Narendra Modi and his Israeli counterpart Benjamin Netanyahu inaugurated the iCreate centre in January 2018 in Ahmedabad.

• The International Centre for Entrepreneurship and Technology (iCreate) is a public-private partnership venture of the Gujrat government to promote entrepreneurship by giving them funding, mentors and office space facilities.

Q7. Answer: (c) Ammonium

• Ammonium (NH4^+) is a cation.

• A cation is a positively charged ion (lose electrons) and It is formed near the cathode during the electrolysis.

• Ammonia (NH3) is base i.e. when it is mixed with acid it can gain one H^+ ion, leading to Ammonium (NH4+)

• An atom or molecule gain or lose electrons to attain stable configuration thereby forming both anions and cations.

• Anions are negatively charged ions (Gains an electron) and they formed near anode during electrolysis.

• Nitrate (NO3^-), Hydroxide (OH^-), Carbonate (CO3^(-2)) are anions.

Q8. Answer: (d) Sister-in-law

From the given information we can draw following family tree,

Clearly, Y will be the sister-in-law of F.

Hence, “sister-in-law” is the correct answer.

Q9. Answer: (b) West Indies

• The host of the 2018 edition of the Women’s World T20 was West Indies.

• The winner of the 2018 edition of Women’s World Cup was Australia.

• The runner ups are team England.

• The host of the next Women’s World T20 in the year 2021 in New Zealand.

Q10. Answer: (d) Chambal

Chambal

Key Points

• The Rana Pratap Sagar Dam is built on the river Chambal.

• It is in the state of Rajasthan and it was opened in the year 1970.

• It is capable of generating 172 MW of power

Additional Information

Q11. Answer: (b) 4Rr

Shortcut Trick

For two circles of radii R and r touching each other externally, the distance between their centers is d = R + r.

The length of the direct common tangent (PQ) is given by the standard formula: PQ = 2√(Rr).

To find PQ², we square the length of the tangent.

=> PQ² = (2√(Rr))²

=> PQ² = 4Rr

Therefore The correct answer is 4Rr.

Alternate Method

Given:

Radii of the two circles = R and r

The circles touch each other externally at point X.

Formula Used:

Length of Direct Common Tangent (DCT) = $\sqrt{[d^2 - (R - r)^2]}$

Where d is the distance between the centers of the circles.

Calculations:

Since the circles touch externally at point X:

=> Distance between centers (d) = R + r

Substituting d in the DCT formula:

=> $PQ = \sqrt{[(R + r)^2 - (R - r)^2]}$

Squaring both sides to find PQ^2:

=> $PQ^2 = (R + r)^2 - (R - r)^2$

Expanding the algebraic identities:

=> $PQ^2 = (R^2 + r^2 + 2Rr) - (R^2 + r^2 - 2Rr)$

=> $PQ^2 = R^2 + r^2 + 2Rr - R^2 - r^2 + 2Rr$

=> $PQ^2 = 4Rr$

Therefore The correct answer is 4Rr.

Additional Information

Direct Common Tangent (DCT)

The length of the direct common tangent to two circles with radii R and r and distance d between centers is $\sqrt{[d^2 - (R - r)^2]}$.

Transverse Common Tangent (TCT)

The length of the transverse common tangent is $\sqrt{[d^2 - (R + r)^2]}$. It exists only when the distance between centers is greater than the sum of the radii.

Circles Touching Externally

When two circles touch externally, d = R + r. In this case, there are exactly 3 common tangents (2 direct and 1 transverse).

Circles Touching Internally

When two circles touch internally, d = |R − r|. In this case, there is only 1 common tangent (direct).

Q12. Answer: (c) 45,000

Total number of tyres produced in 2017 by various companies = 180,000

Tyres produced by company E is 25% of 180000 = (25/100) × 180,000 = 45,000

Therefore The number of tyres produced by company E in 2017 is 45,000

Q13. Answer: (c) Only conclusion II follows

The least possible Venn diagram of the given statements,

Conclusions:

I. All Jute are coirs → False (it is possible but not definite)

II. All mats are Jute → True.

Hence, “Only conclusion 2 follows”.

Q14. Answer: (a) Papaya

The correct answer is Papaya.

• Papaya flowers are Unisexual Flowers.

Key Points

• Flowers that contain either only pistil (Female reproductive organs) or stamen (male reproductive organ) are called Unisexual flowers.

• Corn, papaya, Cucumber are some common examples.

• A flower which contains both pistils (Female reproductive organs) and stamen (male reproductive organs) are called bisexual flowers.

• Sunflower, Mustard, Hibiscus are some common examples.

Q15. Answer: (c) Rs. 2212

Shortcut Trick

Profit = 12% => Multiplier for Selling Price (SP) = (100 + 12) ÷ 100 = 1.12

SP = Cost Price (CP) × 1.12

SP = 1975 × 1.12

SP = 1975 × (1 + 0.1 + 0.02) = 1975 + 197.5 + 39.5 = 2212

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Therefore The correct answer is Rs. 2212.

Alternate Method

Given: CP = Rs. 1975, Profit% = 12%

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

=> Profit = (12 ÷ 100) × 1975

=> Profit = 0.12 × 1975 = 237

=> SP = 1975 + 237

=> SP = 2212

Therefore The correct answer is Rs. 2212.

Additional Information

Cost Price and Selling Price

The Cost Price is the price at which an item is purchased, while the Selling Price is the price at which it is sold to a customer.

Profit Percentage

Profit% is always calculated on the Cost Price unless stated otherwise. Formula: Profit% = (Profit ÷ CP) × 100.

Q16. Answer: (d) 20

We can count the rectangles as follows,

AEMB, EMNF, FDCN, FDHG, GHCN, IJKL, IJRQ, EFST, STNM, MCPO, RCPX, MRXO, QRKL, SJXO, TJRN, SJRM, AFNB, EDCM, EDPO, ISMQ.

Hence, there are “20” rectangles.

Confusion Points All squares are considered to be rectangles but all rectangles are not necessarily squares.

Q17. Answer: (a) hammer, anvil and stirrup

• Vibrations inside the ear are amplified by the three bones, namely the hammer, anvil and stirrup in the middle ear.

• Ear in the human body performs two functions, namely: Hearing and maintaining the balance of the body.

• An Ear consists of three major sections namely: Outer Ear, middle ear and Inner Ear.

Part of Ear	Parts	Function
Outer Ear	Pinna	It directs the sound wave to travel through the ear canal to reach the eardrum.
middle ear	hammer, anvil and stirrup	These three bones are utilised to amplify the sound waves in the middle ear.
Inner Ear	Cochlea	It transforms the waves into an electrical signal and sends it to the brain.

Q18. Answer: (c) Statements 1 and 2 together are necessary

Shortcut Trick

To calculate the total age of two people 10 years from now, we must know the current age of both.

Statement 1 provides Nina’s current age (10 years).

Statement 2 provides the ratio/relation (1/5) between Nina and her sister.

By combining both: Sister’s current age = 10 ÷ 5 = 2 years.

Total age in 10 years = (10 + 10) + (2 + 10) = 32 years.

Therefore The correct answer is Statements 1 and 2 together are necessary.

Alternate Method

Given:

Nina’s age (from St. 1) = 10 years

Sister’s age (from St. 2) = 1/5 of Nina’s age

Formula Used:

Total Age (Future) = (Current Age1 + n) + (Current Age2 + n)

=> From Statement 1: Nina’s current age = 10 years.

=> From Statement 2: Nina’s sister’s age = 1/5 × 10 = 2 years.

=> Total age current = 10 + 2 = 12 years.

=> Total age after 10 years = (10 + 10) + (2 + 10)

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=> Total age = 20 + 12 = 32 years.

=> Since we needed both statements to calculate the individual ages and the sum, both are necessary.

Therefore The correct answer is Statements 1 and 2 together are necessary.

Additional Information

Data Sufficiency Logic

A statement is sufficient if it allows for a unique answer. If one statement provides only a ratio and the other a value, they are usually necessary together to find a specific result.

Age Summation Property

If there are 'n' people, the sum of their ages increases by n × t after 't' years. In this case, 2 people × 10 years = 20 years increase in the total sum.

Age Difference Property

The difference between the ages of two people remains constant regardless of the number of years passed.

Q19. Answer: (c) [figure]

As we know that trinket is a small ornament or item of jewellery that is of little value. Thus, it can't be made of silver because of little value. Silver will make the ornament of higher value. Whereas vessels can be made from silver. Thus, the venn diagram that represents the given information is as follows,

Hence, "option figure C" is the correct answer.

Q20. Answer: (c) -7

Shortcut Trick

Substitute x^(1/3) = y to convert the expression into a quadratic: $y^2 + y - 2 = 0$.

Solve for y using factors (2, −1): y = 1 and y = −2.

Since $x = y^3$, the values of x are $1^3 = 1$ and $(-2)^3 = -8$.

Sum of x values = 1 + (−8) = −7.

Therefore The correct answer is −7.

Alternate Method

Given:

The equation is x^(2/3) + x^(1/3) = 2

Method Used:

Reducing a fractional power equation to a standard quadratic form by substitution.

Calculations:

=> Let x^(1/3) = t

=> Then, x^(2/3) = (x^(1/3))² = t^2

=> The equation becomes: $t^2 + t - 2 = 0$

=> splitting the middle term: $t^2 + 2t - t - 2 = 0$

=> t(t + 2) − 1(t + 2) = 0

=> (t − 1)(t + 2) = 0

=> t = 1 or t = −2

=> Case 1: x^(1/3) = 1 => $x = 1^3 = 1$

=> Case 2: x^(1/3) = −2 => $x = (-2)^3 = -8$

=> Sum of values = 1 + (−8) = −7

Therefore The correct answer is −7.

Additional Information

Quadratic Substitution

Equations of the form $ax^{2n} + bx^n + c = 0$ can be solved by substituting $y = x^n$ to create a standard quadratic $ay^2 + by + c = 0$.

Roots and Powers

When solving x^(1/n) = k, we have $x = k^n$. Note that for odd n, negative values for k are possible, whereas for even n (like square roots), k must be non-negative in the real number system.

Sum and Product of Roots

For a quadratic equation $ay^2 + by + c = 0$, the sum of the roots of y is −b/a and the product is c/a.

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Q21. Answer: (a) 32

0°Celsius (C) = 32 Fahrenheit (F).

CONCEPT:

• Temperature: It is the measure of the degree of hotness and coldness of a body.

• The SI unit of temperature is Kelvin (K).

• The various temperature scales commonly used are Celsius (C), Kelvin (K), Fahrenheit (F), and Rankine (Ra).

• Celsius: It has 100 degrees between the freezing and boiling points of water.

• Here 0° represents the freezing point and 100° represents the boiling point. In many countries, celsius is used to communicate day to day temperatures.

• Fahrenheit: The Fahrenheit scale was proposed by physicist Daniel Gabriel Fahrenheit in 1724.

• This scale is primarily used in the United States and some Caribbean countries to communicate day to day temperatures.

The temperature T in degrees Fahrenheit (°F) is equal to the temperature T in degrees Celsius (°C) times 9/5 plus 32:

°F=9/5°C+32

CALCULATION:

Given that,

Temperature in degree celsius, C = 0°C

We know the formula for conversion (C × 9/5) = F.

F=9/5×0+32= 32°F

Q22. Answer: (b) 15 days

Shortcut Trick

Product of days ÷ Difference of days

Days taken by P = (6 × 10) ÷ (10 − 6)

Days taken by P = 60 ÷ 4 = 15

Therefore The correct answer is 15 days.

Alternate Method

Given: Time taken by (P + Q) = 6 days, Time taken by Q = 10 days.

Total Work = LCM of 6 and 10 = 30 units.

Person	Days	Total Work	Efficiency
P + Q	6	30	5
Q	10	3	

=> Efficiency of P = Efficiency of (P + Q) − Efficiency of Q

=> Efficiency of P = 5 − 3 = 2 units/day

=> Time taken by P alone = Total Work ÷ Efficiency of P

=> Time taken by P alone = 30 ÷ 2 = 15 days

Therefore The correct answer is 15 days.

Additional Information

Work and Efficiency Relationship

Efficiency is inversely proportional to time taken. Total Work = Efficiency × Time.

Combined Work Formula

If A takes 'a' days and B takes 'b' days, together they take (a × b) ÷ (a + b) days.

Q23. Answer: (c) Anupam Kher

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

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

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

Q24. Answer: (b) 500 kg

CONCEPT:

• The type of collision in which the total kinetic energy of the system remains constant before and after the collision is called elastic collision or perfectly elastic collision.

• As there is no net external force on the system, so momentum before the collision and after the collision will remain same.

Linear Momentum before collision (P1) = Linear Momentum after the collision (P2)

P1 = m1u1 + m2u2

P2 = m1v1 + m2v2

m1u1 + m2u2 = m1v1 + m2v2

• The kinetic energy of the system before the collision is equal to kinetic energy of the system after the collision.

KE1 = Kinetic energy before the collision and KE2 = Kinetic energy after the collision

KE1 = $1/2m1u1^2 + 1/2m2u2^2 = KE2 = 1/2m1v1^2 + 1/2\ m2v2^2$

EXPLANATION:

Given that,

Mass of the truck (m1) = 2000 kg

Velocity of the truck (v1) = 10 m/s

Mass of the car = m2

Velocity of car before collision v2 = 0 m/s

The final velocity of car and truck after collision (V_f) = 8 m/s.

If the total kinetic energy and momentum in the system remain constant in a collision, then such collision is called Elastic collision.

By conservation of momentum i.e. final momentum is equal to initial momentum.

Initial momentum will me p1= m1v1+ m2v2

=> (2000 × 10) + (m2× 0)

=> 20000

As initial momentum is equal to final momentum

We get p1 = p2

Where p2 = (m1 + m2) × v_f

=> 20000 = (2000 + m2) × 8

=> 2500 = 2000 + m2

=> m2 = 500

The mass of the car is 500 kg

Q25. Answer: (b) Pankaj Jain

• Pankaj Jain took charge as the Managing Director of India Infrastructure Finance Company Ltd in January 2018.

• He will be holding additional charge of IIFCL along with his present position as Joint Secretary at DFS

• He belongs to 1990 batch IAS officer of Assam-Meghalaya Cadre.

Q26. Answer: (b) A

The pattern followed here is 1^(st) figure consist of 2 squares on shifting to 2^(nd) figure 1 square becomes concentric with other square, similarly 3^(rd) figure consisting 2 circles thus on shifting to 4^(th) figure “one circle will become concentric with another circle”. Only in option figure A the pattern is following.

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

Q27. Answer: (d) Fibrous roots

• Fibrous roots are not the characteristic feature of dicotyledonous plants.

• Dicotyledonous plants are also called knowns are dicot and they are angiosperms (Flowering plants)

• Its roots develop from the radicle and the seed has two cotyledons or embryonic leaves.

• Their leaves have reticulate venation and have a pentamerous and tetramerous flower.

Examples: mustard, bitter gourd, watermelon, brinjal, apple, mango, tamarind etc.

Important Points

• Basic differences between monocot and dicot plants are:

Monocots	Dicots
Have single cotyledon	Have two cotyledons
Have fibrous root system	Have tap root system
Leaves have parallel venation	Leaves have reticulate venation
Eg. wheat, corn, bamboo, and banana	Eg. apples and pear, Congress grass (parthenium)

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Additional Information

• Leaf venation is the design made by veins in a leaf

• If the designs made by the veins of a leaf are parallel to each other, then that is known as parallel venation. For example, maize, grass, wheat, etc.

• Reticulate Venation is the kind of venation design that is net-like on both sides of the mid-rib. For example, rose, coriander, oak, etc.

Q28. Answer: (d) Arvind Kejriwal

• Arvind Kejriwal was the chief minister of Delhi as of August 2018.

• He belongs to the Aam Aadmi Party and he is also the president of the party.

• His party election Symbol is Broom.

Q29. Answer: (c) Rs. 5463.12

Shortcut Trick

Successive multiplying factor for amount calculation: $A = P \times (1 + r1/100) \times (1 + r2/100) \times (1 + r3/100)$

$A = 5000 \times (104/100) \times (103/100) \times (102/100)$

$A = 5 \times 104 \times 1.03 \times 1.02 = 520 \times 1.03 \times 1.02$

$A = 535.6 \times 10.2 =$ Rs. 5463.12

Therefore The correct answer is Rs. 5463.12.

Alternate Method

Given:

Principal (P) = Rs. 5000

Time (n) = 3 years

Rate (r1) = 4%, Rate (r2) = 3%, Rate (r3) = 2%

Calculations:

=> Amount after 1st year = $5000 \times (1 + 4/100) = 5000 \times 1.04$ = Rs. 5200

=> Amount after 2nd year = $5200 \times (1 + 3/100) = 5200 \times 1.03$ = Rs. 5356

=> Amount after 3rd year = $5356 \times (1 + 2/100) = 5356 \times 1.02$ = Rs. 5463.12

Therefore The correct answer is Rs. 5463.12.

Additional Information

Compound Interest with Variable Rates

When rates change every year, the amount is calculated as $A = P(1 + r1/100)(1 + r2/100)...(1 + r_n/100)$.

Effective Rate of Interest

The single equivalent rate for two successive rates a% and b% is calculated using the formula: $[a + b + (ab/100)]\%$.

Difference between CI and SI

For 2 years, the difference is $P(r/100)^2$. For 1st year, CI and SI are always equal on the same principal and rate.

Q30. Answer: (b) 3 units

CONCEPT:

• Electric power (P) is the rate at which work is done by the e.m.f. a source in maintaining current in the circuit.

$P = VI = (V^2)/R = I^2R$

• Electric Energy is the total work done by an e.m.f. a source in maintaining current in the circuit for a given time.

• Its SI unit is the joule (J) or (kWh).

• That is given by, Electrical energy consumed = Electrical power × time

CALCULATION:

Given that,

Rated power of electric washing machine P1= 750 W

Amount of time spent = 4 hr

Energy consumed (E1) = power × time => 750 × 4

= 3 kWH.

We know that 1 kWh = 1 unit

Hence, energy consumed by the machine in one day is 3 units.

Q31. Answer: (b) C

Here, except figure 'C' in all the other figures quarter portion i.e., 1/4^(th) is shaded. whereas in figure 'C' 3/4^(th) portion is shaded.

Hence, "figure C" is the odd one out.

Q32. Answer: (b) 25

The pattern followed here is 1^(st) is the 5^(th) multiple of second term i.e., 7 × 5 = 35. Thus, 125 is the 5^(th) multiple of 25 i.e., 25 × 5 = 125.

Hence, "25" is the correct answer.

Q33. Answer: (d) 84

Shortcut Trick

Use the formula for two pipes: Time taken by B = (A × Combined) ÷ (A − Combined)

Time taken by B = (14 × 12) ÷ (14 − 12)

Time taken by B = 168 ÷ 2 = 84 hours.

Therefore The correct answer is 84 hours.

Alternate Method

Given: Time for Pipe A = 14 hours, Time for Pipe A + B = 12 hours.

Pipe	Time (Hours)	Total Work (LCM)	Efficiency
A	14	84	84 ÷ 14 = 6
A + B	12	84 ÷ 12 = 7	

=> Efficiency of B = Efficiency of (A + B) − Efficiency of A

=> Efficiency of B = 7 − 6 = 1 unit/hour

=> Time taken by B alone = Total Work ÷ Efficiency of B

=> Time taken by B alone = 84 ÷ 1 = 84 hours

Therefore The correct answer is 84 hours.

Additional Information

Pipes & Cisterns Efficiency

Efficiency is inversely proportional to the time taken to complete the work. If a pipe fills a tank in 'x' hours, its 1-hour work is 1/x.

Negative Work (Inlet/Outlet)

Inlet pipes do positive work (fill), while outlet pipes (leaks) do negative work (empty). Total efficiency = Σ(Inlet Efficiency) − Σ(Outlet Efficiency).

Q34. Answer: (c) 555/13 minutes

Shortcut Trick

Total capacity of tank = LCM of (32, 36, 20) = 1440 units.

Efficiencies: P = +45, Q = +40, R = −72 (emptying).

Combined Efficiency (P + Q + R) = 45 + 40 − 72 = 13 units/minute.

Work required to fill half the tank = 1440 ÷ 2 = 720 units.

Time required = 720 ÷ 13 = 55 ^5/13 minutes.

Therefore The correct answer is 55 ^5/13 minutes.

Alternate Method

Given:

=> Time taken by Pipe P to fill the tank = 32 minutes

=> Time taken by Pipe Q to fill the tank = 36 minutes

=> Time taken by Pipe R to empty the tank = 20 minutes

Pipe	Minutes	Total Work	Efficiency
Pipe P	32	1440	+45
Pipe Q	36	+40	
Pipe R	20	−72	

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Calculations:

=> Total capacity of the tank (LCM of 32, 36, and 20) = 1440 units

=> Net combined efficiency = 45 + 40 − 72 = 13 units/minute

=> Half capacity of the tank = 1440 ÷ 2 = 720 units

=> Time taken to fill half the tank = 720 ÷ 13 minutes = 55 ^5/13 minutes

Therefore The correct answer is 55 ^5/13 minutes.

Additional Information

Pipes & Cisterns Concept

Inlet pipes have positive efficiency as they add water, while outlet pipes have negative efficiency as they drain water.

Total Work using LCM Method

Taking the Total Work as the Least Common Multiple (LCM) of all individual times avoids complex fractional calculations and simplifies efficiency values.

Time and Efficiency Relation

Efficiency is inversely proportional to time. Total Work = Net Efficiency × Time Taken.

Q35. Answer: (b) Both I and II are implicit

From the statement, Milan is asking for his teammate's bike. So, we can assume that "Milan's teammate has a bike".

We can also assume that "Milan needs a bike in the evening" as it is clearly mentioned in the given statement. Hence, both the assumptions I and II are implicit.

Q36. Answer: (a) Kerosene

• Sodium metal is stored in Kerosene.

• Metals such as sodium, Potassium are highly reactive and they catch fire if they kept in open, hence these metals are immersed in kerosene to prevent their oxidation.

• Reactive elements displace the less reactive elements in a chemical reaction.

• The reactive element loose electrons readily to attain stable electronic configuration and thus reduce another element and oxidize themselves.

• Reactive metals are found on top of the reactivity series.

• The order of reactivity of metals is given below.

Element	Reactivity	Atomic Number
Potassium (K)	Most Reactive	19
Sodium (Na)		11
Calcium (Ca)		20
Magnesium (Mg)		12
Aluminium (Al)		13
Zinc (Zn)		30
Iron (Fe)		26
Lead (Pb)		82
Hydrogen (H)		1
Copper (Cu)		29
Mercury (Hg)		80
Silver (Ag)		47
Gold (Au)	Least Reactive	79

Q37. Answer: (a) Pituitary

The correct answer is Option 1, i.e Pituitary.

• The Pituitary gland, also known as 'master gland', is an endocrine gland.

• A gland is called endocrine gland when it secretes hormones directly into the bloodstream.

• The pituitary gland is called master gland as most of its hormones control the activity of other endocrine glands.
• It produces growth hormones, prolactin, TSH (Thyroid-stimulating hormone), etc.

Glands	Hormones
Adrenal	Adrenaline, noradrenaline, Cortisol
Pancreas	Glucagon, insulin
Hypothalamus	Gonadotrophin

Q38. Answer: (b) I9F6O5D4F6

The pattern followed here is
1) The first letter of the code is the letter next to the first letter of the word as per the English alphabetical order. eg. C => D
2) The number following the first letter is the unit digit number of the positional of letter preceding it. eg. D => 04 => 4
And this process is repeated till the last letter of the given word as shown in the figure,
similarly,
Hence, “I9F6O5D4F6” is the correct answer.

Q39. Answer: (c) Phylum, Class, Order, Family, Genus, Species

• The hierarchy of animal classification is Phylum, Class, Order, Family, Genus, Species.
• Carolus Linnaeus gave the scientific system for naming the species and hence has called as the Father of Taxonomy.
• This basis of this classification is to sperate the organisms based on their characteristics to separate the larger groups to smaller units I.e. species.

Q40. Answer: (b) EIDLES

The pattern followed here is as follows,
similarly,
Hence, “EIDLES” is the correct answer.

Q41. Answer: (d) 61

Using BODMAS rule:
=> 63 - (- 3)(- 2 - 8 - 4) ÷ [3 {5 + (- 2)(- 1)}]
=> 63 - (- 3)(- 2 - 8 - 4) ÷ [3 {5 + 2}]
=> 63 - (42) ÷ 21
=> 61

Q42. Answer: (c) D

Here, all are naturally obtained products except “sugar” which is a processed product.
Hence, “sugar” is the correct answer.

Q43. Answer: (a) position-time

CONCEPT:
• Equation of motion: The mathematical equations used to find the final velocity, displacements, time, etc of a moving object without considering force acting on it are called equations of motion.
• These equations are only valid when the acceleration of the body is constant and they move on a straight line.
There are three equations of motion:
$V = u + at$
$S = ut + 1/2at^2$
$V2 = u2 + 2 a S$
Where, V = final velocity, u = initial velocity,
s = distance travelled by the body under motion,
a = acceleration of body under motion,
t = time taken by the body under motion.
EXPLANATION:
From the above explanation, we can see that,
• The second equation of motion gives the position-time relation,

• i.e. $s = ut + (1/2) at^2$.
• Here, v is the final velocity, u is the initial velocity, a is the acceleration and t is the time.
• The first equation of motion gives the relation between "velocity and time"
• i.e. $v = u + at$.
• The position-velocity relation gives the third equation of motion,
• i.e. $2as = v^2 - u^2$.

Q44. Answer: (c) Food processing

• SAMPADA Scheme was launched by the union government for the Food processing industry.
• SAMPADA (Scheme for Agro-Marine Processing and Development of Agro Processing Industry) was launched in the year 2017.
• Its objectives are to supplement agriculture, modernize processing and decrease agri-waste.

Q45. Answer: (a) Bromine

• Bromine is the non-metal which is liquid at room temperature.
• It has an atomic number of 35 and its symbol is Br.
• Mercury (Hg) is the only metal in the form of liquid at room temperature.
• Sulphur (S) is a non-metal and Calcium (Ca) is metal and they are in the solid-state at room temperature.

Q46. Answer: (d) 7/5

Shortcut Trick
Identify the Pythagorean triplet for the given $\tan \theta = 4/3$ (Perpendicular/Base).
The triplet is 3, 4, 5, where Hypotenuse = 5.
Value = (Perpendicular + Base) ÷ Hypotenuse = (4 + 3) ÷ 5 = 7/5.
Therefore The correct answer is 7/5.
Alternate Method
Given: $\tan \theta = 4/3$
Formula Used: $\tan \theta$ = Perpendicular (P) / Base (B) | $\sin \theta = P/H$ | $\cos \theta = B/H$ | $H = \sqrt{(P^2 + B^2)}$
=> Let P = 4 and B = 3
=> $H = \sqrt{(4^2 + 3^2)} = \sqrt{(16 + 9)} = \sqrt{25} = 5$
=> $\sin \theta = 4/5$
=> $\cos \theta = 3/5$
=> $\sin \theta + \cos \theta = 4/5 + 3/5 = 7/5$
Therefore The correct answer is 7/5.
Additional Information
Trigonometric Identities
Fundamental identity: $\sin^2\theta + \cos^2\theta = 1$. Also, $\sec^2\theta - \tan^2\theta = 1$.
Pythagorean Triplets
Common sets of integers that satisfy $a^2 + b^2 = c^2$ include (3, 4, 5), (5, 12, 13), and (8, 15, 17).
Relation between Trigonometric Ratios
$\tan \theta = \sin \theta / \cos \theta$. If $\tan \theta = a/b$, then $\sin \theta + \cos \theta = (a + b) / \sqrt{(a^2 + b^2)}$.

Q47. Answer: (a) Bharti Enterprises

• Sunil Bharti Mittal is an Indian billionaire entrepreneur, philanthropist and the Founder and Chairman of Bharti Enterprises.
• He is most famous for his ownership of telecommunication company ‘Airtel’.
• Arcelor Mittal is chaired by Lakshmi Mittal, HCL Technologies is chaired by Shiv Nadar and Wipro Limited is founded by Azim Premji.

Q48. Answer: (c) freight

• Indian Railways earn the maximum revenue from freight.
• Indian Railways is one of the largest employers on earth.
• Indian Railways android app IRCTC won National Award for E-Governance for the year 2018 in special jury award.
• Indian railways have four UNESCO world heritage sites and they are Darjeeling Himalayan Railway enlisted in the year 1999, Mumbai CSMT Building enlisted in the year 2004, Nigiri Mountain Railways enlisted in the year 2005 and Kalka-Shimla Railways enlisted in the year 2008.

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Q49. Answer: (a) regular

CONCEPT:

• Laws of reflection: The angle of reflection equals the angle of incidence.

• The incident ray, the reflected ray and the normal lie in the same plane.

• When light rays strike on a smooth plane surface then the reflection is called regular reflection.

• When light reflects at many angles after the incidence on the surface, such a reflection is called as diffuse reflection.

• Light rays are not parallel to each other after irregular reflection, but they obey laws of reflection at each point of reflection.

EXPLANATION:

• When light is incident on a polished surface, regular reflection takes place.

• Reflection is a phenomenon in which the direction of the incident ray changes when it falls on a smooth, reflecting surface.

• The light ray that was reflected is called reflected ray.

• In the case of a plane mirror, the angle of reflection and angle of incidence is the same.

Q50. Answer: (a) 3 × 10^(-4)

=> 0.3/1000 = 3/10000 = 3 × 10^(-4)

Q51. Answer: (a) These have one electron in their outermost shell

• Lithium (Li), Sodium (Na), and Potassium (K) has one electron in their outermost orbits.

• They belong to group 1 and hence they are Alkali Metals and not alkali earth metal.

• Lithium can form lithium oxide, Sodium forms Sodium oxide and Potassium can form Potassium peroxide in the presence of oxygen.

• They are not Inert elements as they react with other compounds.

Q52. Answer: (b) India

• India hosted the 2018 Men's Hockey World Cup.

• It was held in the city of Bhubaneswar, the capital of Odisha state.

• The 2018 Men's Hockey World Cup was won by Belgium.

Q53. Answer: (d) 3/7

=> P = 3/5 + 2/7 = 31/35

=> Q = 15/31

Therefore P × Q = (31/35) × (15/31) = 3/7

Q54. Answer: (c) Himachal Pradesh

• The power plant at Manikaran is based on geothermal energy, is in Himachal Pradesh.

• It is in Parvathi valley on the banks of Parvathi river.

• Geothermal Energy plants work by utilising heat from the interior of the earth.

• The Geothermal plants are a renewable and non-polluting source of energy.

• They are utilised for providing hot water, generating electricity etc.

Q55. Answer: (b) Luka Modric

• Luka Modric won the Golden Ball Award at the 2018 FIFA World Cup.

• He plays for Croatian National football team and for Spanish football club Real Madrid.

• England national football captain Harry Kane was awarded the Golden Boot for scoring most goals (6) in FIFA World Cup 2018.

• Belgium's Thibaut Courtois won the Golden Glove as the best goalkeeper of FIFA World Cup 2018.

Q56. Answer: (c) International Monetary Fund

• IMF stands for 'International Monetary Fund'.

• IMF was established in the year 1945, has a membership of 190 countries and has its headquarters in Washington D.C, USA.

• Its primary purpose is to uphold global financial stability and to ensure the stability of the international monetary system i.e. the system of exchange rates and international payments that enables countries and their citizens to transact with each other.

Q57. Answer: (d) Only assumption I is implicit

From the statement, Ram wants to "reach on time", so he wants to travel as fast as he can and he mentions that he will "catch the flight". Thus, we can assume that "travelling by plane is the fast way to reach a destination".

There is no mention of “trains and buses” so we cannot say anything about them.
Hence, “Only assumption I is implicit”.

Q58. Answer: (c) 34 years

Shortcut Trick
Sum of ages 18 years ago = 92 − (18 × 2) = 56 years.
Ratio of Cyrus to Nikhil 18 years ago = 2.5 : 1 = 5 : 2.
Sum of ratio parts = 5 + 2 = 7 units → 56 years.
1 unit = 8 years Therefore Nikhil age then = 2 × 8 = 16 years.
Present age of Nikhil = 16 + 18 = 34 years.
Therefore The correct answer is 34 years.
Alternate Method
Given: Sum of present ages of Cyrus (C) and Nikhil (N) = 92 years. 18 years ago, C = 2.5 × N.
Let age of Nikhil 18 years ago be x.
Age of Cyrus 18 years ago = 2.5x.
=> Present age of Nikhil = x + 18.
=> Present age of Cyrus = 2.5x + 18.
=> (x + 18) + (2.5x + 18) = 92.
=> 3.5x + 36 = 92.
=> 3.5x = 92 − 36 = 56.
=> x = 56 ÷ 3.5 = 16.
=> Present age of Nikhil = 16 + 18 = 34.
Therefore The correct answer is 34 years.
Additional Information
Age Sum Property
If the sum of ages of n people is S, then t years ago the sum was S − (n × t).
Age Ratio Logic
The difference between the ages of two people remains constant throughout their lives.

Q59. Answer: (d) 67.50.

Hour hand covers 3600 in 12 hours
Angular distance covered in 1 hour = 360/12 = 300
Angular distance covered in 60 minutes = 300
Angular distance covered in 1 minutes = 1/20
CALCULATION:
Minute hand covers 360 in 60 minutes
60 minutes = 3600
1 minute =360/60
1 minute = 60
Here minute = 45
Angle covered by minute hand = 45 × 6 = 2700
Angle covered by hour hand = 6 × 30 + 45 × ½ = 180 + 22.5 = 202.50
Angle between hour and minute hands = 270 – 202.5 = 67.50
Hence, angle between hour and minute hands is 67.50
Formula to calculate angle (N) between Minute hand and hour hand is:
N= 11/2 ×M-30 ×H
N= 11/2 ×45-30×6
N = 495/2-180
N = 67.5^o^.
hence, the correct answer is 67.5o.

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Q60. Answer: (d) Mr. Ram Nath Kovind

• Vikram Singh, the 1997 batch officer of the Indian Railway Traffic Service (IRTS) is the private secretary of the President of India, Ram Nath Kovind.

• Ram Nath Kovind is the 14^(th) president of India.

• He serving as a president since 2017.

Q61. Answer: (a) May 8^(th) - 12^(th), 2017

• From May 8^(th) - 12^(th) in the year 2017, India organized the Cultural Festival in Egypt to mark the 156^(th) birth anniversary of Rabindranath Tagore.

• It was organised by the cultural wing Indian Embassy in Egypt.

• Rabindranath Tagore was the first Asian to win a noble prize and he won the noble prize for literature in the year 1913 for his poem Gitanjali.

Q62. Answer: (d) D

In the question figure triangle, star, and a small Δ with its mirror image is inscribed in a rectangular shape.

Only in the option figure D all the figure in the question figure can be observed and closely resembles the question figure.

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

Q63. Answer: (c) Al^(3+)

• Aluminium Ion (Al^(3+)) has the smallest size among the given elements.

• As we move from left to right in the periodic table the atomic radius decreases.

• In the given options, in Aluminium (Al) the number of electrons is decreased in outermost orbit or valency shell by 3 hence the attraction between the outermost orbit and nucleus increases thereby shrinking the atomic radii.

• Hence Aluminium ion has the smallest size.

Q64. Answer: (b) Kunwar Bai Yadav

• Kunwar Bai Yadav, a 106-year-old woman from Chhattisgarh who was chosen as the mascot for the ‘Swachh Bharat Abhiyan’ died on 23^(rd) February 2018.

• Swachh Bharat Abhiyan was launched in 2^(nd) October 2014 the birthday of Mahatma Gandhi to promote cleanliness.

• The programme plans to make India free from open defecation by October 2019.

Q65. Answer: (a) 4

Shortcut Trick

Efficiency Ratio: (4 Skilled × 8) = (8 Unskilled × 12) => 32S = 96U => 1 Skilled (S) = 3 Unskilled (U).

Total Work (in U units) = 8U × 12 = 96 units.

Required Group: (3S + 15U) = 3(3U) + 15U = 9U + 15U = 24U.

Days Required = 96 ÷ 24 = 4 days.

Therefore The correct answer is 4 days.

Alternate Method

Person	Days	Total Work	Efficiency
4 Skilled	8	96	12
8 Unskilled	12	8	

Given: 4 Skilled workers (S) finish in 8 days; 8 Unskilled workers (U) finish in 12 days.

Formula Used: Total Work = Efficiency × Time

=> 4S × 8 = 8U × 12

=> 32S = 96U

=> 1S = 3U

=> Efficiency of 1 Skilled worker = 3 units/day (if U = 1 unit/day)

=> Total Work = 4 × 3 × 8 = 96 units

=> Efficiency of (3S + 15U) = (3 × 3) + (15 × 1) = 9 + 15 = 24 units/day

=> Time taken = 96 ÷ 24 = 4 days

Therefore The correct answer is 4 days.

Additional Information

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Work Equivalence Formula

Use M1D1H1/W1 = M2D2H2/W2 to equate work done by different groups of workers where M is the number of men, D is days, H is hours, and W is work.

Efficiency and Time Relationship

Efficiency is inversely proportional to the time taken to complete a task. If efficiency is in ratio a:b, then time taken is in ratio b:a.

Q66. Answer: (b) 15 km/hr

Shortcut Trick

Upstream speed = Distance ÷ Time = 20 ÷ 4 = 5 km/hr.

Speed of stream = Still water speed − Upstream speed.

Speed of stream = 20 − 5 = 15 km/hr.

Therefore The correct answer is 15 km/hr.

Alternate Method

Given:

Speed of boat in still water (u) = 20 km/hr

Upstream distance = 20 km

Upstream time = 4 hours

Formula Used:

Upstream speed (s_u) = Distance ÷ Time

Upstream speed (s_u) = Speed in still water (u) − Speed of stream (v)

Calculations:

=> s_u = 20 ÷ 4

=> s_u = 5 km/hr

=> 5 = 20 − v

=> v = 20 − 5

=> v = 15 km/hr

Therefore The correct answer is 15 km/hr.

Additional Information

Downstream Speed

When the boat travels with the flow, speed = u + v. It is always greater than still water speed.

Upstream Speed

When the boat travels against the flow, speed = u − v. It is always less than still water speed.

Calculating u and v from s_d and s_u

u = (Downstream + Upstream) ÷ 2 | v = (Downstream − Upstream) ÷ 2

Q67. Answer: (c) B

In the question figure a ‘star’ is inscribed in ‘a square’ and both ‘pentagon’ and ‘the square’ are enclosed in another square. This orientation can only be seen in the option figure “B” with 180° clockwise rotation.

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

Q68. Answer: (b) 4I

The pattern followed here is as follows,

Hence, “4I” is the correct answer.

Q69. Answer: (d) Testosterone

- The hormone released from testes is Testosterone.
- Testosterone is the male sex hormone.
- It plays a key role in the development of male reproductive tissues such as the testis and prostate.
- It also increases the growth of body hair.

Hormone	Function	Gland
Thyroxin	It helps in maintaining the body’s metabolism.	Thyroid

Insulin	It helps in regulating sugar levels in the body.	Pancreas
Adrenaline	It increases the heart rate, blood pressure etc during emergency situations.	Adrenal Gland

Q70. Answer: (b) Ethyne, Ethene, Ethane

• The carbon bond length depends on some factors

• Bond length is indirectly proportional to the No. of Bonds. The more the number of bonds less the bond length

1. C—C only a single bond, so the bond length is the longest
2. C=C, double bonds means 2 bonds, so the bond length is shorter than the single bond length
3. C≡C triple bond length means 3 bonds, so the bond length is shortest among all.
4. The Compounds in the Increasing order of their carbon length are Ethyne, Ethene, Ethane.
5. Ethyne< Ethene< Ethane (C2H2<C2H4<C2H6).

• Bond Length is directly proportional to Atomic Size and % P character

1. Eg. For atomic size
2. H-F, H-Cl, H-Br, H-I, here down the group, atomic size increases so the bond length increases with an increase in atomic size.
3. So, H-F< H-Cl<H-Br< H-I, H-I has the longest bond length and H-F shortest bond length

Compound	Description	Chemical formula
Ethyne	it has a triple bond between two carbon atoms	C2H2 It is Alkyne and its general formula is C_nH_(2n-2.).
Ethene	it has two carbon atoms that are double-bonded to each other	C2H4. It is Alkenes and its general formula is C_nH_(2n)
Ethane	It has its two carbon atoms have a single bond between them	C2H6. It is an Alkane and its general formula is C_nH_(2n+2.)

Q71. Answer: (c) Arun Jaitley

• The Union Government has constituted a ministerial panel headed by Arun Jaitley to oversee the merger proposals of state-owned banks.

• It is known Alternative Mechanism and it will oversee the proposal coming from the board of PSB for consolidation.

• Apart from Arun Jaitley, other members are Piyush Goyal and Nirmala Sitharaman.

Q72. Answer: (c) Ohm’s law

• Ohm’s law states the relationship between the current flowing through a metallic wire and the potential difference across its terminals.

• Ohm’s law states that “At a constant physical Conditions (such as temperature, pressure etc) the amount of current flowing in a circuit is directly proportional to voltage (Potential difference) in the circuit.

• Mathematically it can be written as V prop. to I

• Here proportional can be replaced by constant ‘R’.

• Hence Ohm’s Law can be written as V = IR.

Q73. Answer: (c) Bharatamuni

The correct answer is Bharatmuni.

Key Points

• The ancient treatise ‘Natyashastra’ of India was written by Bharatamuni.

• In his book, he purposed a dance of two types they are Tandava and Lasya.

• Where Tandava denotes power and strength while Lasya describes the dance of happiness.

• In his book, he describes the classical dances.

• There are 9 classical dances In India, they are

Dance Form	State
Bharatanatyam	Tamil Nadu
Kathak	Northern India

Kathakali	Kerala
Kuchipudi	Andhra Pradesh
Manipuri	Manipur
Mohiniyattam	Kerala
Odissi	Odisha
Sattriya	Assam
Chhau	Jharkhand, West Bengal, and Odisha

Confusion PointsThe Ministry of Culture also considers Chhau Dance as a classical dance of India, making the total number of classical dances in India as nine.

Q74. Answer: (c) Only statement 1 is sufficient

Shortcut Trick

To find the average size (radius or diameter), we require the numerical values of the individual sizes.

Statement 1 provides the radii of all 6 balls, which allows for the direct calculation of the average.

Statement 2 mentions only the color, which is a qualitative attribute and cannot be used for calculating size.

Hence, the data in Statement 1 alone is enough to answer the question.

Therefore The correct answer is Only statement 1 is sufficient.

Alternate Method

Given:

Number of balls (n) = 6

Radii from Statement 1 = 3 cm, 4 cm, 7 cm, 5 cm, 4 cm, 6 cm

Formula Used:

Average Size (Mean Radius) = (Sum of all radii) ÷ (Total number of balls)

Calculations:

=> Sum of radii = 3 + 4 + 7 + 5 + 4 + 6 = 29 cm

=> Average radius = 29 ÷ 6 ≈ 4.83 cm

=> Statement 1 contains the required data to calculate the average.

=> Statement 2 provides the color (Red), which is not useful for finding numerical size.

=> Therefore, only Statement 1 is sufficient.

Therefore The correct answer is Only statement 1 is sufficient.

Additional Information

Arithmetic Mean

The mean is calculated by summing all observations and dividing by the count (n). Information about the nature or color of the objects is irrelevant to this calculation.

Data Sufficiency Principles

In data sufficiency, you must determine if the provided information is enough to reach a unique numerical result, not necessarily calculate the final result itself.

Quantitative vs Qualitative Data

Quantitative data involves measurable quantities (length, mass, time), while qualitative data involves descriptive characteristics (color, name, category) which cannot be used for standard arithmetic averages.

Q75. Answer: (d) 10

- The number of water molecules present is 'washing soda' is 10.
- We know the molecular formula for Washing Soda is $Na_2CO_3.10H_2O$.
- Recrystallisation of Sodium Carbonate (Na_2CO_3) gives washing soda.
- In a Washing soda, water is present in the form of crystals.

Q76. Answer: (a) 1 : 16

Shortcut Trick

Since DE || BC, ΔADE is similar to ΔABC.

Ratio of sides = AD / AB = 1 / (1 + 3) = 1 / 4.

Ratio of areas = (Ratio of sides)² = (1 / 4)² = 1 / 16.

Therefore The correct answer is 1 : 16.

Alternate Method

Given: AD = 1 cm, DB = 3 cm, and DE || BC.

Formula Used: Area ratio of similar triangles = (Ratio of corresponding sides)²

=> AB = AD + DB = 1 + 3 = 4 cm.

=> In ΔADE and ΔABC, angle A = angle A (Common angle).

=> angle ADE = angle ABC (Corresponding angles as DE || BC).

=> Therefore ΔADE ~ ΔABC (By AA similarity criterion).

=> ar(ΔADE) / ar(ΔABC) = (AD / AB)².

=> ar(ΔADE) / ar(ΔABC) = (1 / 4)² = 1 / 16.

=> ar(ΔADE) : ar(ΔABC) = 1 : 16.

Therefore The correct answer is 1 : 16.

Q77. Answer: (c) 13

First, let us calculate what day was on 1st December 2017.

2000 years = 0 odd days.

From 2001 to 2016, the number of odd days is 1 + 1 + 1 + 2 + 1 + 1 + 1 + 2 + 1 + 1 + 1 + 2 + 1 + 1 + 1 + 2 = 20 or 6 odd days.

From January to December, the number of odd days is 31 + 28 + 31 + 30 + 31 + 30 + 31 + 31 + 30 + 31 + 30 + 1(1st day of December) = 335 or just 6 odd days.

Total odd days is 12 or 5 which is Friday.

1^(st) December is Friday, So 6^(th) December will be the first Wednesday of December 2017.

6, 13, 20, and 27 are Wednesdays in December 2017.

Hence, 13 is the correct answer.

Q78. Answer: (b) Only I is implicit

From the statement, “during peak hours it is better to travel by a two-wheeler”, as we know that during peak hours there a lot of traffic jam and there is very little space to move and a two-wheeler require less space. Thus, we can assume that “a two-wheeler is easier to navigate in the traffic”.

Since in the statement it is not mentioned about “separate lane for two-wheelers” and separate lanes for two-wheels are not present in all cities.

Hence, “only assumption I is implicit”.

Q79. Answer: (a) A

The mirror image can be shown in the following figure,

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

Q80. Answer: (b) Velocity

CONCEPT:

• Velocity: The rate of change of displacement with time is called velocity.

• The SI Unit of velocity is m/s.

EXPLANATION:

• The rate of change of displacement is called velocity. So option 2 is correct.

Key Points

Speed	**It is defined as the total distance travelled with respect to time.**
Acceleration	It is defined as the rate of change of velocity.
Force	It can be defined as a push or a pull that tends to change the state of an object or changes the direction or shape of an object.

Q81. Answer: (d) 409

Shortcut Trick

To check if a number N is prime (not composite), test divisibility by primes up to √N.

For 409, √409 ≈ 20.2. Testing primes 2, 3, 5, 7, 11, 13, 17, 19 shows 409 is not divisible by any.
943 = 23 × 41 | 323 = 17 × 19 | 713 = 23 × 31. These are composite.
Therefore The correct answer is 409.
Alternate Method
Given: Numbers 943, 323, 713, 409.
Concept: A Composite number has more than two factors. A Prime number has exactly two factors (1 and itself).
=> Testing 943: 943 ÷ 23 = 41. (Factors: 1, 23, 41, 943). Composite.
=> Testing 323: 323 ÷ 17 = 19. (Factors: 1, 17, 19, 323). Composite.
=> Testing 713: 713 ÷ 23 = 31. (Factors: 1, 23, 31, 713). Composite.
=> Testing 409: Not divisible by 2, 3, 5, 7, 11, 13, 17, 19. Prime.
Therefore The correct answer is 409.
Additional Information
Prime Number Definition
A natural number greater than 1 that is not a product of two smaller natural numbers. 2 is the only even prime number.
Composite Number Definition
A positive integer greater than 1 that has at least one divisor other than 1 and itself.
Primality Test Rule
To check if n is prime, check divisibility by all primes p such that $p^2 \leq n$.

Q82. Answer: (d) 5

- The number of water molecules in Copper Sulphate solution is 5.
- The chemical formula for Copper Sulphate in its hydrated form is CuSO4. 5H2O.
- Water is present in the form of crystals in Copper Sulphate.
- It is IUPAC name is Copper Sulphate Pentahydrate.
- Another name for Copper sulphate is Blue Vitriol.

Q83. Answer: (c) West

The diagram is as follows:
Hence, he is walking in the West direction.

Q84. Answer: (a) 375 W

=> Mass of the boy (m) = 50 kg
=> Time taken by the boy (t) = 9s
=> Total number of steps = 45 steps
=> Height of each step = 15 cm
=> Total height = 45 × 15 => 675 cm
=> Total height (h) = 6.75 m
=> Gravity is taken here (g) = 10m/s²
We know that,
Potential Energy (P.E) = mgh => (50) × (10) × (6.75).
= 3375 J.
We know that,
Power (p) = Energy/time
= 337 5/9
= 375 W
Power of the boy is 375 W.

Q85. Answer: (a) D

In the question figure, a triangle (Δ) is inscribed in a rectangular paper touching two sides and a corner of that rectangular paper, and one of the corners which is adjacent to the base of the triangle is slightly folded around the corner. The head vertex of the triangle touches the other side of the rectangle. All the correct figures and the correct orientation can only be seen in figure D.
Hence, “option figure D” is the correct answer.

Q86. Answer: (b) -12

Shortcut Trick

For a system of equations to have no solution, the ratio of the coefficients of x and y must be equal: a1/a2 = b1/b2.

Comparing 14x + 8y + 5 = 0 and 21x − ky − 7 = 0:

14/21 = 8/(−k)

2/3 = 8/(−k) => −2k = 24 => k = −12

Therefore The correct answer is -12.

Alternate Method

Given:

Equation 1: 14x + 8y + 5 = 0

Equation 2: 21x − ky − 7 = 0

Condition for No Solution:

For two linear equations a1x + b1y + c1 = 0 and a2x + b2y + c2 = 0, the condition is a1/a2 = b1/b2 ≠ c1/c2.

Calculations:

=> a1 = 14, b1 = 8, c1 = 5

=> a2 = 21, b2 = −k, c2 = −7

=> a1/a2 = 14/21 = 2/3

=> b1/b2 = 8/(−k)

=> For no solution, 2/3 = 8/(−k)

=> 2 × (−k) = 8 × 3

=> −2k = 24

=> k = 24 / (−2) = −12

=> Verification: c1/c2 = 5/(−7) = −5/7. Since 2/3 ≠ −5/7, the condition is satisfied.

Therefore The correct answer is -12.

Additional Information

Unique Solution (Intersecting Lines)

The system has exactly one solution if the ratios of coefficients of x and y are not equal: a1/a2 ≠ b1/b2.

Infinitely Many Solutions (Coincident Lines)

The system has infinite solutions if all three ratios are equal: a1/a2 = b1/b2 = c1/c2.

Nature of Consistency

A system is called consistent if it has at least one solution (Unique or Infinite) and inconsistent if it has no solution.

Q87. Answer: (b) Shivneri

Key Points

• Chatrapati Shivaji Maharaj (1630-1680) was born in the fort of Shivneri on the 19th February 1630.

• His father was Shahji Bhonsle and mother Jija Bai.

• He established the Maratha Empire and he assumed the title ‘Chatrapati’ in the year 1674.

• Chauth and Sardeshmuki were the taxes collected by the Marathas in their neighbouring countries.

Q88. Answer: (b) 9

Shortcut Trick

Number of digits available (n) = 3 (which are 3, 5, 7).

Total positions to fill for a two-digit number = 2.

Since repetition is allowed, total numbers = $n^2 = 3^2 = 9$.

Therefore The correct answer is 9.

Alternate Method

Given: Digits = {3, 5, 7}, Type = Two-digit number, Repetition allowed.

=> Number of ways to fill Tens place = 3 (3, 5, or 7)

=> Number of ways to fill Units place = 3 (3, 5, or 7 since repetition is allowed)

=> Total possible numbers = 3 × 3 = 9

Therefore The correct answer is 9.

Additional Information

Fundamental Principle of Counting

If one event can occur in 'm' ways and a second can occur in 'n' ways, total occurrences = m × n.

Permutation without Repetition

If digits cannot be repeated, the number of ways to form an r-digit number from n digits is ${}^nP_r = n! \div (n-r)!$.

Case of Digit Zero

If '0' is included in the digits, it cannot be placed in the highest place value position (e.g., tens place in a 2-digit number).

Q89. Answer: (a) 20 s

CONCEPT:

• The rate of flow of electric charge is called an electric current.

• Due to the flow of electric current in resistance, there is some heat generated in that resistance. This phenomenon is called the heating effect of current.

• The electric heater generates heat by using the electric current flowing in it.

=> Heat generated (H) = I2 R t = power (P) × time taken (t)

Where I is current, R is resistance and t is the time taken

CALCULATION:

Given: Rated power of bulb (P) = 50 W and Energy consumed by the bulb (E) = 1000 J

• We know that power

=> E = Pt

=> t = E/P = 1000/50 = 20 Sec

• The total time (t) the bulb glows is 20 sec.

Q90. Answer: (c) 11/6

Concept Used:

Calculation:

[{21/3 - (5 + (2 - 3))} + 31/2] = ?

[{21/3 - (5 - 1)} + 31/2] = ?

=> [{7/3 – 4} + 7/2] = ?

=> [-5/3 + 7/2] = ?

=> ? = (-10 + 21)/ 6 = 11/6

Q91. Answer: (d) 8

Shortcut Trick

Identify the smallest difference between any two numbers: 48 − 16 = 32 and 104 − 48 = 56.

The HCF must be a factor of the smallest difference (32).

Factors of 32 are 1, 2, 4, 8, 16, 32. Check the largest factor that divides all given numbers.

16 divides 16 and 48, but not 104 (104 ÷ 16 = 6.5). The next factor is 8.

8 divides 16, 48, and 104 (8 × 2 = 16, 8 × 6 = 48, 8 × 13 = 104).

Therefore The correct answer is 8.

Alternate Method

Given: Numbers are 16, 48, and 104.

Formula Used: Prime Factorization Method for Highest Common Factor (HCF).

=> Prime factors of 16 = 2 × 2 × 2 × 2 = 2^4

=> Prime factors of 48 = 2 × 2 × 2 × 2 × 3 = $2^4 \times 3^1$

=> Prime factors of 104 = 2 × 2 × 2 × 13 = $2^3 \times 13^1$

=> HCF = Product of the lowest power of common prime factors.

=> Common prime factor is 2, and its lowest power is 2^3.

=> HCF = $2^3 = 8$.

Therefore The correct answer is 8.

Additional Information

Definition of HCF

The Highest Common Factor (HCF), also known as GCD, is the greatest number that divides two or more numbers without leaving a remainder.

Long Division Method

Divide the larger number by the smaller number until the remainder is zero; the last divisor is the HCF of those two numbers.

Relation with LCM

For two numbers a and b: HCF(a, b) × LCM(a, b) = a × b.

Q92. Answer: (b) 119

Shortcut Trick

Ratio of Blue balls to Red balls = 36 : 68 = 9 : 17.

Given Blue balls = 63, which is 9 × 7.

Since the ratio is constant, multiply Red balls by the same factor: 17 × 7 = 119.

Therefore The correct answer is 119.

Alternate Method

Given:

Initial Blue balls (B1) = 36

Initial Red balls (R1) = 68

New Blue balls (B2) = 63

Formula Used:

For a constant ratio: B1 ÷ R1 = B2 ÷ R2

Calculations:

=> Ratio = 36 ÷ 68 = 9/17

=> Let the number of red balls be x.

=> 9 / 17 = 63 / x

=> x = (63 × 17) ÷ 9

=> x = 7 × 17

=> x = 119

Therefore The correct answer is 119.

Additional Information

Direct Proportion

Two quantities are in direct proportion if an increase in one leads to a corresponding increase in the other, such that x/y = k.

Ratio Equality

When two ratios a:b and c:d are equal, they are said to be in proportion, written as a:b :: c:d.

Product of Extremes and Means

In any proportion a:b = c:d, the product of the extremes (a × d) is always equal to the product of the means (b × c).

Q93. Answer: (a) 0.03

Symbol	•	×
Meaning	•	÷

Given expression: ((175 + 160) × 50) × 10

After changing the symbols:

((175 - 160) ÷ 50) ÷ 10

= (15 ÷ 50) ÷ 10

= (0.3) ÷ 10

= 0.03

Hence, “0.03” is the correct answer

Q94. Answer: (a) 61 m/s

• The time for the ball returning to the ground after being thrown up (t) = 12.5s

• As we know that Time of ascent is equal to the time of descent.

• Time to taken for ascent (t1) = 12.5/2 => 6.25.

• We know that final velocity of ball at its maximum height (v) = 0

• Acceleration against gravity (g) = -9.81 m/s²

• We know that formula v = u + at

0 = u + (-9.81) (6.25).

u = 61.31 m/s.

The velocity with which the ball was thrown up = 61 m/s.

Q95. Answer: (b) (1, 4)

Shortcut Trick

The point dividing the segment in ratio m : n is the weighted average of the coordinates.

x-coordinate = (2 × 2 + 1 × (−1)) / (2 + 1) = 3 / 3 = 1

y-coordinate = (2 × 6 + 1 × 0) / (2 + 1) = 12 / 3 = 4

Therefore The correct answer is (1, 4).

Alternate Method

Given: A(x1, y1) = (−1, 0), B(x2, y2) = (2, 6), and ratio m : n = 2 : 1.

Formula: The Section Formula for internal division is P(x, y) = [(mx2 + nx1)/(m + n), (my2 + ny1)/(m + n)].

=> x = [2 × 2 + 1 × (−1)] / (2 + 1)

=> x = (4 − 1) / 3 = 3 / 3 = 1

=> y = [2 × 6 + 1 × 0] / (2 + 1)

=> y = 12 / 3 = 4

Therefore The correct answer is (1, 4).

Additional Information

Internal Division Formula

Divides a segment internally in ratio m:n: P = [(mx2 + nx1)/(m + n), (my2 + ny1)/(m + n)].

Q96. Answer: (c) Only conclusion I follows

The statement says that, 100 people work at Ravi's own company so it can be concluded that Ravi is an entrepreneur. The statement dos not say anything about the character f Ravi whethe he is good person or not, so conclusion II is not valid.

Hence, only conclusion I follows.

Q97. Answer: (b) N

The pattern followed here is as follows,

Hence, “N” is the correct answer.

Q98. Answer: (c) 1857

• The First War of Indian Independence was fought in the year 1857.

• It is also known as Indian Sepoy Mutiny of 1857.

• It was called The First War of Indian Independence by V.D Savarkar.

• He authored a book called ‘The History of the War of Indian Independence’ in which he stated his views and announced the mutiny as the First War of Indian Independence.

• Lord Canning (1856-1862) was the Governor-General of India/ Viceroy of India during this revolt.

Q99. Answer: (c) [figure]

We know that a table is a kind of furniture, but we cannot relate ‘camera' with either table or furniture.

Thus, the following Venn diagram is best suitable for the given information:

Hence, the figure in option 3 is the correct answer.

Q100. Answer: (c) Rs. 1440

Shortcut Trick

Marked Price (MP) = Rs. 1600

Discount% = 10%

Multiplier for SP = (100 − 10) ÷ 100 = 0.9

Selling Price (SP) = 1600 × 0.9 = 1440

Therefore The correct answer is Rs. 1440.

Alternate Method

Given: Marked Price = Rs. 1600, Discount Rate = 10%

Formulas: Discount = MP × (Discount% ÷ 100) | SP = MP − Discount

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=> Discount = 1600 × (10 ÷ 100) = Rs. 160
=> Selling Price (SP) = 1600 − 160
=> Selling Price (SP) = Rs. 1440
Therefore The correct answer is Rs. 1440.
Additional Information
Marked Price (MP)
The price printed on an item or the label price is called the Marked Price. Discounts are always calculated on this value.
Selling Price (SP)
The actual price at which the item is sold to the customer after deducting the discount from the MP.

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